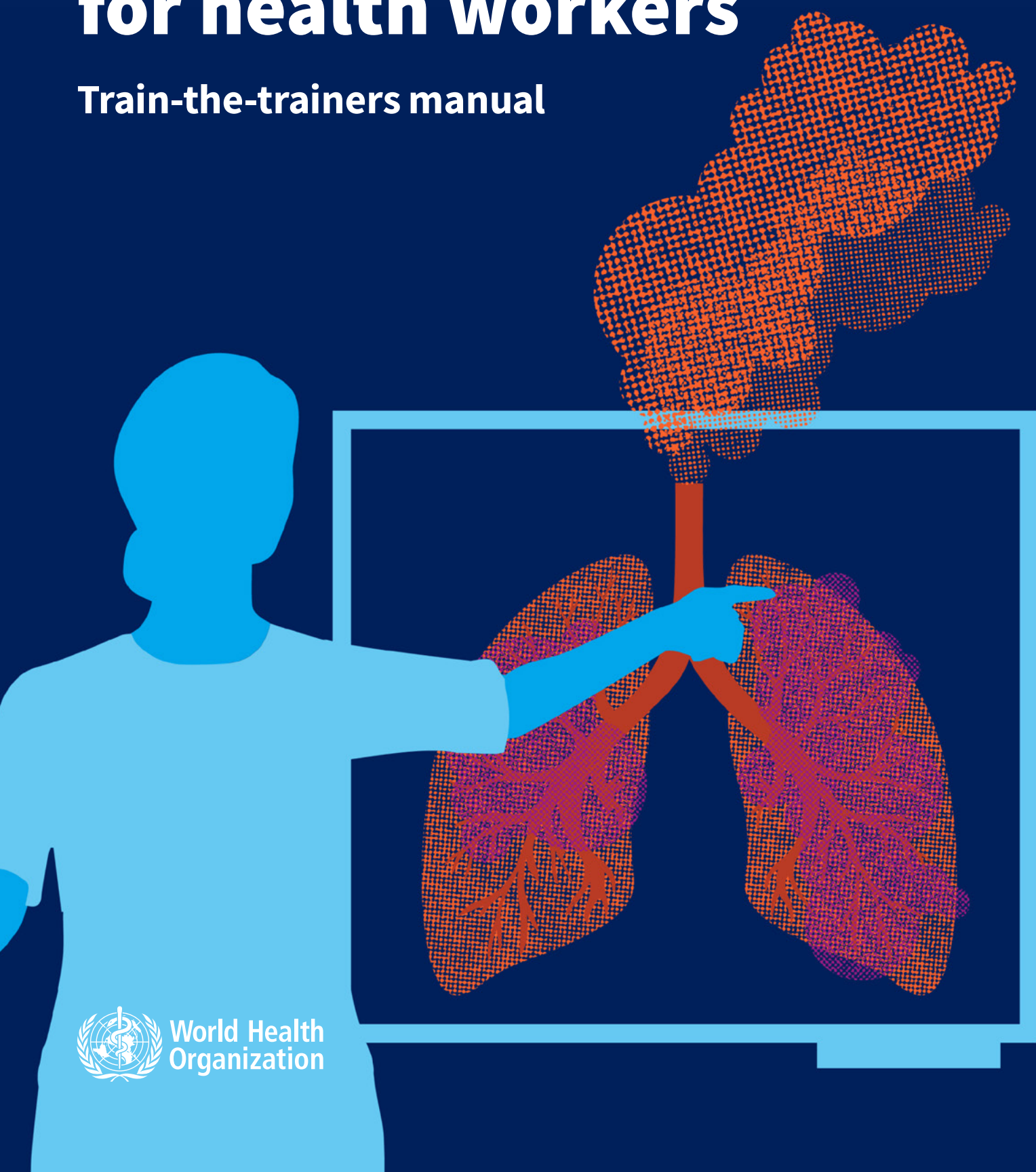


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# Air pollution and health training toolkit for health workers

Train-the-trainers manual



World Health  
Organization



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Organization**

Air pollution and health training toolkit for health workers: train-the-trainers manual

ISBN 978-92-4-009458-1 (electronic version)

ISBN 978-92-4-009459-8 (print version)

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# Foreword

It wasn't until after my daughter Ella passed away that I found out what had triggered her severe and debilitating asthma attacks. Air pollution, spewed from the diesel and petrol vehicles clogging the South Circular Road near our home, and all over our London Borough of Lewisham.

In December 2020, nearly 8 years after Ella's untimely death at the age of 9, a coroner finally confirmed it – illegal levels of air pollution from the South Circular traffic had been a significant contributing factor to Ella's severe asthma. If it wasn't for the high levels of air pollution, not only would Ella not have got asthma, she would not have died on that fatal night.



© Richard Maidment

Rosamund Adoo-Kissi-Debrah, Founder of the Ella Roberta Foundation

As a result, Ella is now the only person in the world to have “air pollution” listed as a cause of death on her death certificate.

Ella was under the care of five hospitals during her illness. I could see it on the faces of the nurses and doctors who saw us coming in repeatedly: they were alarmed by the severity of her asthma attacks, and trying hard to keep my daughter alive and breathing.

Yet, not one medical professional ever mentioned the potential role of air pollution in Ella's illness. That wasn't for lack of care, but for lack of education and training about the impacts of toxic air on human health.

We know a lot more about the effects of air pollution exposure now than we did 10 years ago. We know that it is linked to 6.7 million deaths per year worldwide. We know that it seeps into every organ of the body, and can cause problems including asthma, lung and heart diseases, cancer, poor cognitive development, dementia, depression, low birth weight and premature birth.

The coroner who reviewed Ella's case acknowledged this shortfall in medical education in the Prevention of Future Deaths report he published in April 2021, in which he identified three key changes that could be made to prevent deaths like Ella's in the future. His report is focused on the United Kingdom of Great Britain and Northern Ireland, but the three changes can and should be applied worldwide.

First, set binding air quality standards in line with the World Health Organization (WHO) global air quality guidelines. As the coroner made clear, no amount of air pollution is safe to breathe, but following the WHO guidelines will reduce the number of premature deaths considerably.

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Second, raise public awareness by expanding air pollution monitoring and making the information easily accessible and understandable. We need to help people make informed decisions about their routes to school drop-offs and work, where they choose to buy a house, and where they let their children play outdoors.

Third, educate medical professionals to spot the potential effects of air pollution exposure, and speak to patients and their carers about it. This should apply across the medical field, from colleges to professional training bodies.

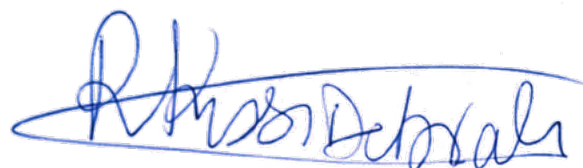
I have welcomed the recent positive developments, with leaders from across the medical education and training fields now discussing ways to increase awareness of air pollution in their professions. The public trust their doctors, and doctors must use this opportunity to educate their patients.

Today, more than 10 years after Ella's death, air pollution is still everywhere. 99% of the world breathes air that exceeds levels recommended in the WHO global air quality guidelines – from traffic, from fossil fuel-fired power plants, from wood burning and other sources. There has been a lack of political will all over the globe to phase out fossil fuels and adopt renewable energy, and what this is costing in terms of human lives and health is catastrophic.

While we must pressure governments to step up and protect our human right to breathe clean air, we also need health workers to help raise awareness about the health impacts of air pollution, and how to reduce exposure.

I welcome WHO's work in building the capacity of health professionals to understand the health risks from air pollution exposure, to communicate risk reduction measures with patients and communities as well as to advocate for clean air and healthy environments. This training manual – part of the WHO Air Pollution and Health Training toolkit for health workers (APHT) is a great achievement and a resource that all health professionals can use to educate themselves and others.

Health workers have an important role to play in the battle for clean air; let's support them to make sure fewer people need to go through what Ella went through and dramatically reduce the human cost of air pollution.



*Rosamund Adoo-Kissi-Debrah*  
*CBE, BreatheLife Voice and Founder of the Ella Roberta Family Foundation*

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# Acknowledgements

This manual was developed by Nita Chaudhuri (WHO consultant), Samantha Pegoraro (Department of Climate Change, Environment and Health, WHO) and Josselyn Mothe (Department of Climate Change, Environment and Health, WHO), under the overall supervision of Heather Adair-Rohani (Department of Climate Change, Environment and Health, WHO).

Valuable technical comments and reviews were also provided by Alan Abelsohn (World Organization of Family Doctors); George Atiim (WHO Country Office for Ghana, Accra, Ghana); Omnia El Omrani (International Federation of Medical Students' Association); Sophie Gummy (Department of Climate Change, Environment and Health, WHO); Joel Kaushansky (Health Canada); Jessica Lewis (Department of Climate Change, Environment and Health, WHO); Jonathan Mensah (Ghana Health Service); Pierpaolo Mudu (WHO European Centre for Environment and Health, Bonn, Germany); Abraham Mwaura (Department of Climate Change, Environment and Health, WHO); Carl Osei (Ghana Health Service); Ben Benasco Sackey (WHO consultant); Kerolyn Shairsingh (WHO consultant); Paul Safar (WHO consultant); Yassen Tcholakov (World Medical Association) and Tseng Tsu Wei (WHO consultant).

The clinical case scenario on low respiratory tract infections in Sri Lanka was written by Sumal Nandasena (Ministry of Health, Sri Lanka) and reviewed by Nita Chaudhuri; Alejandro Jesus Estevez (Instituto Nacional de Salud Pública, Mexico); Paolo Lauriola (International Society of Doctors for the Environment); Kari Nadeau (Stanford University) and Samantha Pegoraro.

Development of the publication was coordinated by Samantha Pegoraro and Sophie Gummy.

Production of the publication was made possible thanks to financial support from the governments of Canada, Norway and Spain, and the Climate and Clean Air Coalition (CCAC).

WHO is also grateful to all the participants of the pilot workshops of the Air Pollution and Health Training toolkit for health workers (APHT) held in Kumasi, Ghana, in June 2022 and in Kigali District, Rwanda, in June 2024 for their enthusiasm, motivation and valuable feedback on this product.

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# Abbreviations and acronyms

<b>APHT</b>	Air Pollution and Health Training
<b>CCAC</b>	Climate and Clean Air Coalition
<b>CHW</b>	community health worker
<b>LCS</b>	low-cost sensor
<b>LMICs</b>	low- and middle-income countries
<b>LPG</b>	liquified petroleum gas
<b>NCD</b>	noncommunicable disease
<b>NGO</b>	nongovernmental organization
<b>PBL</b>	problem-based learning
<b>PM</b>	particulate matter
<b>SLCPs</b>	short-lived climate pollutants
<b>SMART</b>	specific, measurable, attainable, realistic, time-bound
<b>TtT</b>	train-the-trainer
<b>WHO</b>	World Health Organization

---

# Glossary

**Capacity building:** The process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt and thrive. An essential ingredient in capacity building is transformation, which is generated and sustained over time from within.<sup>1</sup>

**Community health workers (CHWs):** Health care providers who live in the community they serve, and receive lower levels of formal education and training than professional health care workers such as doctors, nurses and midwives.<sup>2</sup> This group of health care workers has enormous potential to extend health care services to vulnerable populations, such as communities living in remote areas and historically marginalized people, to meet unmet health needs in a culturally appropriate manner, improve access to services, address inequities in health status, and improve health system performance and efficiency.

**Evaluation:** For the APHT toolkit, evaluations can take two forms. First, evaluation is used for systematic and objective assessment of the skills, knowledge and competencies of the trainees before and/or after training. Secondly, evaluation is used to assess the relevance, effectiveness, efficiency, impact and sustainability of a training (how it went). In both cases, evaluation can also address specific issues (quiz on a specific part of a module that proved difficult for the trainees) or part of the training (relevance of specific clinical case scenarios, content of the slides). This can provide valuable information on adapting and improving the materials.

**Health workers:** Health workers are all paid workers employed in organizations or institutions whose primary intent is to improve health, as well as those whose personal actions are primarily intended to improve health but who work for other types of organizations.<sup>3</sup>

**Interactive sessions:** A set of interrelated actions where trainees work together with the purpose of acquiring or strengthening new skills and knowledge. For the APHT toolkit, interactive sessions are those sessions where trainees work together.

**Public health professionals:** All workers, with or without a medical background, whose job is related to serving the population in attaining the best health possible. In the case of this training toolkit, they are not working at an individual level (as clinicians do) but at a population level, being involved in fields such as epidemiology, clinical research, environmental health, public health policy and health management, at both national and local levels.

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<sup>1</sup> Capacity-building [webpage]. United Nations; 2024 (<https://www.un.org/en/academic-impact/capacity-building>).

<sup>2</sup> What do we know about community health workers? A systematic review of existing reviews. Human Resources for Health Observer Series 19. Geneva: World Health Organization; 2021 (<https://www.who.int/publications/i/item/what-do-we-know-about-community-health-workers-a-systematic-review-of-existing-reviews>).

<sup>3</sup> The world health report: 2006: working together for health. Geneva: World Health Organization; 2006 (<https://apps.who.int/iris/handle/10665/43432>).



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**SMART objectives:** Objectives that are Specific, Measurable, Attainable, Realistic and Time-bound.

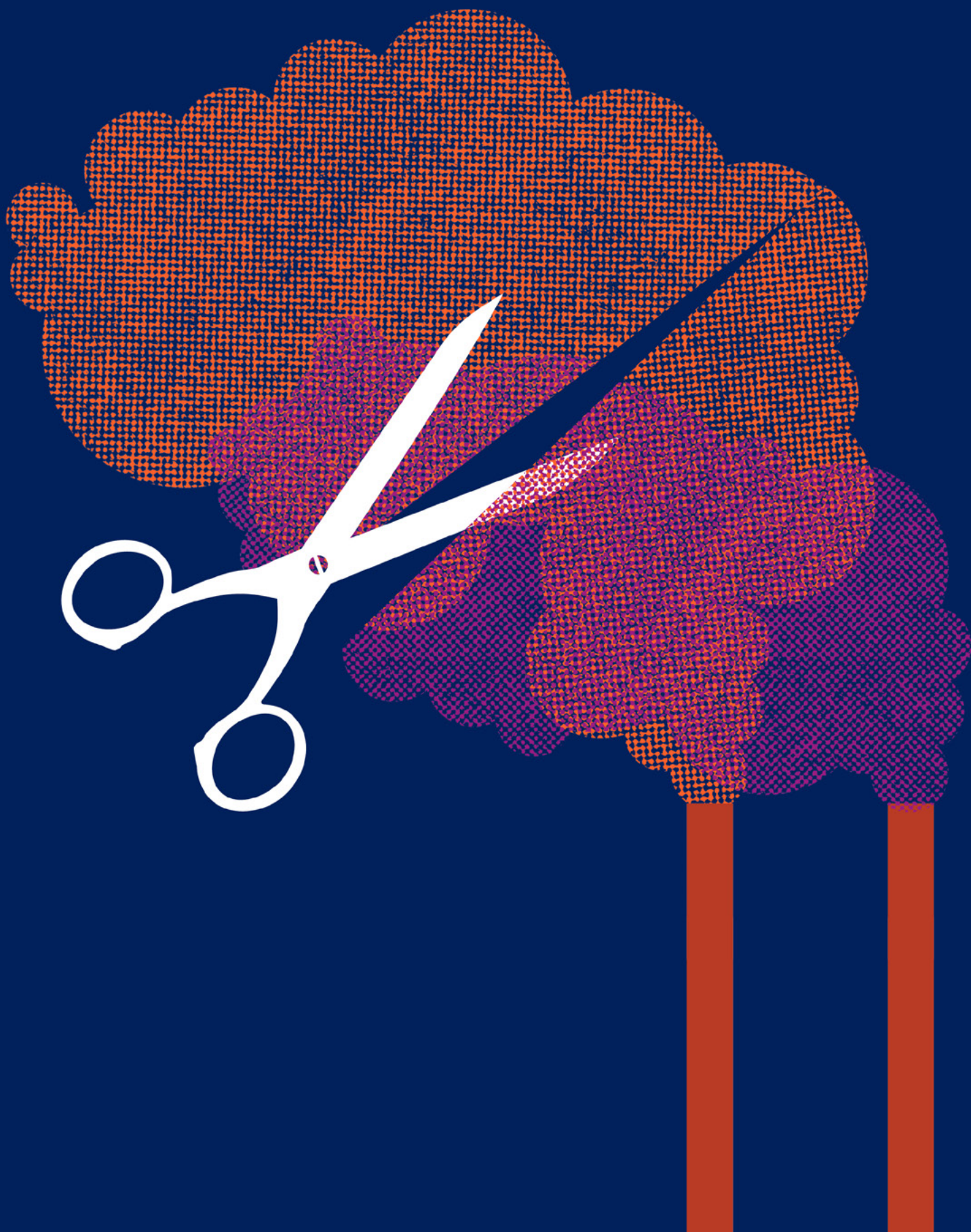
**Toolkit:** A set of specific products such as training modules, training manual, tools and communication materials ready to use, that are put together in a consistent and organized manner.

**Trainee:** The individual taking part in a training programme.

**Trainer:** The individual delivering the training.

**Training module:** A set of slides covering an air pollution and health topic. Each module is designed to provide a 1-hour lecture. As the scientific backbone of the curriculum, each module contains the respective learning objective(s), comprehensive text notes, key messages, bibliography, as well as case studies, where appropriate. Modules can be adapted to local or specific context and needs.

# Introduction





Air pollution is the most important environmental determinant of health. In 2019, exposure to household and ambient air pollution is estimated to have caused 6.7 million deaths globally, mostly from noncommunicable diseases (NCDs) such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease and lung cancer, but also from acute lower respiratory tract infections such as pneumonia (1). Further, a growing and consistent body of evidence shows that additional air pollution health effects include preterm and low birth weight, exacerbation and onset of asthma, as well as cognitive and neurological impairment.

In a world where 99% of people breathe unsafe levels of polluted air, this environmental threat is a risk for everybody. However, the most vulnerable and susceptible populations pay the highest price of air pollutant exposure: older people, children, pregnant women, people with chronic health conditions, and those from a low socioeconomic status. Thus, these individuals and those who are active or work outdoors, or live near industrial zones or busy, polluted roads are disproportionately impacted.

Regions and countries differ widely in their burden of air pollution. Globally, low- and middle-income countries (LMICs) still experience greater exposure to unhealthy levels of particulate matter (PM) compared with the global average, where the air quality in fewer than 1% of cities complies with recommended thresholds for PM<sup>2.5</sup> or PM<sup>10</sup> (particulate matter of diameter  $\leq 2.5$  mm or 10 mm, respectively) set by WHO (2). This perpetuates the unequal global distribution of risk factors, health and wealth.

A reduction in air pollution emissions is a “win–win” opportunity to simultaneously protect human health and the environment and to address the complex challenge of climate change, as the combustion of fossil fuels contributes to increasing the levels of some air pollutants. In addition to a number of interventions that can take place in sectors like transportation, urban planning, power generation and industry to reduce air pollution, building the capacity of the health sector and workforce on air pollution and health is essential to reduce the burden of disease.

The international community recognized that the health sector should play a more prominent role in the battle for clean air (2,3). World Health Assembly resolutions WHA68.8: “Health and the environment: addressing the health impact of air pollution” (4) and A69/18: “Road map for an enhanced global response to the adverse health effects of air pollution” (5) request WHO to strengthen the capacity of the health sector to address the adverse health effects of air pollution and highlight the pivotal role of health workers in boosting advocacy and political action for clean air.

Yet, while progress has been made in recent times, air pollution is not sufficiently addressed in health curricula and clinical guidelines (6–8). WHO has extensively reviewed existing training opportunities on air pollution and health, although most of these only apply to high-income countries (9).



**A reduction in air pollution emissions is a “win–win” opportunity to simultaneously protect human health and the environment and to address the complex challenge of climate change**



The APHT toolkit for health workers is a comprehensive set of training materials exploring different air pollution and health topics and reflecting global and regional challenges that can serve different types of audiences while taking into account the variety of roles within the health sector. It aims to provide health workers with the knowledge and tools necessary to understand and address the health effects of air pollution and mitigate risks by effectively engaging with patients, individuals and communities, while advocating for clean air interventions. APHT was built around the concept of train-the-trainer (TtT), which means trainees are enabled to become trainers and educate peers and communities.

The APHT toolkit was pilot tested in different fora and settings including in-person workshops held in Ghana in 2022 and in Rwanda in 2024, allowing participants to engage in comprehensive, distributive learning of knowledge and skills, enabling them to effectively train others. Key health professionals were invited to join a series of events to pilot the training materials and actively contribute to the finalization of the toolkit elements (10).

Equipping health workers with strengthened or new knowledge and skills on air pollution is critical to fostering individual and community awareness, inspiring effective clean air policy actions, and safeguarding against the adverse health effects of air pollution.



# How to use this manual

This TtT manual is a guidebook designed to help trainers deliver trainings using the APHT toolkit for health workers (11). It provides practical suggestions and insights on how to leverage all the content and make best use of the toolkit materials.

This manual is divided into three main sections. **Section 1** explores the TtT approach and introduces the principles of peer education. It entails pedagogical guidance to complement the content of the toolkit, including tips to improve the delivery of the training, such as effectively engaging your audience. **Section 2** delves into the practical and logistical aspects related to the organization of air pollution and health training or workshops, whether online or in-person. **Section 3** provides an overview of the key elements included in the training toolkit, including how to use the modules and a comprehensive list of interactive sessions to include in workshop agendas. The annexes include useful tools and templates to help in organizing events.

The trainers are:

- individuals who will be delivering trainings using this material;
- individuals involved in supporting delivery of trainings; and
- individuals involved in designing training courses and adapting the training toolkit for delivery at local, national or regional levels.

See also **Section 2**: Establishing an organizing team.

While this manual has been developed based on extensive feedback and expert consultation, it will need to be adapted to each setting based on cultural context and feasibility.

The APHT toolkit is for on-the-ground testing and WHO welcomes additional peer review and feedback. If you do use the training materials, please send in your feedback to:

[aqh\\_training@who.int](mailto:aqh_training@who.int)





# What's in this manual

This interactive page is a quick map of the manual sections.



Click on the arrows to go straight to the section that interests you.



From anywhere in the manual you can click on the home button to come back to this page.

## The basis

*Theoretical background:  
how to become a trainer*

- Peer education approach
- Delivering training to adults: characteristics and features
- Ten tips to be an effective trainee

Jump to Section 1

## The organization

*Guidance on how to organize  
a training from A to Z*

- Principles of organizing a training: project management, definition of the audience, fundraising, advertisement, etc.
- How to organize an in-person training session
- How to organize an online training

Jump to Section 2

## The contents

*Guidance on how to use the training modules and  
make it captivating and impactful*

- How to present slides effectively
- How to use the notes in the slide deck
- Strategy to engage with your audience

Jump to Section 3

*Interactive sessions to complement and enrich the  
learners' experience*

Introductory activities

Problem-based learning activities

## Communication

- Video materials: let's hear about from the experts
- The BreatheLife campaign
- Infographics

Jump to materials

## Resources

- Do not forget to check samples and template documents in the annexes!

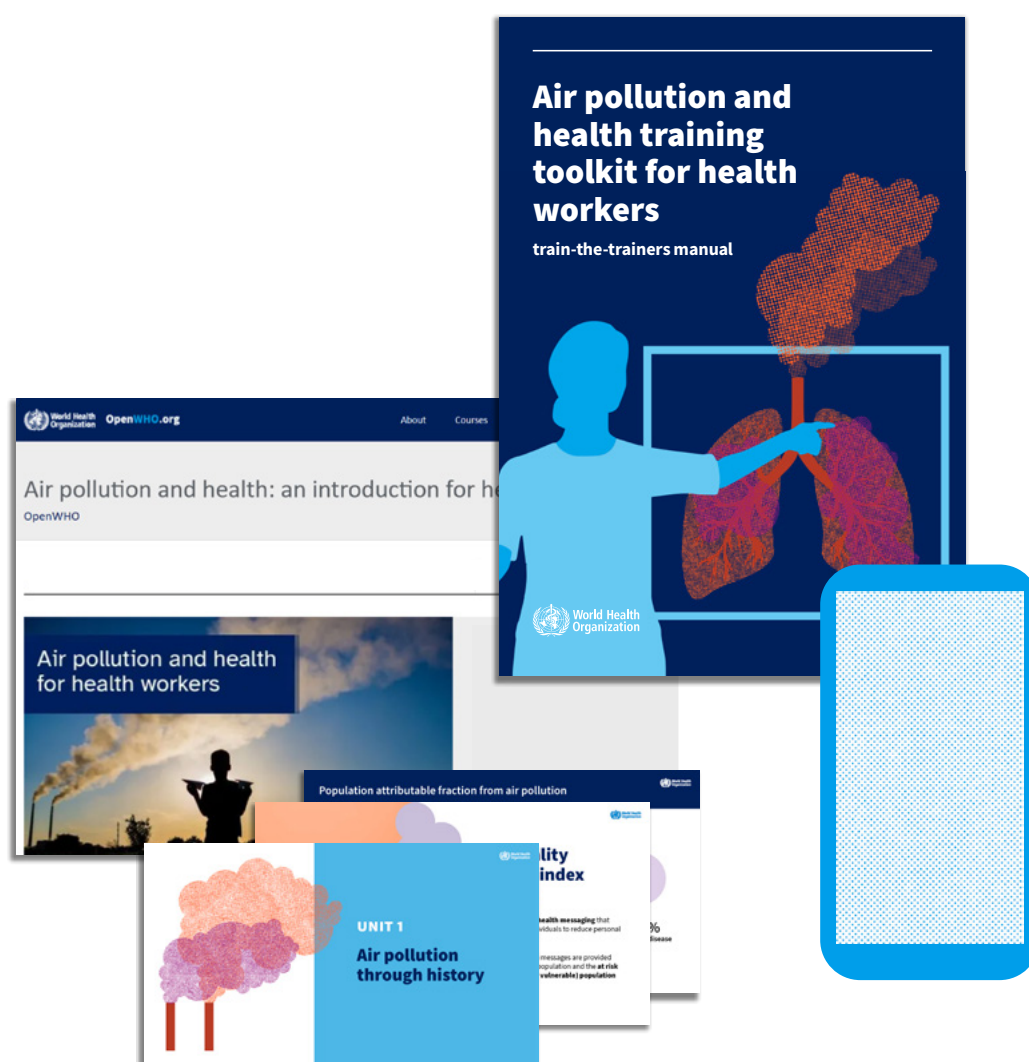
Jump to annexes



# About the toolkit

The toolkit comprises:

- training modules – slide decks with detailed text notes including references
- TtT manual (this manual)
- clinical case scenarios on air pollution
- online course
- communication and outreach materials.



## Key learning objectives of the toolkit

- Describe the main air pollutants and their sources.
- Describe how humans are exposed to air pollutants.
- Explain the main health effects of air pollution and the pathological mechanisms through which air pollutants undermine people's health.





- Recognize the health benefits of both ambient and household air pollution interventions at the public, household and individual level.
- Understand the leading role health workers can play in addressing air pollution and health with individuals, patients and communities.
- Understand the key challenges and solutions on air pollution and health in the different WHO regions and globally.

### **Overall expected outcomes of the toolkit**

- Integrate good practice advice on preventive measures to reduce exposure to ambient and household air pollution for individuals into daily practice.
- Engage within and beyond the health sector to raise awareness and advocate for clean air at the local, national and global level.
- Train and educate peers, patients and the community.
- Learn how to become a trainer and organize air pollution- and health-related activities.

### **Target audience**

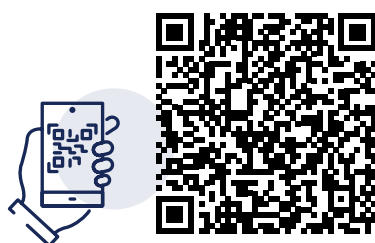
#### **Caregivers such as:**

- o doctors
- o medical and health care students
- o nurses
- o midwives
- o community health workers.

#### **Public health professionals such as:**

- o epidemiologists
- o managers of health care facilities
- o district health officers
- o environmental health officers
- o researchers and academics
- o other relevant professionals working at population level.

### **Download the training material**



All material can be downloaded from the APHT toolkit website: <https://www.who.int/tools/air-pollution-and-health-training-toolkit-for-health-workers>

# Section 1

## The basis





# Train-the-trainer approach or how to become a trainer

## At the end of this section, you will:

- Gain an understanding of a peer education approach in delivery of knowledge and learning for adults.
- Learn how to tailor learning to address learners' needs, for example, based on local context.
- Develop skills and resources to deliver trainings.

The TtT model enables workshop and training participants with specific skills to become trainers and disseminate knowledge among peers and individuals. Through this process a trainee learns evidence-based content, engages in learning with the trainer, completes several exercises and then practises teaching segments to other participants (12).

Globally, for air pollution and health education, this approach ensures scaling up and dissemination of knowledge at country, regional and local level, ensuring the long-term sustainability of the programme.

## What is peer education?

Peer education has been used effectively in medical and health education and for lifelong learning and continuous education of health workers (see Box 1).





### Box 1. A brief history of peer education

Peer education has a long history (13). Peer tutoring and learning was first conceptualized by Andrew Bell in the 18th century, although its origins dates back centuries and some authors trace it back to the Ancient Greeks (14). It was coined by Bell as the “mutual method”, following his observations in 1789 in the orphanage he managed in India and later experiments upon returning to England. This mutual tuition was built on the idea of a student serving as tutor for another classmate. Around the same time, another British educationalist, Joseph Lancaster, implemented a similar methodology, called the “monitorial system” in his school where some students were selected to supervise other students (15).

The peer-assisted learning or peer education and learning describes a collaborative and cooperative teaching and learning strategy where learners are active equal partners, students are self-directed, share in interventions and actively participate in discussions and feedback. The pedagogical origins of this teaching and learning strategy lie with theorists such as Piaget and Perry, who espoused the virtues of social interaction, collaboration and non-evaluation as essential elements to the construction of knowledge (13).

Teaching is a powerful instrument in the learning process. According to the 18th-century French writer Joseph Joubert, “to teach is to learn twice” (16). Through peer education, the teacher-learner duality and dynamic improves learning for all.

Peer education has been widely used in higher education and the evidence of the effectiveness of certain types of peer teaching have been documented (14,17). In the area of health care, peer education has been used widely and proven beneficial in HIV prevention among specific groups including young people, sex workers, people who practise unprotected sex, and intravenous drug users. Peer education has been also used for harm reduction for drug users, as in tobacco and alcohol misuse. Finally, more recently, peer education has been used in medical training for doctors in areas such as drug prescription (18–20).

The cornerstone of peer education is the common ground and similar knowledge base that exists between the trainer and the learner.

However, preparation for training demands reflection and constant assimilation of new information into existing knowledge. The trainer, therefore, is encouraged to:

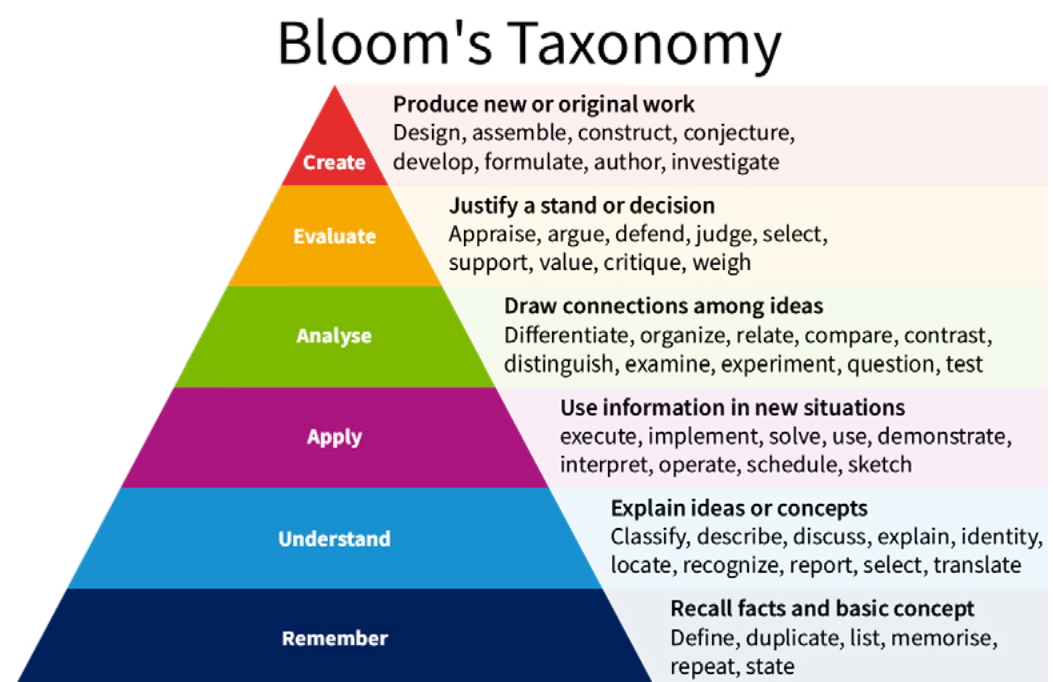
- Have a strong understanding and internalize the information and concepts included in the modules prior to leading a training.
- Understand how the knowledge can be applied in a real-life setting.
- Simplify, clarify and exemplify the knowledge to trainees.

## Taxonomy of educational objectives

In 1956, Benjamin Bloom and his collaborators developed the Taxonomy of Educational Objectives (21), a framework that describes learning goals which stands as a key pillar of the pedagogical approach this manual pursues (see Fig. 1).

The framework, elaborated by Bloom and adapted in 2001 (22,23), presents six major categories: Remember, Understand, Apply, Analyse, Evaluate and Create. The use of verbs as main categories describes actionable words involved in the cognitive process by which learners go from knowledge acquisition to putting new skills and abilities into practice.

Fig. 1.  
Bloom's taxonomy



Source: Armstrong P (2010), Bloom's taxonomy (<https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>) (23).

## Constructivist model to training: building on existing knowledge

The constructivist theory of learning, which holds that the act of learning is based on a process, integrating new information into the pre-existing knowledge of health care workers (24). Any knowledge trainees may have already acquired based on their experience is therefore elevated and built upon via the trainer's role of facilitator and guide.

## Problem-based learning

Problem-based learning (PBL) activities are provided to promote critical thinking skills, problem-solving abilities and communication skills. It is a training method where complex real-world problems are used as an instrument to promote the learning of concepts and principles as well as applying such concepts in specific settings or scenarios (25). In the





context of the APHT toolkit, PBL can take place through looking at real-life air pollution and health situations presented or raised by the trainee(s) or trainer. Such situations provide an important opportunity for peer-to-peer learning and problem-solving to apply the knowledge presented in the training modules. A full set of PBL activities is presented in **Section 3** of this manual.

## Action-reflection learning

Action-reflection learning is a practice where learning is conducted through reflections by the trainee on past, present and future actions, and through solving real-life cases (26). The three dimensions of the approach are laid out in Table 1.

**Table 1.**  
Action-reflection levels

Type	What is it	Relevant interactive activities presented in this manual
<b>1. Reflection in action</b>	Thinking about something that is happening.  The objective is to think about what to do next to take action straight away.	<ul style="list-style-type: none"> <li>Air pollution and health stories (<b>Activity 2.1</b>)</li> <li>Air quality awareness – using low-cost sensors (<b>Activity 2.5</b>)</li> <li>Field visit (<b>Activity 2.6</b>)</li> <li>Air pollution and health clinical case scenarios (<b>Activity 2.7</b>)</li> </ul>
<b>2. Reflection on action</b>	Thinking about something that happened.  The objective is to think about how and why to take action differently next time.	<ul style="list-style-type: none"> <li>Photo story (<b>Activity 2.2</b>)</li> <li>eScience café: bring in the experts (<b>Activity 2.3</b>)</li> <li>Air pollution intervention case studies from journalistic sources or reports (<b>Activity 2.4</b>)</li> </ul>
<b>3. Reflection for action</b>	Thinking about what will need to happen.  The objective is to plan action for the future.	<ul style="list-style-type: none"> <li>Advocacy strategy development (<b>Activity 2.8</b>)</li> <li>Simulation on drafting an air pollution and health action plan (<b>Activity 2.9</b>)</li> <li>Personal action plan for clean air (<b>Activity 2.10</b>)</li> <li>Country or regional action planning for clean air (<b>Activity 2.11</b>)</li> <li>Train-the-trainer session (<b>Activity 2.12</b>)</li> </ul>

Source: Adapted from Schön (1992)(26).

Considering the audience for this training, trainers must apply the principles of adult learning (12,27) (see Box 2).



## Box 2. Principles of adult learning

### Adults are...

#### Relevancy oriented

- Trainees need to know why the training matters to them.
- Trainers must identify clear objectives before the training begins and relate theories and concepts that are applicable to trainees' work or other responsibilities they value.

#### Goal oriented

- Trainees need to see how the training will help them achieve their goals, whether professional or personal.
- Trainers must show how training modules and toolkit activities relate to their goals early in the process.

#### Practical

- Trainees need a chance to see how the knowledge gained is practical and have the opportunity to practise their skills in training sessions.
- Trainers must make knowledge relevant for practical application not just for the sake of acquiring knowledge.
- Trainees learn better when they are engaged with a variety of techniques beyond lecturing.

#### Autonomous and prefer to be self-directed

- Trainees are self-motivated and can lead their learning process.
- Trainers must actively involve trainees in the learning process and serve as facilitators or coaches.

#### Full of life experiences and knowledge

- Trainees want to share their perspectives and experiences.
- Trainers need to encourage trainees to share their knowledge/experience so as to allow them to connect what is learned with their own real-world examples.

Source: Adapted from Knowles et al. (2011); CDC (2019) (12,27).





## The four essential elements of the training and learning process

The four essential elements of learning that every trainer must address in the preparation and delivery of the material are **motivation**, **reinforcement**, **retention** and **transference** (28,29).

### Motivation

A relationship must be established with a trainee that is friendly, open and supportive. The importance of the learning process should also be stressed while the level of difficulty should be high enough to be challenging, but not so high that the participants are frustrated or overwhelmed. Based on **action-reflection exercises** trainers can assess whether the trainees are grasping the material and adjust the level of difficulty if needed.

### Reinforcement

Trainees need specific and constructive feedback, mentorship and demonstration of the benefits of learning as well as positive reinforcement telling them what they have done well.

### Retention

Trainees are more likely to retain information if a meaning or purpose is implicitly or explicitly mentioned. To help retain knowledge, application to personal life or work should be incorporated into the training. Links should be made between both trainers' and trainees' experiences related to the training content. Exercises that allow learners to practise during learning enhance retention. The interactive activities in Section 3 also support information retention.

### Transference

Transferring knowledge from the trainer to the trainees is an important aspect of the learning process. One should consider that:

- **Trainees can easily associate new information with something they already know.** For example, health workers are aware that tobacco smoke was not considered harmful to human health for a long time. They may therefore relate this to the underappreciation of the health risk associated with air pollution exposure.
- **Trainees see that the information provided is extremely beneficial for their daily practice.** For example, knowing about air pollution helps in the design of specific public health interventions, as well as understand which prevention and individual exposure risk reduction messages should be delivered to patients, individuals and communities.
- **Trainees feel they are learning something new.** For example, learning about air pollution and its impacts on NCDs such as cardiovascular and chronic respiratory diseases or lung cancer provides new understanding about air pollution being a risk factor for these well-known diseases.



## Ten tips for an effective trainer

### 1. Identify your role!

Trainers are likely to play different roles during a workshop or training event, depending on the assessment of the learners and the amount of content and direction required to achieve the training outcomes (30) (see Table 2). If the material is very new, learners may need more direction to understand and master the contents. On the other hand, facilitating discussions by drawing on trainees' knowledge and experience is paramount.

**Table 2.**  
Different roles of  
being a trainer

<b>Facilitator</b> <ul style="list-style-type: none"><li>• Provides guidance although not involved in the process</li><li>• Helps trainees gain knowledge from experience and each other</li></ul>	<b>Coach</b> <ul style="list-style-type: none"><li>• Provides guidelines, help and direction</li><li>• Watches from the sidelines</li><li>• Observes, practises and gives corrective feedback</li></ul>
<b>Expert</b> <ul style="list-style-type: none"><li>• Acts as an adviser</li><li>• Provides subject matter expertise</li></ul>	<b>Instructor</b> <ul style="list-style-type: none"><li>• Provides detailed direction, foundational material and structured learning events for learners to master a topic</li></ul>

Source: Adapted from McArdle GEH (2015), *Training design and delivery: a guide for every trainer, training manager, and occasional trainer* ATD Press (30).

### 2. Plan in advance

Effective training is based on hours of preparation. Therefore, it is important that you take the time to plan. The recommended preparation time is 3 hours for every hour of training. The planning should cover the following aspects: overall structure of the training, reflection on how to deliver the course, further study of the material including diving into the references available, selection and development of the specific activities in addition to delivering the set of training modules, adapting the materials to local or national context, adapting the slide deck or building new slides, etc.

### 3. Learn and study the material

Understanding and being familiar with the training materials is certainly essential. The training modules element of the APHT toolkit already contain precise text notes to guide the delivery of content and key theoretical concepts. However, making your own notes on what you would like to focus on is also very important as this will facilitate a smooth delivery and increase your ability to answer questions.

### 4. Establish confidence

To boost your performance as a confident trainer, you can use the following tips to demonstrate your credibility and minimize your stage fright.



### Demonstrate your credibility

- Be honest – if you don't know the answer to a question don't make one up.
- Make your presentation as balanced and free from explicit bias as possible. Be honest and explain your reasoning if there is any explicit bias and acknowledge that implicit bias is also possible.
- Invite questions and ask trainees questions about the information presented to make sure that they have contextualized it.
- Support the information with facts and experiences.
- Be a good listener to other people's stories.
- Cite credible authorities and experts.

### Minimize your stage fright

- Remember: you know the material!
- Practise before the big day by rehearsing the training module(s) presentations.
- Prepare all the logistical materials needed beforehand.
- Know the training room and your equipment, test the microphones, test the audio-visual systems, where appropriate.
- Know who the participants are going to be, if possible (e.g. occupation, organization, geographical origin, education background, etc.).
- Rest and eat well!

## 5. Boost your listening skills

Listening is a crucial part of being a trainer. It is important to remember to:

- Maintain eye contact.
- Limit judgements.
- Do not interrupt.
- Wait for a pause before asking questions or comments.
- Empathize with the audience.
- Pay attention to nonverbal cues such as facial expression and posture.

## 6. Facilitate discussion

At times you will facilitate and steer discussion in order to encourage trainees with questions, ideas and share experiences relating to air pollution and health. It is important to be balanced between facilitating and leading the discussion. A major difference between leading and facilitating is that a leader often tells while a facilitator always asks.

## 7. Utilize and stimulate all the senses

Mental activity is stimulated using our five senses. Research suggests that sight and hearing contribute most to the learning process, but touch, smell and taste also play a role (31). These senses interact with one another enhancing our power of awareness. Combining as many senses as possible during training will, therefore, stimulate better knowledge acquisition and retention for all types of trainees. Multisensory learning is particularly interesting in the context of air pollution. For example, field trips to visit



hotspots (see **Activity 2.6**) allow participants to see and directly witness sources of exposure, as well as smell air pollution.

## 8. Be prepared for changes

Although detailed planning ahead is essential to ensure a training goes smoothly, be prepared for changes when the training day comes. This may include changes to the content, timing and logistics. Regardless of how much change and re-designing you need to implement, keep your goal in mind. Keeping a focus on it will ensure that the content and flow of the training are appropriate.

## 9. Ask and answer questions

### Asking questions

Asking questions stimulates deep reflection about air pollution and health topics that trainees are presented with and helps with retention of the information.

- Ask clear and concise questions, one topic at a time, to retain focus.
- Use open-ended questions that encourage answers beyond “yes” or “no” to open learning conversation.
- Prompting or providing examples of questions can be useful to initiate the conversation and stimulate responses but should not be overused so as not to discourage original ideas and critical thinking by trainees.
- Use questions that ask trainees about their professional experiences.
- Listen reflectively and actively to the question. This builds consensus and understanding in a group.
- Don’t be afraid of an absence of questions: it can sometimes take a while. You can use the following prompting statement to foster discussion: “We are only here to share thoughts”, “Are there any aspects of the question that are not clear?” Try not to shame your trainees by saying “Nobody has any questions?”, as this may emphasize the silence.



### Box 3. Examples of general questions about air pollution

- How has poor air quality affected the lives of your patients or people in your community?
- How do you assess potential air pollution exposure as a cause of symptoms in your patients?
- Do you remember particular days or episodes of high levels of air pollution that you could smell and see that prevented you from doing outdoor activities? Please describe.
- Have you had any discussions with other colleagues on air pollution? What did you speak about?



### Answering questions

A good practice is to establish the ground rules at the beginning of a training. The trainer may decide to allow trainees to take the floor anytime or during a dedicated Questions & Answers session.

- If you don't know the answer, don't make it up. Ask the group or say you will research it and get back to them.
- Break down a difficult question into manageable parts and be precise by providing an answer with all the details.
- If you don't want to answer a question or the answer would take too much time out of the planned agenda for the session, say so and suggest meeting with the person after the session.
- Keep track of the questions, if feasible.

### 10. Have fun!

Although knowledge acquisition and application are important, having fun and appropriate humour will make the training more enjoyable and impactful!



# **Section 2**

## The organization





# Organizing and delivering an air pollution and health training

## At the end of this section, you will:

- Learn how to organize an in-person training.
- Explore online training modalities.
- Apply techniques to deliver effective trainings.

Several ways exist to organize air pollution and health training including in-person, online or blended formats. This section presents how to organize the previously listed formats. Face-to-face or in-person trainings require advance preparation, taking into account not only content development but also logistical aspects as well as fundraising, marketing and evaluation. A section is dedicated to online workshop organization, yet much of the content for in-person trainings may apply also to online or remote learning opportunities.

## Establishing an organizing team

An effective organizing team will make planning for a training easier. Team members should have different and precise roles and responsibilities. It would be beneficial to assign clear tasks and action points, and to set up regular team meetings for internal updates and tracking. Table 3 presents some of the different roles within an organizing team. A person may have more than one role to cover, depending on the size of the learning event and the human capacity of the training team (see Table 3).







**Table 3.**  
Organizing team:  
example of roles  
and tasks

Role	Tasks
<b>Lead</b>	Represents the training at the highest level and helps ensure the project is moving forward. Removes organizational barriers. Leverages resources and influence.
<b>Project manager</b>	Acts as project manager. Coordinates the tasks of team members and identifies key areas for planning. Organizes regular team meeting, tracks the status of the different tasks and activities, regularly reports to the lead about any organization and contextual issues, and liaises with other relevant stakeholders when needed. Keeps track of budget and time.
<b>Logistics focal point</b>	Leads the activities on the venue, travel, audio-visual equipment.
<b>Administrative focal point</b>	Manages contracts and processes finance operations, helps organize recording and archiving.
<b>Trainer</b>	Leads the activities related to the content of the training, such as designing the agenda and curriculum, adapting the material and, where appropriate, delivering the training.
<b>Communication and promotion focal point</b>	Ensures the training is properly promoted to respective audiences.

## Identifying the target audience

When organizing a workshop using the TtT approach, it is important to invite individuals that are motivated to become trainers themselves. This could include individuals responsible for larger groups of health workers in their organizational structure or individuals motivated to train others through their various networks. Refer to **“Target audience”** p. 7 to identify health care workers you could invite.

## Setting up an agenda

Your agenda will be the outline of your training. It should include all the main “training moments” such as sessions dedicated to the training modules and other interactive activities such as field visits, clinical case scenarios, Q&As, evaluation time. It should also include non-training time such as coffee breaks, lunch breaks or welcoming and opening remarks.

For the participants, it is often important to know what they can expect from the training by having a clear understanding of the workshop logistics (location, meeting room, start and finish time of training, availability of meals, etc.), as well as the course structure and mediums of instruction.

For the organizers, knowing what role is assigned to whom is essential. You should factor in any “lost time” such as breaking into groups, audio-visual malfunctions or transferring



from one room to another. For example, a 1-hour session on air pollution and health clinical case scenarios can effectively cover: 5 minutes' all-class introduction; 5 minutes to assemble the different groups; 45 minutes' group work; and 5 minutes to re-assemble again. The use of breaks should be smartly scheduled to maximize the time available (e.g. in between lectures and group work).

You can find example of such agendas in Annex 2.

## Assessing the budget

A detailed budget should be developed so you have a clear idea of what financial resources you need to run the training effectively. Additionally, this can be used to engage with potential donors. A sample budget is provided in Annex 3.

## Fundraising for the event

Fundraising is an important way to financially support your training workshops. Donors often provide opportunities for funding trainings within their call for proposals and grants. Partnerships with organizations or businesses may also provide in-kind contributions for your training event.

### How to fund your training?

- Special fundraising events could also be organized on specific themes that may attract the attention of donors while you are planning and designing your workshop.
- An ad hoc website can be developed for your training event or advertised on your organization's website. A donation page can be added to collect funds, if possible or appropriate for your institution or organization.
- Crowdfunding is a new way of gathering funds for a project. If your training coincides with a project that appeals to individuals, crowdfunding may be an option.
- Finally, applying a fee for your training may be an alternative way to finance it. Make sure that you have developed a good budget and have a thorough understanding of how much your training will cost.

## Promoting the training event

Promoting your training programme encourages people that you target to participate. It is important to get an understanding of who your potential trainees could be in order to deploy appropriate advertising effort. Organizers can provide some sneak previews of the contents of the course to gain people's interest. Attractive and compelling promotional materials are also helpful. This can be achieved by tailoring the catchphrases and content to the local context and highlighting what participants will gain and how it will impact their work. Successive emails can be sent containing new information on the content. Feedback or endorsements from participants of previous trainings can let potential participants see the quality of your sessions. Information should be replicated on various social media platforms with consistency and promoted widely.



## Evaluating training delivery

A good evaluation mechanism is key to the continuous improvement of the training. Written evaluations providing a rating system and/or a list of qualitative questions assessing trainees' experience and learning provide useful feedback and information that can be used in the planning and delivery of future trainings. Feedback should be gathered on training methodology, course structure, objectives and outcomes, and content, as well as whether the training provided the knowledge, skills and confidence to train others. A sample evaluation form is provided in Annex 8.

Other ways of collecting evaluation feedback are through focus groups, interviews and informal feedback from peers.

Finally, organizing a debrief both during and after the training with co-facilitators and organizers is also important, as it will allow time to discuss lessons learned, as well as to resolve any problems with the materials or specific participants.

## Evaluating participants' knowledge

It can be useful to conduct pre- and post-training tests. A sample quiz can be found in Annex 5. This will allow you to gauge trainees' baseline knowledge as well as the newly acquired information and further discuss some aspects of the training.

Additionally, it can be useful to conduct a follow-up discussion and/or evaluation long after the training, e.g. 6 months. You can use this time to take stock of the changes in the practice of the trainees, ask them to share their experience since the training, whether they have started to deliver trainings, develop new activities or learn new information about the topics.

## Selecting a venue for in-person training

The venue where the training takes place should be in a convenient location for participants to get to. It should be easily accessible by public transport if possible. The training rooms should be well ventilated with appropriate room temperature and have enough space for participants to work together comfortably. Appropriate rooms or space for breakout groups should be made available, depending on how the agenda is framed. Due considerations to safety and security concerns should be given. Based on rules, wireless internet access should also be provided if possible.

It is recommended to check the venue a day before the training to become familiar with the training room setting and to ensure that all audio-visual equipment is available and working. A more detailed checklist is available in Annex 1.



## Considering other logistical aspects for in-person training

### Training room setup and workspace layout

The arrangement of furniture and equipment in the training room will depend on the chosen teaching methods. You may want to have trainees:

- focus their attention on you while you speak;
- discuss in small group;
- work in their own space.

The goal of a good layout is to give trainees maximum working space and a good viewing angle for presentations. The layout should encourage discussions and interactions between the trainer and the trainees and between the trainees. A long room should be avoided if possible as those in the last rows tend to disengage more rapidly. A U-shape is a commonly used and effective layout but other layouts can also be used depending on the activities included within the training.

When a class is split into subgroups for discussion, the trainer can move between groups to answer questions and clarify the group's exercises.

### Audio-visual equipment in the training room

Ensure clear and good viewing of projected materials for all trainees.

- Place the screen as high as possible for “line of sight” viewing from the back of the room.
- Be sure the screen is of sufficient width. The standard ratio of screen width to distance from the projector is a ratio of 1:6 (1 m screen width for 6 m length of room).
- Do not place the screen under a light source. It will wash out the image.

### Stationery supplies

Trainees should be encouraged to bring their own pens and notebooks. However, organizers should consider providing these supplies, which should be sustainable (recycled, resourced locally), as well as non-toxic. It is common for conference facilities to provide some of these supplies, yet it is good practice to make additional provision. A more complete checklist of the types of material needed is provided in Annex 1.

## Exploring online training modalities

Although this manual is mainly intended for the organization of in-person training opportunities, online learning options may be an effective choice to train a larger number of people that are not in the same location or to create blended learning opportunities. Online learning opportunities may also be more environmentally sustainable with lower carbon emissions than in-person options (32,33) Some of the pros and cons about choosing the online learning modality are presented in Table 4.



**Table 4.**  
Pros and cons of  
online training

Pros	Cons
<b>Flexible scheduling</b>	No face-to-face interaction
<b>Faster completion</b>	Difficult to assess learners' comprehension of materials via facial expression and body language
<b>Self-pace option</b>	Not all topics may be available as online training might be shorter
<b>Study anytime</b>	Requires self-direction on the part of the trainees
<b>Log in from anywhere</b>	Challenges with accessing reliable internet
<b>Access to more trainees</b>	Difficult to develop rapport and interactivity with trainees
<b>Potentially lower costs</b>	Sustaining engagement may be challenging
<b>May reduce carbon emissions compared with in-person gatherings</b>	



Check the online course: *Air pollution and health: an introduction for health workers* (<https://www.who.int/tools/air-pollution-and-health-training-toolkit-for-health-workers>)

Several modes for online trainings exist.

### Option 1: Webinars and live stream lectures

Each live stream lecture should capture the audience's attention; therefore, it is advised that these sessions be no longer than 60–90 minutes. Online lectures could be complemented with virtual interactive activities.

### Option 2: Recorded lectures

With pre-recorded lectures, you should consider the following:

- Intersperse slides with videos of you – seeing a face during a lecture will engage learners more.
- Keep videos short in duration (i.e. no longer than 15 minutes).
- If videos longer than 15 minutes are required and they have a clear structure, consider segmenting them into a series of shorter video clips.
- Make sure course slides can be read on small screens (e.g. mobile phone, tablet).
- Ensure that trainees have access to reliable high-speed internet.

It can be very useful to invest time and resources in such lectures, especially if it is foreseen that the trainings will be repeated.



### Making online trainings interactive

This manual provides a number of interactive activities for trainees that can be adapted to classroom and online teaching settings. Fostering a peer education approach is key.

Here are some general tips on how to make online sessions interactive:

- Ask for feedback based on the trainees' experience.
- Let trainees choose the order in which they want to learn the module topics if the order of the topics does not matter, following an initial introduction.
- Make it social by using games or stories.
- Have trainees contribute their knowledge about a subject or chair online group discussions.
- Break trainees into small groups, for example, either with a facilitator or only with peers.
- Ask specific questions to which everyone can answer tapping into the trainees' experience or knowledge.
- Use polling or quizzes to test and stimulate your audience.

### Selecting your video conferencing platforms for online meeting

There are many video conferencing platforms that can be used to present content and organize breakout groups and discussions. The following are some things to consider:

- Make sure to know your online tool well in advance, including the different roles and features.
- The speaker should look as much as possible into the camera and have a background that allows trainees to focus on the content. The sound should be loud and clear and the image good quality, to minimize distractions.
- The number of minutes that are available for free on these platforms and whether a subscription fee is necessary.
- The number of participants allowed.
- The ability to view the participants.
- The ability to control people's microphones and chat.
- The ability to make presentations.
- The ability to have chat, Q&A or polls functions.
- The ability to have breakout rooms which allow for small group learning and more individualized instruction.

Trainers can divide trainees into groups and give them the opportunity to work on a task together. Trainer and facilitators may visit each group in the online breakout room to provide guidance on the task, answer questions, clarify air pollution and health concepts and share problem-solving tips.

The following are some possible ways to divide a group:

- Randomize trainees with different backgrounds so as to enhance collaboration between different sectors and expertise.
- Put trainees with the same background in the same group so as to adapt the training materials for the intended audience.





- Randomize trainees with varying levels of training experience so those with more experience can guide those with less.

### Other considerations for online trainings

- Dry runs with facilitators and trainers to ensure systems work, and everyone is on the same page.
- Ensure hosting and co-hosting rights in the chosen platform.
- Encouraging turning camera on, or when speaking, where the internet allows etc.
- Using the same virtual background for the organizers to ensure consistency and a sense of cohesion.
- Managing microphones and mute options.
- If recording, remember to always request permission.

## Training kick off, closing and follow up

These strategies are mainly focusing on in-person training. They are, however, also relevant for online training, with some adaptation.

### Kicking off a training

Before kicking off a training, take some time to review **Ten tips for an effective trainer**. Additionally, these tips can also be shared with your trainees, when a session around “becoming a trainer” takes place, usually towards the end of the training.

#### Greetings

Greeting participants and trainees is a good way to kick off and create a positive and comfortable environment for working together:

- o Introduce yourself and engage with trainees by asking their names and professional and academic backgrounds.
- o Serve refreshments such as coffee or tea with snacks, where possible.
- o Provide name tags for the trainees.
- o Ask trainees to sign the attendees’ list if/where needed.

#### Break the ice

Icebreakers allow trainees to become energized before the training and set an enthusiastic tone to actively engage everyone. It is important to:

- o Get to know your audience.
- o Show enthusiasm.
- o Encourage everyone to participate.
- o Get trainees to know each other – promoting team dynamics for the session.

Check interactive **Activity 1.3** for an example of an icebreaker activity.



### Set workshop ground rules

To set group rules ask the trainees the key rules they would like to set for the workshop and why. The trainer can put these on a flipchart and ask trainees to add to them during the session. These may include:

- o Be a good listener.
- o Respect the opinions of others.
- o Listen to and think about what others are attempting to say.
- o Be honest and open.
- o It is okay to disagree, but not to be disagreeable.
- o Share your thoughts.

### Closing the loop – from trainee to trainer

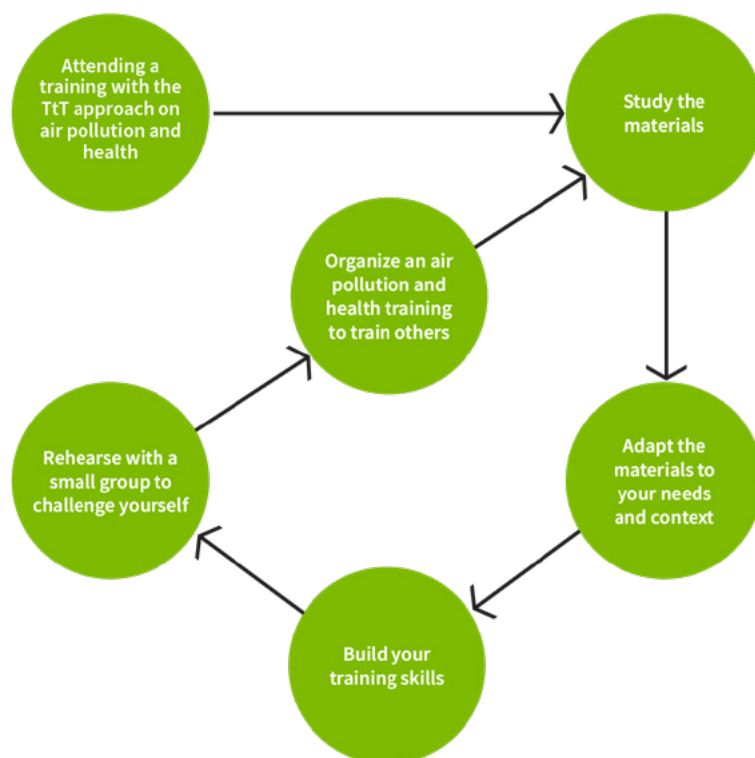
The TtT approach, as explained in the introduction, goes beyond delivering a training. It should empower trainees to become trainers themselves. Therefore, the training should focus not only on delivering knowledge and skills related to air pollution and health, but also the competencies that will allow trainees to be in a position to deliver trainings and scale up the dissemination of knowledge and capacity.

Thus, as part of the workshop or training, some specific sessions should be dedicated around the topic of organizing an event and how to become a trainer. Usually, this moment should come at the end of the trainings. For example, after a week-long training, 2–3-hour sessions can be built around presenting this manual, sharing trainers' experiences, tips, conducting group exercises to build training skills etc.

You can find some general guidance below to help close this loop:

- Run the TtT session (**Activity 2.12**) on how to organize a workshop on air pollution and health.
- Refer to the rest of this section for information on organizing a training and present the most important points.
- Use and present the current manual content.
- Share your personal experience as a trainer: what are your tips and tricks? what is your experience?
- Encourage trainees to take steps forward and boost their motivation.
- Encourage follow-up activities: create a community of peers and alumni to keep connected and regularly take stock.

Fig. 2.  
The cycle of  
becoming a trainer



### Organizing follow-up activities

Training is not a one-time moment but rather should take place over a longer timeframe. It is important to consider follow-up activities clearly from the beginning, if relevant. This will also help later in dealing with the expectations of the trainees.

Table 5 lists the activities that can be conducted after a training. It is important to lay out a clear timeline of activities that allows you to retain the momentum.

Table 5.  
Follow-up activities

Activity	Description
<b>Post-training test</b>	A post-training quiz or test to assess knowledge retention. Examples of such questions can be found in <b>Annex 5</b> . It is also recommended to include the questions that trainees asked you throughout the training. This can be organized, for example, at the end of the training or a week after.
<b>Training evaluation</b>	A survey to evaluate the workshop and capture the perceptions of the trainees. An example can be found in <b>Annex 8</b> . The questions can be adapted to specific goals, for example, targeting certain aspects of the training, testing the hypothesis of new approaches or methods to deliver lectures.
<b>Presenting additional training modules</b>	A session dedicated to present other modules of the toolkit. This can be organized either in-person or online (webinar).
<b>Check-in and follow-up meeting</b>	A meeting (either in-person or online) to discuss the progress and barriers of the ex-trainees and new trainers in delivering new trainings, to capture the change in the practice and work, to encourage the creation of working groups on adapting materials and developing new tools, for example, new interactive sessions or new air pollution and health clinical case scenarios.

# **Section 3**

## The contents





# Air pollution and health training materials

A number of training materials have been developed by WHO as part of the APHT toolkit (11). They include training modules and this TtT manual, which includes a set of interactive activities to complement workshops and training opportunities while applying a TtT approach.

## At the end of this section, you will:

- Get an overview of the air pollution topics covered in the training modules.
- Understand how the training modules are structured.
- Apply effective guidance to deliver trainings or workshops.
- Choose and use a set of air pollution and health interactive activities for trainings and workshops.
- Use communication and media material.



Check the online course:  
*Air pollution and health:  
an introduction for  
health workers*

([https://www.who.int/  
tools/air-pollution-and-  
health-training-toolkit-  
for-health-workers](https://www.who.int/tools/air-pollution-and-health-training-toolkit-for-health-workers))

## Training modules: working with slide decks

The training modules include key scientific knowledge on air pollution and health. Trainers can pick and choose the modules considered most suitable for the purposes of the training, depending on time availability, specific target audience and the main objectives to be achieved.

The contents of each training module include:

- **Learning objectives** at the beginning of each module;
- **Glossary** providing definitions of key terms used in the module;
- **Comprehensive notes** under each slide that can be used as a script for the module presentation and related references;
- **Key messages** summarized and presented at the end of the module;
- **Case studies**, where appropriate and
- **WHO maps, graphs, pictures and videos**, where appropriate.





**Table 6.**  
Example of training  
modules

<b>Core modules</b>
Introduction to ambient air pollution
Introduction to household air pollution
Health effects of air pollution: a general overview
The role of health workers
<b>Additional modules (under development)</b>
Clean energy solutions at the household level
Air quality index: understanding principles and use
Principles of risk communication on air pollution
Air pollution: from building the evidence to health risk assessment
Air pollution and cardiovascular diseases
Air pollution and the respiratory system
Air pollution: from the womb to childhood
Air pollution: brain and mental health

*Note:* Titles may be subject to change, visit the [APHT toolkit webpage](#) to download the training modules.

There are a number of ways to ensure trainees are engaged during the presentation of these modules.

### Tips on presenting the slides

- Schedule enough time to finish the presentation. As a general rule, each slide requires 1 minute of presentation.
- Comprehensive text notes are included under each slide to guide the presentation.
- One can select and customize the slides as they relate to the target audience and context. Creating an ad hoc slide deck is part of the learning and mastering of the contents.
- Incorporate active learning and ask the audience questions during the presentation.
- Stand at the side of the screen and face the audience while presenting to establish connection.
- Add text on slides while doing the presentation to include new ideas and comments, when appropriate.
- Test your screen presentation, making sure the presenter mode, which contains text notes, works as intended.
- Couple the presentation of the module with videos and other media resources (see **Media materials**).





### Engaging trainees with the slide decks

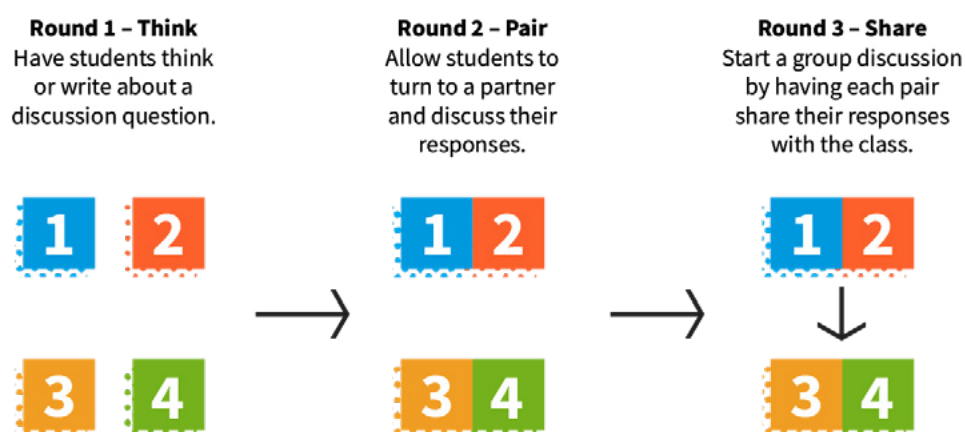
**Opening question and introduction:** Trainers may want to ask opening questions such as “Take a moment to reflect on the sources of air pollution in your community”. Subsequently assess any previous knowledge of your audience and respond accordingly. It is important to not make assumptions about the audience’s current understanding of air pollution and health-related concepts.

**Questions during presentations:** Trainers can address the audience with direct questions on a regular basis. This provides additional opportunities for reflection and interaction.

**Think-pair-share:** During your session, you can also ask trainees to reflect in pairs. Ask them to:

- Think about a discussion topic.
- Turn to a partner to present thoughts and knowledge.
- Share responses and knowledge in a group discussion.

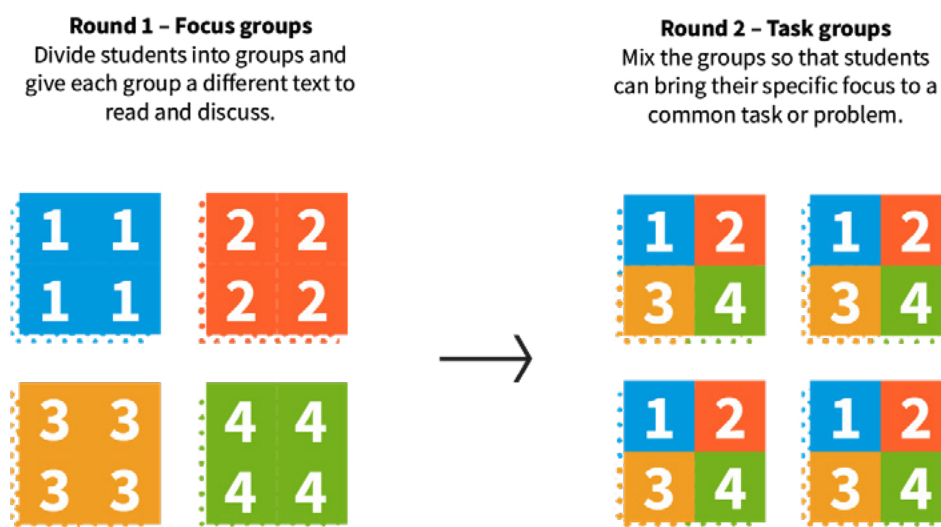
Fig. 3.  
Think-pair-share



Source: Adapted from Lyman F (1981), *The responsive classroom discussion* (34).

**Jigsaw:** Trainees are divided into groups to read a text or document, for example, an extract of a scientific paper, report or commentary. Mixing the groups will allow bringing the focus to a specific task, problem or to the sharing of knowledge. See interactive **Activity 2.4**.

Fig. 4.  
Jigsaw



Source: Adapted from Aronson E et al. (1978), *The jigsaw classroom* (35).

**Brainstorming:** Trainers can propose trainees think deeply and draw from prior knowledge and new knowledge about a problem that has been presented in your session, for example, “What strategies can be used by patients and individuals to avoid exposure to air pollution?”

**Take home messages:** Trainers may want to consider asking trainees what they believe are the take home messages of the presented material and how they could be used in a practical setting.

**Teaching in plenary:** Trainees can be invited and prompted to use the learning and teaching techniques found in this manual and any other sources to practise their skills as trainers in presenting to the audience some of the key concepts they have just learned.

# Interactive sessions: putting the trainee's role at the centre

Interactive activities are an essential complement to the training modules to make the sessions engaging and to enhance the assimilation of new knowledge. This section include two types of interactive activities:



## Introductory activities



## Problem-based learning (PBL) activities

These activities can be adapted and should also be considered as a starting point for trainers to come up with their own set of activities, based on the specific target audience (category of health workers, global/regional/local setting, etc.), the training modules chosen as part of the workshop, and the workshop modality (in person, online, blended event).



# Introductory activities

## 1.1 Pre-training survey

Collecting data and information before the training event has happened is very important to shape it to meet participants' expectations and needs, as well as to assess effectiveness and achievements of the objectives and outcomes at a later stage.

### Purpose

To facilitate the collection of information on trainees including:

- Their experiences in the field of air pollution and health encountered in their daily professional practice.
- Expectations concerning the air pollution and health workshop.
- Willingness to become an advocate for air quality and health and take part in disseminating knowledge among their peers and community.

### When

Once the participants have been selected and before the start of the training.

### Online/in person

Delivered online, for both in-person and online trainings.

### Duration

15 minutes.

### Methodology

Online survey.

### Resource

Sample survey is included in Annex 4.

## STEPS

When	What	Methodology
Preparation	Based on the sample pre-training survey provided (see <b>Annex 4</b> ) choose questions or add questions specific to your region and training group and place questions on an online platform.	Preparation
Pre-training	Send out the questionnaire, ideally 4–2 weeks before the training.	Online survey
Pre-training	Compile and analyse responses to design the training based on the trainees' profiles. Adjust the agenda of the training, if needed and where possible.	Analysis and action
During the training	Present training survey results to trainees at the beginning of your training.	Sharing results



## 1.2 Pre-/post-training quiz

*A knowledge assessment tool that can be used before, during and after the training!*

### Purpose

To immediately engage trainees with air pollution and health contents by testing their knowledge and to encourage discussion. Trainers may also choose to ask participants to retake the test at the end of the training to enable them to assess their knowledge. The quiz can also be used throughout the training while presenting training modules to engage even more with the audience.

### When

Before, during and after the training.

### Online/in person

Delivered online or on paper. Suitable for both in-person and online trainings.

### Duration

25 minutes for full pre-/post-training.

### Methodology

Quiz, discussion.

### Resource

Quiz in paper or electronic format found in Annex 5.

## STEPS

Time	What	Methodology
Before the training	Choose some (or all!) questions from the pre-/post-training quiz (see <b>Annex 5</b> ) based on the training modules that are included as part of your training. You can of course also develop new questions using your own creativity, local context and experience! Print the quiz form or make it available online.	Preparation
5 mins	After introductions, ask trainees to fill in the air pollution and health quiz in silence.	Quiz
10 mins	Once the quiz has been filled in, you may ask trainees with a show of hands or with the online quiz tool how they have answered each question. Ask trainees if they want to share any of their knowledge and experience on the topic. If you are developing an online version of the quiz, it is likely that the online platform may allow you to show the distribution of the replies from each quiz.	Discussion
10 mins	After a response has been given to each question, reveal the correct answer with a brief explanation of its significance using it as a segue to introduce the objectives of the air pollution and health training session and the topics that will be discussed. Trainers may ask respondents to come back to the quiz at the end of the session or training.	Discussion

## 1.3 Human map

Icebreaker activities are an important part of training and allow the trainer to set the tone for the duration of the session.

Fig. 5.  
Human map activity



Building health workforce capacity on air pollution and health: a train-the-trainer pilot workshop, Ghana; 2022.  
© WHO/Ben Sackey.

### Purpose

To allow trainees to get to know each other and learn each other's name to put them at ease with sharing ideas and opinions with the group as well as to create a safe, relaxed and productive learning environment.

### When

At the beginning of the training.

### Online/in person

More suitable for in-person training.  
Extensive adaptation and specific digital tool are required for online delivery.

### Duration

Depending on the size of the group, this activity can take approximately 10 minutes for every 10 participants. Consider 5 additional minutes for the introductory explanation and conclusions.

### Methodology

Movement and interaction.

### Resource

Large open space in the training room or outdoors.

## STEPS

Time	What	Methodology
5 mins	<p>Explain to the trainees that they are going to do a human map of where they all come from. This will allow them to get acquainted.</p> <p>Designate a point in the space that represents the training venue. Stand at the point and say that this represents the point on the map where we are. Ask someone to point out north with their arm, and then show which way is east, south and west.</p>	Explanation





Time	What	Methodology
5 mins	<p>Ask the trainees to position themselves around the space based on where they live relative to where you are standing. This may include the neighbourhood, city, region or country. Get trainees to speak to one another so they can find out where they are in relation to one another on the imaginary map. This is the point of the exercise.</p> <p>Make sure everyone has found their place.</p>	Movement and interaction
10 mins every 10 participants	<p>Ask the group to introduce themselves, telling the group to say their name, where they live and work and their expectations from the training course.</p> <p>Try to verbally acknowledge input from each participant by thanking them with their name. Repeating names and responding positively to all contributions during this activity will make trainees feel more comfortable expressing ideas and opinions later on in the training and help them to learn each other's names more quickly.</p> <p>Engage trainees in discussion on the various places of where they are from and the various expectations from the course. Be sure to link it to the objectives of the training and course content.</p>	Introduction



## 1.4 Mapping air pollution sources

*Many individuals do not consciously think about the household and ambient air pollution sources in their environment. By mapping these sources, trainees can get a better understanding of their own region, linking sources to potential health effects and their daily variations.*

### Purpose

To engage participants to identify and visualize air pollution sources in their community, which can be used to trigger discussion on the consequent health effects, specific populations highly exposed and the more vulnerable, or for advocacy purposes and to raise awareness of the type of actions that could be taken in the community.

### When

After presenting the introductory training modules.

### Online/in person

More suitable for in-person training. Extensive adaptation and specific digital tool are required for online delivery.

### Duration

40–60 minutes.

### Methodology

Drawing and discussion.

### Resource

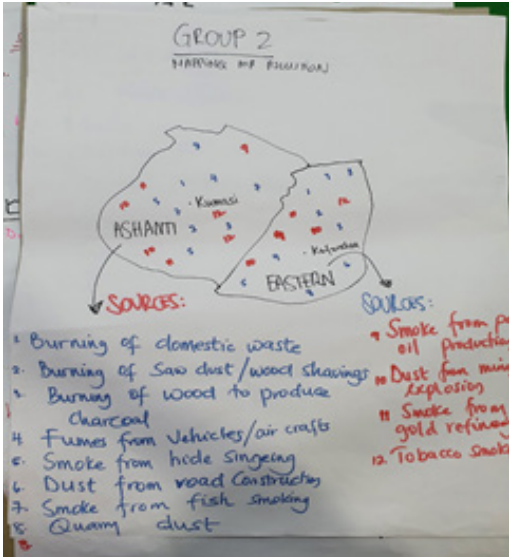
Flipchart paper, paper, markers, tape.

## STEPS

Time	What	Methodology
5 mins	Ask trainees to divide into groups geographically and distribute paper to each individual or group.	Instructions
15 mins	Ask participants, individually or in groups, to draw their neighbourhood, city or region. Subsequently, ask them to identify the major sources of household and ambient air pollution.	Drawing
5 mins	Once the drawings have been completed, tape the drawings on the walls.	

Time	What	Methodology
15 mins (this part could last longer depending on the number of groups and trainees)	<p>Ask individuals or groups to explain the sources of air pollution in their community.</p> <p>Ask the following questions:</p> <ul style="list-style-type: none"> <li>Who is responsible for these sources?</li> <li>What they think the components of the air pollution are.</li> <li>What they think the health effects are.</li> <li>What strategies they think could be used to mitigate air pollution exposure.</li> </ul> <p>Depending upon group composition, a representation of a city, region or global sources of air pollution can be visualized around the room.</p> <p>Use the contents of the maps to trigger discussion on key local and global sources of air pollutants, components and the global burden of disease using the module slides as a support.</p> <p>Keep the drawing for future exercises, for example when developing an advocacy strategy (see <b>Activity 2.8</b>).</p>	Discussion

Fig. 6.  
Mapping air pollution  
sources activity



Building health workforce capacity on air pollution and health: a train-the-trainer pilot workshop, Ghana; 2022. © WHO/Ben Sackey.



Building capacity of the health workers through the Air Pollution and Health Training toolkit (APHT): a train-the-trainer pilot workshop, Rwanda; 2024. © WHO/Belyse Inamahoro.



## 1.5 Graffiti wall

*An evaluation activity mixing interaction and discussion in the group.*

### Purpose

To allow participants to review their learning from each module covered during the training.

### When

After each training module or at end.

### Online/in person

Suitable for both in-person and online training, with the assistance of digital tools (digital and accessible white board).

### Duration

20 minutes.

### Methodology

Drawing, writing, movement.

### Resource

List of training modules, one or two flipchart pages per module covered during training (allowing enough space for all trainees to write comments on each module topic), marker pens, tape or adhesive to affix pages to wall, clear walls or tables and space to move, and background music and speakers.

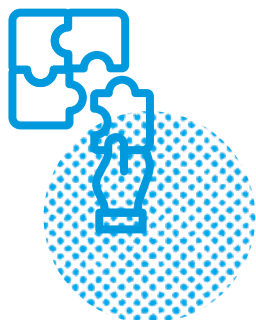
## STEPS

Time	What	Methodology
2 mins	Introduce the activity and explain that to help the group revise what has been covered during the training you have written the title for each training module on a sheet. Read out each title.	Instructions
10 mins	<p><b>Graffiti process:</b> Ask trainees to spend 10 minutes moving around the room writing phrases, sentences or words. Alternatively, trainees can draw or doodle what has been covered during the training including big learning outcomes as well as light bulb moments.</p> <p>Hold the focus of the group encouraging them to move through and provide their thoughts individually.</p>	Movement Drawing Sketching Doodling Writing
5 mins	<p><b>Learning from each other:</b> Thank people for their beautiful graffiti and ask participants to now go back to every sheet, adding to what has been written and being reminded of what learning they may have forgotten.</p> <p>Give time reminders and keep the group moving. Take some notes about the learning that you see on the sheets.</p>	Movement Drawing Sketching Doodling Writing
3 mins	<p><b>Wrap up:</b> Bring trainees together and provide some reflection on the major learning themes that you have seen emerging on the sheets.</p> <p>Ask trainees to take a step back from sheets so they can just see the titles and reflect on which modules have stood out and been the most valuable. Ask them to pick the top three as this will be useful in the evaluation.</p>	Discussion



## Problem-based learning activities

Another type of interactive session that can strengthen the assimilation of knowledge and competencies are PBL activities. PBL puts trainees at the centre of learning and skills development and allows the immediate application of recently acquired knowledge coupled with previous experience (25). At the centre of this type of interactive session is a problem, which needs to be analysed and solved.



### Box 4. Brief history of problem-based learning

The PBL process was pioneered by Barrows and Tamblyn at the medical school programme at McMaster University Medical School, Canada, in the 1970s (36). Students disenchanted with traditional medical education perceived that the vast amount of material presented in the first 3 years of medical school as having little relevance to the practice of medicine and clinically based medicine. The PBL curriculum was developed to stimulate learning by allowing students to see the relevance and application to future roles. It maintains a higher level of motivation towards learning, and shows the importance of responsible, professional attitudes with teamwork values. The motivation for learning drives interest because it allows for selection of problems that have real-world application (25).

The general steps of a problem-based approach are listed below. Various activities are provided in this manual that can use all or parts of this approach within different timeframes. Based on the generic steps below, more activities can be developed by the trainers:

**Step 1:** The trainer presents real-world air pollution and health problems to the group.

**Step 2:** The trainer creates small groups of three to five trainees. A chair for each group is chosen.

**Step 3:** The groups clarify the terms of the problem.

**Step 4:** Trainees define a problem, listing four to seven questions including what, where and how. The problem is then broken into component parts.

**Step 5:** Trainees share what they have learned from the research and use the new information to come up with solutions.



**Table 7.**  
Overview of the  
problem-based  
learning activities

Activity reference	Title	What it is about?
2.1	Air pollution and health stories	Sharing air pollution and health stories from the trainees' own experiences to highlight issues and facilitate discussion on concepts and knowledge using problem solving. It is the narrative version of Activity 2.2: Photo story.
2.2	Photo story	Visually analysing different settings as they relate to air quality, pollutant sources, vulnerable/susceptible groups and potential health effects. It is the photo version of Activity 2.1: Air pollution and health stories.
2.3	eScience café: bring in the experts	Inviting an expert to discuss specific aspects of air pollution in more depth, foster discussion and give the opportunity to answer trainees' questions.
2.4	Air pollution intervention case studies from journalistic sources or reports	Discussing, interpreting and applying problem solving of real-world air pollution and health case studies from newspapers or reports.
2.5	Air quality awareness – using low-cost sensors	Engaging trainees to monitor real-time variations of air quality in the training room, learn how to use various types of air quality monitors and recognize the circumstances in which to use the different monitors.
2.6	Field visit: air pollution and health – sources, stakeholders and solutions	Organizing a visit to one or multiple sites where sources of air pollution and/or its effect and/or solutions can be observed.
2.7	Air pollution and health clinical case scenarios	Combining clinical reasoning with environmental risk factors such as air pollution. This activity allows applying knowledge gained on the link between air pollution and health to real-life clinical case scenarios, and integrate new information into scenarios.
2.8	Advocacy strategy development	Engaging trainees to develop an advocacy strategy to mitigate the impact of air pollution on health in their region.
2.9	Simulation on drafting an air pollution and health action plan	Planning and negotiating for action towards clean air and health in both the short and long term. This is connected to Activity 2.11: Country or regional action planning for clean air, and focuses on negotiation.





Activity reference	Title	What it is about?
2.10	Personal action plan for clean air	Brainstorming on individual actions trainees can take back to implement their workplace and home.
2.11	Country or regional action planning for clean air	Simulate the planification of actions at country or regional level, aiming at reducing the impact of air pollution and health and empowering trainees to influence national agendas beyond the health, public health and health care sector. This is connected to Activity 2.9: Simulation on drafting an air pollution and health action plan, and focuses on the actual planning.
2.12	Train-the-trainers session	Simulating how trainees would use the training resources of the APHT toolkit in their own training activities, such as organizing an in-person workshop, an online event or any other learning opportunity to improve the curriculum of health professionals.



## 2.1 Air pollution and health stories

*This session taps into the trainees' personal experiences, i.e. "their stories". Trainees come from a variety of health care professions and backgrounds and will have unique stories to share, including their personal ones about health effects from air pollution, including clinical or community impacts, air pollution sources, settings, as well as political or administrative barriers to improving air quality. These stories are valuable and can serve as examples of real-world case studies that can be analysed and discussed during the training.*

*The trainer can facilitate this interactive session with some guiding questions (see below).*

### Purpose

To actively engage trainees to share their own air pollution and health stories to highlight issues and facilitate discussion on concepts and knowledge using problem solving.

### Online/in person

More suitable for in-person workshop but can be used online.

### Duration

45 minutes or intermittently throughout training sessions.

### Methodology

Discussion.

### Resource

Flipchart, markers, laptop.

## STEPS

Time	Activity	Methodology
5 mins	Depending on group size break up into small groups or stay in main group. Identify a chair to guide discussion if working in small groups.	Instructions
20 mins	<p>Ask the group the following questions to initiate and guide story telling. Trainers may choose up to three to five questions:</p> <ul style="list-style-type: none"> <li>• Do you have stories or experiences to share on air pollution and health in your clinical practice or community?</li> <li>• Has a patient or other individual ever asked your opinion or advice on air quality and its health impact?</li> <li>• What were the key sources of air pollution?</li> <li>• What were the key health effects among your patients and community?</li> <li>• What were the barriers to improving the health of your patients?</li> <li>• Who were the stakeholders or actors in this story?</li> <li>• What are some the key issues and questions that arose in this story?</li> <li>• Have you ever used an air quality index?</li> <li>• Have you engaged in air pollution and health advocacy activities? How?</li> </ul>	Facilitation Discussion



Time	Activity	Methodology
	Designate a note taker to record stories for future use, so that they can be used as examples or case studies in the future.	Instructions
20 mins	<p><b>Discussion:</b> Once trainees have recounted their stories highlighting key air pollution and health linkages and problems, problem solving can start with the main group. Ask other trainees if they have related stories and or suggestions.</p> <p><b>Wrap up:</b> Summarize key story highlights and potential action points that can be carried out by trainees. Ask trainees what the main problems were, and lessons learned from the stories, and how to make a pledge to address air pollution and health in their communities.</p>	Problem solving

### Example story 1

#### Is an eight-lane highway in Paris contributing to asthma attacks?

“I was working on a Tuesday at my office in Paris when a newly appointed colleague started having difficulty breathing. He felt a strange reactivity in his lungs that he had never felt before. He hadn’t had asthma in a long time, and it came suddenly. My colleague took a salbutamol inhaler at spaced out intervals and more frequently than he was used to. It seemed to work. I wondered if the eight-lane highway (hotspot site for high levels of air pollution) just outside our office may have contributed to triggering his asthma attack. How could I find out?”

Key points in this story include questions on:

- Treatment management.
- Triggers for asthma.
- Air pollution sources.
- Key pollutants and health effects.
- Use of air quality index.
- Understanding potential investigation protocols concerning short- or long-term air pollution exposures and health effects.



### Example story 2

#### Triggers for asthma among children from open air waste burning site in Ghana

“Seven years ago there was a warehouse that dealt in the storage of imported goods being transported to other parts of Ghana and neighbouring countries. The company, without consulting the Environmental Protection Agency and other relevant institutions, decided to burn its waste products and other expired goods in an open pit early in the morning. Within a period of 2 hours, several children and a few adults from the communities around this warehouse were rushed into the emergency unit of my hospital with difficulty breathing, cough, wheezing, watery eye discharge, which started upon exposure to fumes from the burning that entered their homes.

I was a doctor on duty at the hospital at that time. The ages of the children brought in were between 3 and 7 years old. None of these children had any history of asthma and no family history of asthma. Upon a careful and thorough environmental history taking, it was noted that all of the patients were staying within about 500 meters of where the burning was taking place.

The common examination findings included increased respiratory rate, use of accessory respiratory muscles, flaring of the ala nasi, wheezing on expiration, chest indrawing, reduced air entry and presence of rhonchi. Oxygen saturation was reduced in all victims on room air. The patients were put on intranasal oxygen by nasal prongs at a flow rate of 5 L/min and given salbutamol by nebulization in addition to intravenous hydrocortisone according to their age and weight. All of them responded well to the treatment and were discharged within 24 hours.

The authorities were informed, and the Fire Department put out the fire immediately.

Investigations showed that several cartons of expired chemicals and unclaimed products were burnt in open air.”

Key points in this story include questions on:

- Triggers for asthma and air pollution sources.
- Community exposure to air pollution.
- Role of CHWs in advising individuals and patients.
- Strategies for reducing individual exposure.
- Advocacy for regulations on open air waste burning and its implementation.



## 2.2 Photo story

*Photos provide a good way for trainees to actively analyse visually different settings as they relate to air quality, pollutant sources, vulnerable/susceptible groups and potential health effects. In this activity, trainees will analyse photos.*

### Purpose

To engage trainees to present and analyse their understanding of recently acquired knowledge on air pollution and health through photos.

### Online/in person

More suitable for in-person workshop but can be used online.

### Duration

From 30 minutes.

### Methodology

Small groups discussion.

### Resource

Photos in paper or digital form.

### Guidance on taking photos

Photos in the public domain are generally okay for use, but it is polite to ask individuals if you can take a photo profiling them or their business. Sometimes even informal sector industries have a landlord, so it is important to ask for permission. This could also be seen as an opportunity to explain to community members why air pollution is an important health issue and why it is important that the health sector is involved in tackling it

## STEPS

Time	What	Methodology
Before the session	<p>Take or obtain photos of the following items. You may take photos during a field visit (see <b>Activity 2.6</b>). You may also consider asking participants to bring their own photos.</p> <p><b>Slum</b></p> <ul style="list-style-type: none"> <li>• Unclean fuel and technologies for cooking, heating or lighting</li> <li>• Clean fuels and technologies for cooking, heating or lighting</li> <li>• Unventilated cooking and living spaces</li> <li>• Children with mothers in cooking spaces</li> <li>• Open waste burning</li> <li>• Informal work including:               <ul style="list-style-type: none"> <li>o making pots out of molten metal waste</li> <li>o car repair</li> <li>o informal smelting operations</li> <li>o small brick kilns</li> <li>o smoking fish</li> <li>o others</li> </ul> </li> </ul>	Photography



Time	What	Methodology
	<b>Traffic</b>	
	<ul style="list-style-type: none"><li>• Vehicle types in the traffic corridor and main pollutants from each including heavy duty vehicles, diesel vehicles, two-stroke tuk tuk (auto rickshaw), etc.</li><li>• Volume of traffic</li><li>• Note the change in air pollution levels with the distance from traffic corridors</li></ul>	
	<b>Industrial zone</b>	
	<ul style="list-style-type: none"><li>• Various industries in zone</li><li>• Emissions from industry and specific pollutants</li><li>• Air pollution control systems</li></ul>	
	<b>Landfill sites</b>	
	<ul style="list-style-type: none"><li>• Methane gas</li></ul>	
	<b>Construction sites</b>	
	<ul style="list-style-type: none"><li>• Dust production</li></ul>	
	<b>Agricultural sites</b>	
	<ul style="list-style-type: none"><li>• Crop burning</li></ul>	
	<b>Indoor environments</b>	
	<ul style="list-style-type: none"><li>• Occupants</li><li>• Cooking</li><li>• Building materials</li><li>• Combustion appliances</li><li>• Maintenance products</li></ul>	
	<b>Air quality monitoring station</b>	
	<ul style="list-style-type: none"><li>• How monitoring station works</li><li>• What do they measure?</li><li>• Where are they are located?</li></ul>	
	<b>Different people exposed, according to age, sex, gender</b>	
	<b>Peak flow meter</b>	
	<b>Stethoscope</b>	
	<b>Blood pressure gauge</b>	





Time	What	Methodology
15 mins	<p>Break trainees into groups of two.</p> <p>Place photos in a pile and ask trainees to take three to five photos and ask the following question, “Based on the information learned on health effects and air pollution sources in the training modules, can you tell me how these photos illustrate the concepts discussed?”</p> <p>You may also make the photos available digitally on a shared drive so that trainees can access them and create a photo story using the photos available.</p> <p>Ask pairs of trainees to discuss the photos and write down notes referring to the air pollution and health module slides, highlighting key points and questions.</p>	
15 mins	<p>Ask pairs of trainees to present to the class what the photo story represents with salient points and outstanding questions.</p>	
5 mins	<p><b>Discussion points:</b> Trainees should be able to identify key sources of air pollution, pollutants, vulnerable/susceptible groups and exposures.</p> <p>They should also be able to identify key questions on clinical decision-making and exposure histories as they relate to the scenarios presented.</p> <p><b>Wrap up:</b> Summarize the points brought up in the presentation highlighting how analysis of different settings can increase awareness of air quality and the potential health effects, moments for management and treatment, and potential mitigation measures. It may also be interesting to point out to trainees how researchers are exploring using photos to estimate air pollution levels.</p>	



## 2.3 eScience café: bring in the experts

*This activity offers the opportunity to invite an expert to discuss specific aspects of air pollution in more depth, foster discussion and give the opportunity to answer any outstanding questions for the trainees. Scientific research provides the basis for understanding the health impacts of air pollution and health. Understanding the contribution of different scientific disciplines to the body of knowledge on air pollution and health can aid in developing better intervention strategies.*

### Purpose

The purpose of this activity is to explore and discuss the scientific basis of air pollution and health evidence in more depth with experts in the region.

### Online/in person

Suitable for in-person workshop and online trainings.

### Duration

Adaptable depending on the agenda.

### Methodology

Discussion.

### Resource

Scientific articles, flipchart, markers, laptop.

## STEPS

When	What	Methodology
Pre-training	Identify experts in your region knowledgeable about scientific aspects of air pollution and health. Choose some review articles or research project to discuss regarding aspects of the chosen topic. Invite experts to your event.	
Step 1	In plenary, experts will present evidence for a specific aspect of air pollution and health along with outstanding questions for trainees to examine.	Presentation
Step 2	Start the discussion by organizing small groups or staying in the main group. Identify a chair to guide the discussion if working in small groups. Identify a recorder to take notes while trainees are telling their stories.	
Step 3	Groups will discuss the questions that the experts have asked, and trainees will try to research and share their knowledge to try to answer these questions.	Discussion
Step 4	Groups will present their answers to the plenary for discussion with input from the expert.	Discussion



## 2.4 Air pollution intervention case studies from journalistic sources or reports

*This activity revolves around the discussion of a real-world air pollution problem, taken from journalistic sources. The trainees are tasked to discuss, define the problem, identify the causes and possible remedies. The trainer can choose case studies from journalistic sources or reports that relate to the trainees' particular region or local issues. Remember that all good case studies include:*

- *An authentic portrayal of important issues and processes on the topic.*
- *Reliable data and evidence base with reference to the sources.*
- *Multiple interpretations of a situation.*
- *More than one viable solution.*

### Purpose

To engage trainees in discussion, interpretation and problem solving of real-world air pollution and health case studies.

The use of case studies helps trainees:

- Critically analyse and problem solve.
- Encourage reflective practice with regard to decision-making in complex situations.
- Motivate trainees and create an independent learning framework.

### Online/in person

More suitable for in-person workshop but can be used online.

### Duration

Around 1 hour.

### Methodology

Small group discussion.

### Resource

Flipchart, markers, case studies.

## STEPS

Time	What	Methodology
Before the activity	<p>Pick a number of case studies from those provided in the training modules or from journalistic sources or scientific journals. Ensure their credibility. You may want to show photos or videos linked to the case studies.</p> <p>Possible topics include:</p> <ul style="list-style-type: none"> <li>• Discussing the level of pollution of the region/city.</li> <li>• A focus on a specific health effect.</li> <li>• The implementation of a national or regional regulation to reduce emissions (e.g. the introduction of subsidies for clean energy solutions for households) or local solution to reduce air pollution emissions while promoting health (e.g. the use of bicycles).</li> </ul>	



Time	What	Methodology
2 mins	Ask trainees to break into groups of two to four. You may decide upon these groups ahead of time. Allocate one case study to each group, wherever possible. Check the <b>think-pair-share</b> exercise.	
5 mins	Have trainees read the case study thoroughly in silence or have one member read it out loud to the group. Ask them to take notes, highlight relevant facts, stakeholders and key problems.  Provide clarification for any questions the trainees may have.	Reading
10 mins	Ask trainees to identify two to five problems in the case study and describe why they exist and how they impact stakeholders? Use the questions below to guide discussion and analysis.	Discussion
15 mins	<p>Trainees may construct a mind map or problem tree to deconstruct the problems by identifying causes and impacts.</p> <p>The following are sample questions that can guide analysis for different types of case studies.</p> <p><b>Public health interventions</b></p> <p>Public health interventions may include those from housing, transport, energy, industry, waste management, urban planning etc.</p> <p>What were the main problems in the case study?</p> <p>Who were the key stakeholders in implementing intervention?</p> <p>What were the components of the intervention?</p> <p>What were the key health markers used to track changes in public health impacts (e.g. morbidity rate in chronic bronchitis; days lost from work)?</p> <p>Were they appropriate?</p> <p>What were the confounders (socioeconomic status, smoking)?</p> <p>Were the pollutants chosen for the intervention appropriate or sufficient?</p> <p>Did the intervention address adequately the health needs of the population?</p>	Drawing



Time	What	Methodology
	<p>What were some of the potential negative outcomes of the intervention?</p> <p>What could be an alternative solution or intervention to the problem presented?</p> <p>How could this intervention be used in your region?</p> <p><b>Risk perception</b></p> <p><i>How does this case study affect risk perception by the different stakeholders?</i></p> <p><i>How might you develop a risk communication strategy by answering the following questions:</i></p> <ul style="list-style-type: none"><li>• <i>How are individuals exposed to the risk?</i></li><li>• <i>What are the consequences of exposure?</i></li><li>• <i>Is the risk controllable?</i></li><li>• <i>What are other people's experience with the risk?</i></li><li>• <i>Who is responsible for the negative consequences?</i></li><li>• <i>Are there any advantages?</i></li></ul> <p><b>Health impacts</b></p> <p><i>What are the identified and potential health impacts within the air pollution scenario?</i></p> <p><i>What are the main pollutants?</i></p> <p><i>What are the main sources of air pollutants?</i></p> <p><i>What role does the health care workforce have in resolving the case study?</i></p>	
15 mins	Ask trainees to uncover possible solutions by building a solution tree using information from module materials, outside research and trainees' experience. Propose the best solution with strong evidence. Describe the role of the health sector.	
15 mins	Ask trainees to present their case to the class with their analysis.	Presentation



## 2.5 Air quality awareness – using low-cost sensors

Personal or portable air quality monitors are also known as low-cost sensors (LCS) (37). These devices can monitor particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>), ozone and carbon monoxide, among others, as well as temperature and humidity. The simplest ones give PM information and are the least expensive. They can be used to demonstrate the air quality in and around the training location or as part of field visits for raising of awareness and education purposes (see **Activity 2.6**). Their use can illustrate real-world variations in air quality during the day and/or over several days.

The use of LCS is an opportunity for citizen science (38). In some countries, groups of concerned citizens, often supported by scientists and nongovernmental organizations (NGOs) have taken authorities to court over air quality issues, and the courts have ruled in favour of the right to clean air in several instances. Thus, LCS provide an opportunity to support citizen science initiatives and to record data in LMICs, which are often understudied by public health and atmospheric science research communities. Low-cost sensors can be used to: observe air pollution parameters; support public information, education and awareness activities; and provide data for advocacy and local empowerment (37,39).

### Purpose

To engage trainees to monitor real-time variations in air quality, learn about the use of various types of air quality monitors and recognize circumstances in which using the various monitors is appropriate. Also, to discuss the strengths and weaknesses of LCS versus air quality monitoring stations and determine which instrument is the most appropriate given the reasons for the monitoring.

### Online/in person

In-person workshop only.

### Duration

60 minutes.

### Methodology

Demonstration, measurement.

### Resource

LCS.

## STEPS

When	What	Methodology
Pre-training	Obtain or purchase a LCS. They may be available from local ministries of environment or health or public health departments.	Preparation
Time	What	Methodology
10 mins	According to the manufacturer's instructions, demonstrate how to measure air quality pollutants in different indoor and outdoor environments. You may measure directly different pollutant sources. Trainers will have to have training beforehand on how to use these monitors.	Demonstration





10 mins	Record the measurements through the provided application at several intervals during the day and over several days of the training.	Recording
15 mins	Discuss the findings with trainees; highlight the daily variations, potential sources and health effects. Highlight some of the reasons why variations may occur such as cooking times, rush hour traffic or industrial work schedules.	Discussion
10 mins	Demonstrate or show a video of an air quality monitoring station for comparison with LCS.	Demonstration
15 mins	Discuss the strengths and weaknesses between LCS vs air quality monitoring stations and see which instrument is most appropriate given the reasons for monitoring (e.g. some factors to consider include accuracy, subject compliance, size of area/population covered).	Discussion

Fig. 7.  
Use of LCS for raising  
awareness about  
air pollution



Demonstration of the use of an air quality LCS for raising awareness purposes meeting the community in a rural village in Kigali District. Activity as part of the Building capacity of the health workers through the Air Pollution and Health Training toolkit (APHT): a train-the-trainer pilot workshop, Rwanda; 2024.  
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## 2.6 Field visit: air pollution and health – sources, stakeholders and solutions

*This activity is structured around the visit of a site where sources of air pollution and/or its effects can be observed. Depending on the location of the training session, trainees will or will not be familiar with the different sources of air pollution in the surrounding area. Organizing a field visit or tour to examine various locations and air pollution sources can provide an opportunity for participants to witness first hand its health effects and further discuss or identify potential interventions at the individual or population level.*

### Purpose

This activity is designed to:

- Engage trainees to identify key sources of air pollution, vulnerable/susceptible groups, health effects and potential mitigation measures.
- Enable health workers to compare air pollution exposure measurements across potential sources of community exposure.

### Online/in person

In-person training only.

### Duration

3–4 hours.

### Methodology

Guided tour, interview, photography.

### Resource

Guide and focal point at each site, map, field visit observation and questionnaire guide, LCS, camera (do not forget to ask for permission to take photos!).

## STEPS

When	What	Methodology
Consider 1 week for preparation	<ol style="list-style-type: none"> <li>1. Examine a map of a region, highlighting key features. Identify slum areas, high traffic corridors, industrial zones, rural areas and where household air pollution sources may be present.</li> <li>2. Identify point sources of air pollution and areas where ambient air pollution may be high.</li> <li>3. Identify air pollution monitoring stations in the region.</li> <li>4. Identify key people who can introduce you to certain communities and settings. It is essential to engage with the community in a respectful and mindful way. This requires identifying key actors in the community in order to facilitate the identification of relevant sites.</li> <li>5. Research key air pollutants that may be emitted from these sources and understand variations in emissions by day, week, month and season.</li> <li>6. Identify a health facility in a particularly polluted zone.</li> <li>7. Consider obtaining air quality data using an LCS for the day of the field visit and discuss the data with trainees and the community.</li> </ol>	Preparation



When	What	Methodology
	<p>8. Identify a route which trainees can walk, cycle or drive to examine particular sources. Try to identify an area where there is a concentration of sources.</p> <p>9. If necessary, rent a bus or car to transport trainees.</p> <p>It can be useful to provide protective gear for the trainees. It is also important to explicitly seek permission to take photos and use photos in publications/website, especially where photos contain identifiable people.</p> <p><b>Air pollution source examples</b></p> <p><b>Slum</b></p> <ul style="list-style-type: none"><li>• Dirty fuels and technologies for cooking, heating or lighting</li><li>• Unventilated cooking and living spaces</li><li>• Children with mothers in cooking spaces</li><li>• Open waste burning and other ineffective waste management practices</li><li>• Informal work including:<ul style="list-style-type: none"><li>o making pots out of molten metal waste</li><li>o car repair</li><li>o informal smelting operations</li><li>o informal e-waste recycling</li><li>o brick kilns</li><li>o smoking fish</li><li>o charcoal production</li></ul></li></ul> <p><b>Traffic corridor</b></p> <ul style="list-style-type: none"><li>• Vehicle types in a traffic corridor and the main pollutants from each, including: heavy duty vehicles, diesel vehicles, two-stroke tuk tuk (auto rickshaw)</li><li>• Volume of traffic</li><li>• Note the change in air pollution levels with the distance from traffic corridors</li><li>• Traffic produced in dusty, unpaved or poorly maintained roads</li></ul> <p><b>Industrial zone</b></p> <ul style="list-style-type: none"><li>• Various industries across the zone</li><li>• Emissions from industry and specific pollutants</li><li>• Air pollution control systems</li></ul>	



When	What	Methodology
	<p><b>Landfill sites</b></p> <ul style="list-style-type: none"> <li>• Methane gas</li> </ul> <p><b>Construction or mining sites</b></p> <ul style="list-style-type: none"> <li>• Dust production</li> </ul> <p><b>Agricultural sites</b></p> <ul style="list-style-type: none"> <li>• Crop burning</li> </ul> <p><b>Indoor environments</b></p> <ul style="list-style-type: none"> <li>• Households</li> <li>• Cooking, heating and lighting fuels and technologies</li> <li>• Building materials</li> <li>• Combustion appliances</li> <li>• Maintenance products</li> </ul> <p><b>Air quality monitoring station you can consider the following:</b></p> <ul style="list-style-type: none"> <li>• How monitoring station works</li> <li>• What they measure</li> <li>• Where they are located</li> </ul> <p><b>Health centre in tour area you can consider the following:</b></p> <ul style="list-style-type: none"> <li>• Does the health centre have dependable electricity?</li> <li>• Is there a generator or other polluting source of energy?</li> </ul>	
Step 1	<p>Have trainees available at the meeting point for starting the tour at least 30 minutes before the start time.</p> <p>If you rent a bus or car, make sure the tour location is not more than 1 hour from the training centre.</p> <p>Have trainees break into groups.</p> <p>Get to your location for the start of the field visit.</p>	Organization
Step 2	<p>Have trainees observe the site closely, including, pollution sources, vulnerable/susceptible groups and individuals as well as potential interventions.</p> <p>Take photos and use them for discussion at the training venue. The authorization from the people on the site needs to be explicitly requested beforehand to avoid any misunderstanding.</p>	Observation

When	What	Methodology
Step 3	Have trainees break into smaller groups; each group visiting a particular example of an air pollution hotspot and interviewing key respondents to access their knowledge and perceptions on personal and community health impacts of the air pollutants. You can ask participants to use the template “Field visit observation and questionnaire guide” (see <b>Annex 6</b> ), which can be modified according to your needs.	Interview
Step 4	Trainees may also interview health professionals to discuss whether they see an exacerbation of health effects in their clinical practice on days with poor air quality.	Interview
Step 5	<b>Wrap up:</b> Have trainees present their findings from the field visit, such as air pollutants, sources, health effects, barriers to mitigation, potential interventions at the individual or population level.	Presentation
Step 6	<b>Follow up:</b> Field visits provide a wealth of information and examples that can be useful for other activities. Documenting this via notes, photos and videos should be considered.	

Fig. 8.  
Observing the effects  
of air pollution  
on a field visit



A CHW raising awareness on household air pollution in a village in Kigali District. Activity part of the Building capacity of the health workers through the Air Pollution and Health Training toolkit (APHT): a train-the-trainer pilot workshop, Rwanda; 2024.  
© WHO/Belyse Inamahoro.

Smoke coming from a three-stone stove in a rural household in Kigali District. Activity part of the Building capacity of the health workers through the Air Pollution and Health Training toolkit (APHT): a train-the-trainer pilot workshop, Rwanda; 2024.  
© WHO/Samantha Pegoraro.



## 2.7 Air pollution and health clinical case scenarios

The air pollution and health clinical case scenarios are an educational tool that combines clinical reasoning with environmental risk factors such as air pollution. This activity encourages the application of knowledge gained on the link between air pollution and health to real-life clinical case scenarios.

Each scenario focuses on:

- Diverse and specific air pollution diseases (e.g. cardiovascular diseases, respiratory health, children's health/reproductive health outcomes).
- Higher risk groups (e.g. older people, pregnant women, children).
- Exposure to ambient and/or household air pollution in urban or rural settings, with a special focus on LMICs.

The methodology for development of the clinical case scenarios is the Script Concordance Test, which is used to assess clinical reasoning in ambiguous or uncertain situations (40,41). Although the strength of evidence of the health impacts of air pollution is well assessed and acknowledged by the scientific community, taking into account uncertainty mostly in the context of causality at the individual level is important. A vignette describes a clinical situation in a few lines, followed by questions that health professionals would ask in that same situation. A hypothesis or option is proposed, then new information is delivered. Hence, the learner is requested to assess if the new information changes the hypothesis, and how, on a Likert scale. The learner's answer is compared with those of experts. An example of a clinical case scenario is provided in **Annex 7**.

### Purpose

To improve reasoning and decision-making skills among health workers related to air pollution in the health assessments of their patients and their ability to induce action at the individual and the community level. The activity has a number of specific objectives:

- To identify air pollution exposure as a risk factor for health.
- To understand and include air pollution knowledge in the assessment of a patient.
- To identify individuals who might be at higher risk.
- To identify the potentiating, synergistic or confounding role of air pollution with other risk factors of health outcomes.

- To identify key air pollution exposure prevention interventions which could be delivered through individual (e.g. behaviour change), community and public health action.
- To empower patients with the knowledge to recognize air pollution related diseases and how to reduce their risk.

### Online/in person

Suitable for both online and in-person workshops.

### Duration

60–90 minutes per clinical case scenario, adaptable.

### Resource

A case scenario example you can use is available in **Annex 7**.





## STEPS

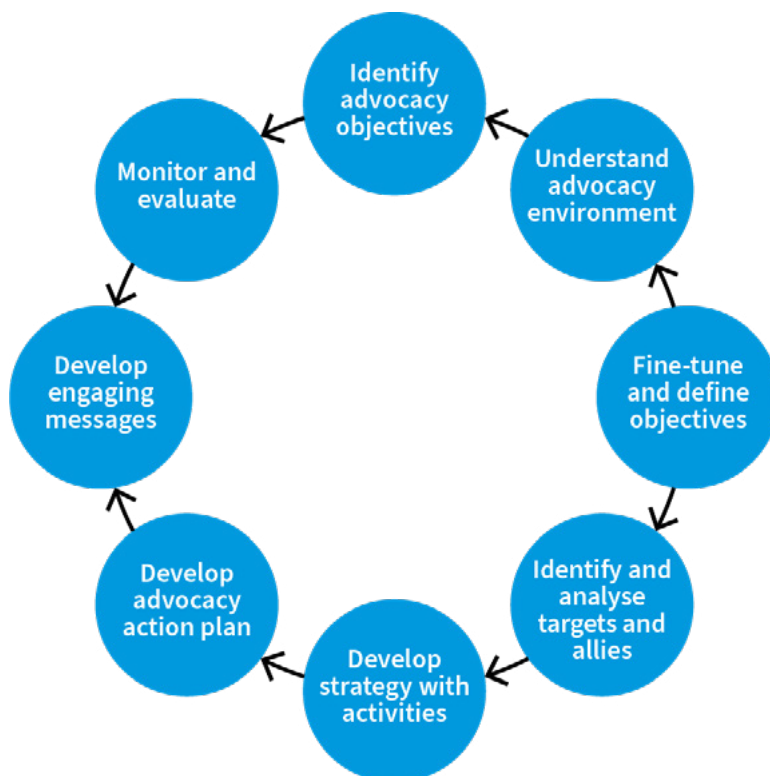
When	Activity	Methodology
Step 1	<p>Present the first vignette of a clinical case scenario and ask trainees to answer the impact on the hypothesis through an interactive platform.</p> <p>Explain to trainees that each scenario consists of a series of vignettes.</p> <p>Each vignette contains:</p> <ol style="list-style-type: none"><li>1. An initial narrative (description of the patient).</li><li>2. A predefined hypothesis (if you think that ...).</li><li>3. New information (and then you discover that ...).</li><li>4. A decision to be made (how does the new information change your hypothesis?).</li></ol> <div><div><input type="checkbox"/></div><div>Strongly disagree</div></div> <div><div><input type="checkbox"/></div><div>Disagree</div></div> <div><div><input type="checkbox"/></div><div>Neither agree nor disagree</div></div> <div><div><input type="checkbox"/></div><div>Agree</div></div> <div><div><input type="checkbox"/></div><div>Strongly agree</div></div> <p>The opinion of a number of experts is shown at the end of each scenario, after the user has selected their choice. The user can then compare it with their own.</p> <p>Remember – there are no right or wrong answers!</p>	Presentation Interactive software
Step 2	Show trainees’ responses and discuss why they chose these responses.	Presentation Discussion
Step 3	Show expert responses and discuss the reasoning behind why experts have provided these responses and the degree of uncertainty.	Presentation Discussion
Step 4	Repeat the above sequence for each vignette.	Presentation Discussion
Step 5	Present key messages to be learned from the clinical case scenario and feedback from the trainees.	Presentation Discussion



## 2.8 Advocacy strategy development

*This activity puts the trainees in the shoes of advocates. Health care professionals are uniquely placed to advocate on behalf of their patients. They also have the credibility and the opportunity to advocate for their community to mitigate risks from air pollution and improve air quality. This exercise allows trainees to understand how to use the information gathered during the workshop training sessions to influence decision-makers and boost cross-sectorial action for clean air.*

Fig. 9.  
Advocacy strategy cycle



An advocacy strategy is a system or method for organizing activities to meet a particular set of goals. You can use one or all of the steps in this exercise during the training to get trainees to think about how they would influence change in their region. Consider the advocacy cycle for air pollution and health (see Fig. 9) for an introduction to the steps of this activity.

Most health workers advocate on behalf of their patients; however, they also have an opportunity to advocate for their community to mitigate risks from air pollution.



Key principles should guide a health professional on advocacy. They include:

- Using their credibility to make the link between air pollution and health for their patients and community.
- Ensuring their arguments are evidence based.
- Staying within their area of health expertise to support advocacy.
- Identify and collaborate with relevant experts and stakeholders who can strengthen the outreach efforts.

#### **Purpose**

The purpose of this activity is to engage trainees to develop an advocacy strategy to mitigate air pollution's impact on health in their region.

#### **Online/in person**

More suitable for in-person workshop but can be used online.

#### **Duration**

Around 3.5 hours

#### **Methodology**

Brainstorming, planning

#### **Resource**

Flipchart paper, markers, laptop.

## STEPS

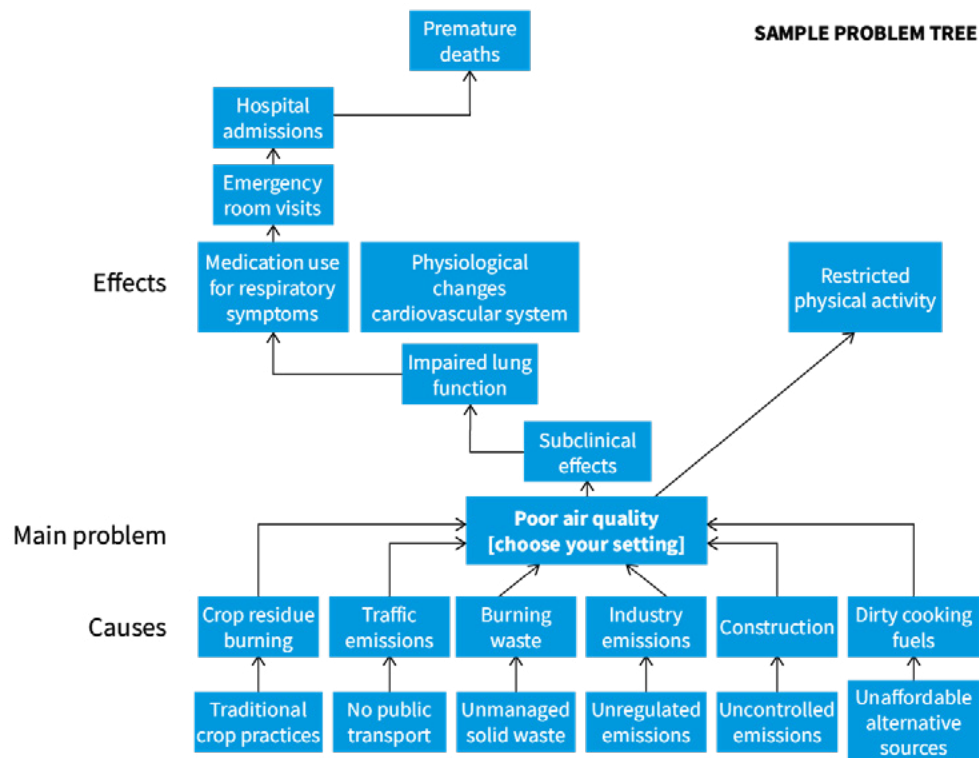
When	What	Methodology
Pre-session	<p>Trainees should be divided into groups according to their community, city, country or region.</p> <p>Ask trainees to follow the steps below to build an advocacy strategy on air pollution and health (e.g. groups can be advocating for changes such as active transportation, more bike lanes, eliminating coal as a power source, switching solid fuel for cooking to liquid petroleum gas in the region, etc.).</p>	Instructions
Step 1	<p><b>Identify advocacy objectives</b></p> <p>Ask trainees to identify the main problem linked to air pollution and health in a city, community or region and build a problem tree (see example).</p> <p>Identify the causes of the main problem, especially the underlying root causes, such as economics, regulation or practices.</p> <p>When analysing the context ask the trainees to pay particular attention to factors such as:</p> <ul style="list-style-type: none"> <li>• history, politics, legislative or security;</li> <li>• society and culture cultural; and</li> <li>• environmental health policy.</li> </ul>	<p>Brainstorming</p> <p>Discussion</p> <p>Diagramming</p>



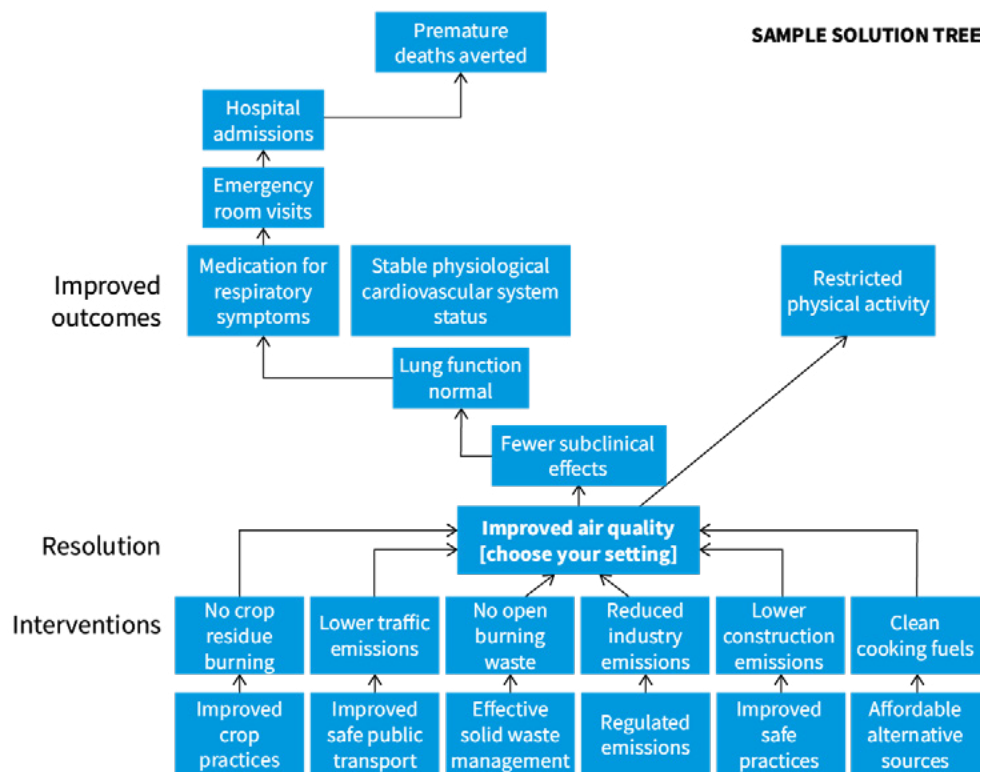
## Time

## What

## Methodology

Outline a  
problem tree

Build a **solution tree** to identify interventions to address the problems





Time	What	Methodology
	<p>Identify the barriers and constraints to changes to legislation, politics or practices.</p> <p>Identify the objectives of the advocacy.</p> <p>Identify the different stakeholders and their sphere of influence.</p> <p>Identify windows of opportunity for health care professionals to influence stakeholders at local, regional, national and international level.</p>	
Step 2	<p><b>Understand the advocacy environment</b></p> <p>Identify and analyse the:</p> <ul style="list-style-type: none"><li>• political context</li><li>• social context</li><li>• legal framework</li><li>• different channels and levers of influence</li><li>• media context</li><li>• stakeholders.</li></ul>	Discussion Analysis
Step 3	<p><b>Define SMART objectives</b></p> <p>Once a deeper analysis has been conducted, identify SMART objectives for the advocacy strategy. These include:</p> <p><b>Specific</b> – Who does, what, when and how?</p> <p><b>Measurable</b> – Can we measure the outcome?</p> <p><b>Attainable</b> – Is it possible to achieve this objective?</p> <p><b>Realistic</b> – Is it really possible to achieve this objective? Is it relevant to the issue?</p> <p><b>Time-bound</b> – Is there a timeframe and specific deadline for this strategy?</p>	Discussion Analysis



Time	What	Methodology
Step 4	<p><b>Identify and analyse your targets and allies</b></p> <p>List stakeholders or actors that may be:</p> <ul style="list-style-type: none"> <li>• Primary targets – decision-makers with power to make direct change.</li> <li>• Secondary targets – stakeholders that have access to decision-makers that you can access more easily.</li> <li>• Position stakeholders on a stakeholder map to identify who has power to influence decisions and who is close to the problem. Trainees can use a map the audience and categorize by role using the example below.</li> </ul>	<p>Discussion</p> <p>Analysis</p> <p>Diagramming</p>
<p style="text-align: center;"><b>Mapping stakeholders</b></p> <p><b>High energy and action</b></p> <p><b>Blockers</b> = active resisters</p> <p><b>Champions</b> = active supporters</p> <p><b>No energy or action</b></p> <p><b>Avoiders</b> = passive resisters</p> <p><b>Silent boosters</b> = passive supporters</p> <p>Disagree with your mission      Agree with your mission</p> <p><b>High energy and action</b></p> <p><b>Blockers</b></p> <ul style="list-style-type: none"> <li>• Monitor what they are saying and who is listening to them</li> <li>• If they are not influential, assess impact</li> <li>• Confront if their influence is significant</li> <li>• Counteract by giving facts and enlisting champions</li> </ul> <p><b>Champions</b></p> <ul style="list-style-type: none"> <li>• Give them information</li> <li>• Acknowledge their contributions</li> <li>• Let them champion your cause</li> </ul> <p><b>No energy or action</b></p> <p><b>Avoiders</b></p> <ul style="list-style-type: none"> <li>• Inform or ignore</li> <li>• Get critical mass of champions to influence them</li> </ul> <p><b>Silent boosters</b></p> <ul style="list-style-type: none"> <li>• Educate, enable, inform and motivate</li> <li>• Energize them by involving champions they admire</li> </ul> <p>Disagree with your mission      Agree with your mission</p>		



Time	What	Methodology
Step 5	<b>Develop a strategy and related activities</b>  Identify activities that health care professionals can implement to influence decision-makers: <ul style="list-style-type: none"><li>• Expertise including personal testimonies, clinical observations, data collection, country and/or patients' case studies.</li><li>• Join associations, alliances and coalitions.</li><li>• Communication/media tools.</li><li>• Mobilize public opinion.</li><li>• Lobby.</li></ul>	Discussion Analysis
Step 6	<b>Develop an advocacy action plan</b>  Develop a timeline for activities for the advocacy strategy.  Questions to ask when developing the plan include: <ul style="list-style-type: none"><li>• Are the intended advocacy objectives SMART (Specific, Measurable, Achievable, Reliable, Time-bound)?</li><li>• Who are the potential partners and allies?</li><li>• Who are the antagonistic actors?</li><li>• What activities can be put in place to influence the decision-makers?</li><li>• Do you have the data and arguments to influence decision-makers?</li><li>• What resources are needed (e.g. human, financial, etc.)?</li><li>• What is a realistic timetable?</li><li>• Who is in charge of what?</li></ul>	Discussion Analysis



Time	What	Methodology
Step 7	<p><b>Develop engaging messages</b></p> <p>Ask trainees to identify:</p> <ul style="list-style-type: none"><li>• Stakeholders that will receive the messages.</li><li>• Stated goals of the stakeholders (vision, objective).</li><li>• Unstated goals (personal, intention).</li><li>• Interest, motivations, values and needs.</li></ul> <p>Based on the above responses, consider why would or should stakeholders care about the activity/ask/advocacy related to air pollution.</p> <p>Then ask trainees to identify:</p> <ul style="list-style-type: none"><li>• The main objective/ask of the pitch?</li><li>• What do they want the stakeholders to do as a result of the pitch?</li><li>• What do the stakeholders need to know to inspire their action?</li><li>• What tone do they want to set? Formal? Casual?</li><li>• How do they want the stakeholders to feel during and after the pitch? Informed? Inspired? Enlightened? Motivated?</li></ul> <p>Based on this analysis, an engaging message can be developed.</p>	Discussion Analysis
Step 8	<p><b>Presentation and discussion points</b></p> <p>Have trainees present their advocacy strategy to the group.</p> <p>Discuss whether trainees believe they could influence the required change in their country, city or region.</p> <p>Highlight the variety of activities and strategies that could be used.</p> <p>Discuss how they can get started</p> <p>Ask the trainees to make a pledge to engage in advocacy on air pollution and health.</p>	Presentation
Step 9	<p>Summarize the key strategies that have been presented and encourage participants to implement them.</p>	





Time	What	Methodology
Step 10	<b>Follow up:</b> You could encourage trainees to obtain five interviews with five decision-makers to discuss clean air recommendations in their context (e.g. public transportation) within 1 year, for example. The implementation of the advocacy strategy could also be monitored and integrated into training follow-up activities, when relevant.	



## 2.9 Simulation on drafting an air pollution and health action plan

This simulation session will give trainees the opportunity to practise negotiation and reflect beyond their usual scope of clinical practice. Air pollution issues require multidisciplinary partnerships between many different sectors, including the health sector.

After this session, trainees will be equipped with the skills needed to promote the health co-benefits of clean air and sustainable solutions, include health as an argument for the development of policies to reduce air pollution at national, regional or local level, and play a participatory role as health workers and professionals in advocacy actions for the reduction of air pollution and the protection and promotion of health and well-being.

### Purpose

To equip the trainees with the skills to plan and negotiate for action concerning clean air in both the short and long term.

### Online/in person

More suitable for in-person workshop but can be used online.

### Duration

90 minutes.

### Methodology

Small group discussion:

- A brief presentation about air pollution and governance.

- There will be a situation of either short- or long-term air pollution exposure and trainees will try to fix the problem by taking on different national, regional or local roles, such as representatives of the health, environment, education sectors etc. Subsequently, the trainees will attempt to agree on a common policy or action plan that could fix the situation.
- A scenario of a chronic ally high air pollution situation can also be provided.

### Resource

Description of different stakeholders, case study, slideshow, projector and screen, flipchart, markers.

## STEPS

When	Activity	Methodology
Step 1	<p><b>Introduction</b></p> <p>Choose an air pollution scenario and present it to trainees. Describe details related to air pollutant levels, health effects and various stakeholders that are responsible for making decisions to improve the situation.</p> <p>Case studies could include both ambient and household related issues at national, regional or local level.</p>	Presentation



When	Activity	Methodology
Step 2	<p><b>Introduction to the activity</b></p> <ul style="list-style-type: none"><li>• Divide trainees into small groups.</li><li>• Present the case study.</li><li>• Assign each group of trainees stakeholder roles from different sectors with instructions about who they will be representing.</li><li>• Outline the general expectations regarding their roles as stakeholders and ensure that the roles are adequately described.</li><li>• Sectors include, but are not limited to: health care, transport, industry, education, housing, power generation and agriculture at municipal, regional, national and international levels.</li></ul> <p><b>Develop recommendations</b></p> <ul style="list-style-type: none"><li>• Give trainees 10 minutes to make at least two short-term recommendations to address the air pollution crisis based on the technical knowledge and skills they have learned from the training modules and their own experience.</li><li>• Give trainees an additional 5 minutes to make at least one long-term recommendation to deal with the air pollution crisis.</li><li>• What capacities will the health sector need in order to effectively implement these recommendations?</li></ul> <p><b>Discussions and negotiations</b></p> <ul style="list-style-type: none"><li>• Ask trainees, in their role as a stakeholder, to identify categories under which recommendations may be made (e.g. education, transport).</li><li>• Once the categories have been decided upon. Each stakeholder group will make recommendations in each category using in part health impacts as an argument (e.g. education – school closure; transport – no cars in city centre).</li><li>• Each stakeholder group will present their set of short- and long-term recommendations on a slide or flipchart.</li><li>• When recommendations have been made, the activity facilitator will encourage negotiation and debate between the different groups of trainees (stakeholders). One group could role play the health sector and convene the other sectors.</li></ul>	Simulation



When	Activity	Methodology
	<p><b>Conclusion</b></p> <ul style="list-style-type: none"><li>• Once stakeholders have reached agreement, trainees present the finalized action plan as the outcome of the activity.</li></ul> <p>The trainer or a trainee will act as note taker during the simulation by writing down recommendations on a slide or flipchart making modifications based on the ongoing negotiation process.</p>	
Step 3	<p><b>Wrap up:</b> Encourage trainees to talk freely about both the easy and difficult points in the negotiation process. Ask them to reflect on the complexity of governance when attempting to address the topic of air pollution and health.</p>	Discussion in plenary



## 2.10 Personal action plan for clean air

Health care professionals can undertake a number of individual actions to tackle air pollution and its effects on health. The modules provide some examples that can generate further ideas specific to the trainees' context.

### Purpose

To enable trainees to brainstorm individual actions that they can take back to their workplace and home to tackle air pollution and health.

### Online/in person

More suitable for in-person workshop but can be used online.

### Duration

30 minutes.

### Methodology

Brainstorm, discussion.

### Resource

Tables and chairs, blank paper, coloured markers, laptops (optional).

## STEPS

Time	What	Methodology
5 mins	<p>Ask trainees to gather around various tables set up in the room. The space should resemble a coffee bar where trainees can choose where to sit.</p> <p>Place piles of blank A4 paper and coloured markers at a number of points on each table. Alternatively, a laptop can be used.</p>	Preparation
15 mins	<p>Ask trainees to read the handouts of the modules they have been given and review their notes. Ask them to note one or two actions they will take at work or home to tackle air pollution and health.</p> <p>Ask trainees some upstream questions such as:</p> <ul style="list-style-type: none"> <li>• <i>What am I going to do with the information that I learned?</i></li> <li>• <i>Who are my audiences I want to share the information and knowledge with and elicit action?</i></li> <li>• <i>How do I translate the material for my audience so that the probability of understanding and taking action is maximized?</i></li> <li>• <i>How can I incorporate air pollution as a risk factor in my practice as a clinician or public health practitioner?</i></li> </ul>	Reading Brainstorming



Time	What	Methodology
	<p>Trainees can follow the five steps of making an action plan including:</p> <ol style="list-style-type: none"><li>1. Identifying SMART (Specific, Measurable, Achievable, Reliable, Time-bound) objectives.</li><li>2. Developing a list of actions for each objective.</li><li>3. Identifying resources needed.</li><li>4. Creating timeline.</li><li>5. Setting up a way to monitor progress.</li></ol> <p>Move around the tables at a slight distance to get a sense of action lists/plans that the trainees are creating and provide feedback.</p>	
5 mins	<p>Congratulate trainees on their synthesis of action ideas. Ask whether there are any areas of overlap, or actions that could be grouped together. If there is an action too huge to achieve for a trainee on their own, ask trainees to rewrite it so that it can be realistically achievable.</p>	
10 mins	<p>Ask trainees to create a table that lists each action and also the following items:</p> <ul style="list-style-type: none"><li>• Who will they need to work with to achieve this?</li><li>• Is approval needed, by whom, or by what process?</li><li>• What are the potential barriers and how you will overcome them?</li><li>• Is there a timeframe for when they will complete this action?</li><li>• Is there anything else is needed to achieve this action?</li></ul> <p>Ask them to create the action plan.</p> <p><b>Wrap up:</b> Thank everyone for their action plans.</p>	Brainstorming



## 2.11 Country or regional action planning for clean air

Planning for action at the country or regional level on reducing the impact of air pollution and health can empower trainees to influence national agendas. As a result of creating an action plan during this exercise, trainees can potentially use it to inform regional or national authorities about priorities and approaches.

### Purpose

To enable participants to connect with colleagues in their country/region to generate actions that will help prevent the negative health impacts of air pollution. To facilitate a sense of action and enthusiasm at the culmination of the training.

### Online/in person

More suitable for in-person workshop but can be used online.

### Duration

Around 120 minutes.

### Methodology

Brainstorming and presentation.

### Resource

Flipchart, markers.

## STEPS

Time	Activity	Methodology
5 mins	Split trainees into regional groups or groups that they feel comfortable in.	
10 mins	Ask each group to brainstorm on a list of topics they would like to address in a country national or regional action plan.	Brainstorming
45 mins	<p>Ask groups to choose one topic to focus on to develop an action plan.</p> <p>Ask trainees to list:</p> <ul style="list-style-type: none"><li>• SMART (Specific, Measurable, Achievable, Reliable, Time-bound) objectives.</li><li>• Actions for each objective.</li></ul> <p>Move around the groups at a slight distance to get a sense of the action lists/plans that trainees are creating and provide feedback.</p>	Brainstorming
5 mins	Congratulate trainees on their synthesis of action ideas. Ask if there are any areas of overlap, or actions that could be grouped together. If there is an action too huge to achieve on their own, ask them to rewrite it so that it can be realistically achievable.	





Time	Activity	Methodology
20 mins	Ask trainees to further identify: <ul style="list-style-type: none"><li>• stakeholders</li><li>• resources needed</li><li>• timeline.</li></ul>	Brainstorming
30 mins	If time permits ask trainees to present the action plans to the larger group.  <b>Wrap up:</b> Thank everyone for their action plans and acknowledge them as a fantastic outcome from the training.	Presentation



## 2.12 Train-the-trainers session

This activity helps introduce the TtT manual as a useful resource for trainees/soon-to-be trainers. It is also articulated around simulating how trainees would use this training resource in their own training activity, such as organizing another in-person workshop, an online event on changing the health training curriculum of future health professionals.

### Purpose

To have participants actively engage in designing their own training sessions using this manual and their own creativity.

### Duration

Ideally 2 to 3 hours.

### Resource

Flipcharts, markers, laptop, this manual.

### STEPS

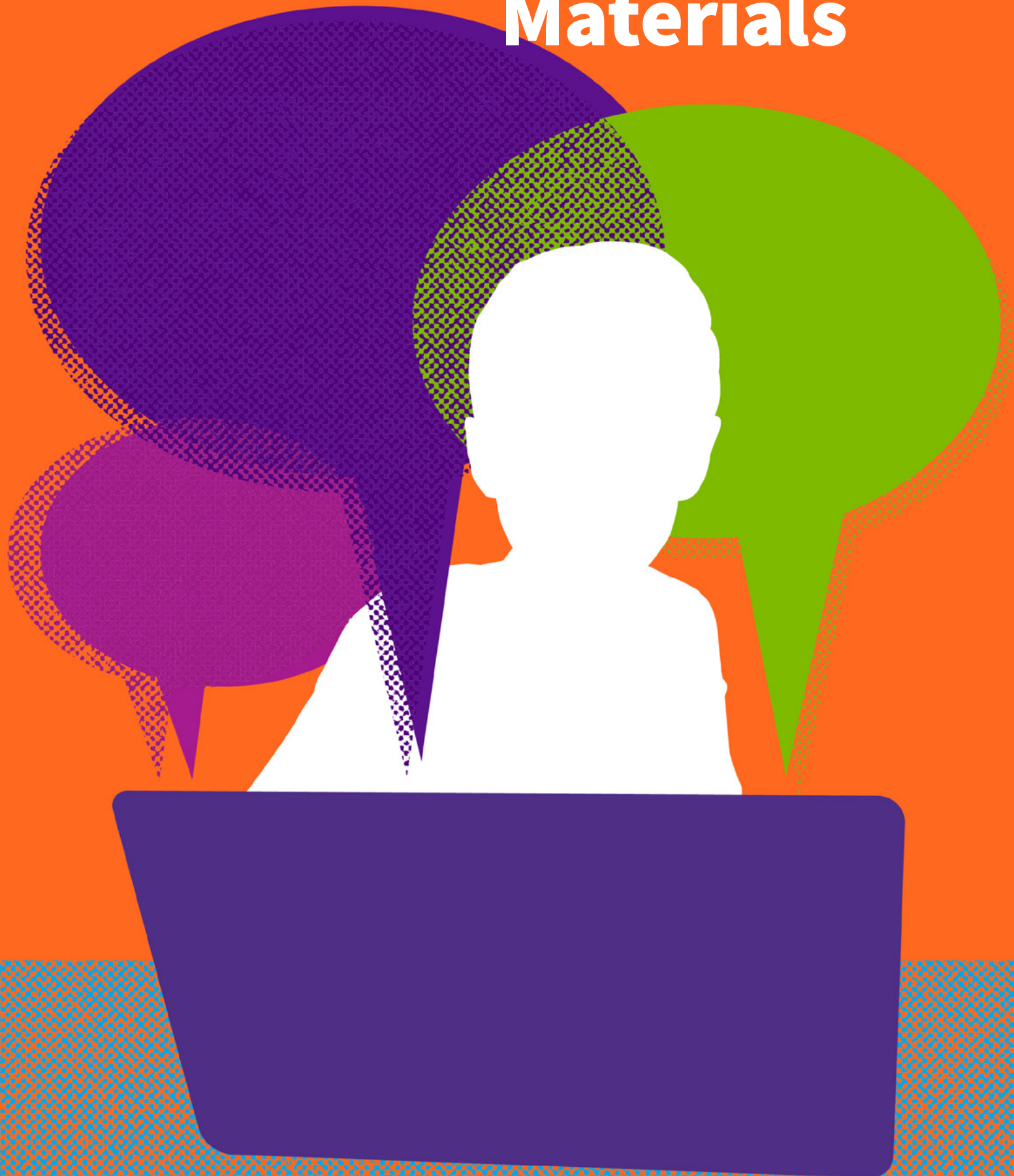
When	Activity	Methodology
Step 1	<p>The TtT manual is presented in plenary to all the trainees. The presentation should go beyond browsing the manual. The goal of the presentation is to:</p> <ul style="list-style-type: none"> <li>• Ensure that the trainees know what the manual is and how to use it.</li> <li>• Present its structure, the main sections, the different type of information that can be found, from theoretical knowledge to hands-on descriptions of interactive session.</li> <li>• Provide some practical tips necessary for conducting training using the information contained in this manual.</li> </ul>	Presentation by the trainer
Step 2	<p>Participants will be divided into five breakout groups according to the following:</p> <ul style="list-style-type: none"> <li>• Group 1: in-person workshop for health workers.</li> <li>• Group 2: online event of 2 hours for health workers.</li> <li>• Group 3: air pollution and health curriculum for future health professionals.</li> <li>• Group 4: celebrate the International Day of Clean Air and Blue Skies<sup>4</sup> with a community campaign.</li> <li>• Group 5: a 1-day event with CHWs.</li> </ul>	Breakout groups

<sup>4</sup> The International Day of Clean Air and Blue Skies was designated on 7 September by the United Nations General Assembly in 2019 responding to the international community's increasing interest in clean air. This international day emphasizes the need to make further efforts to improve air quality to protect human health. For more information see: <https://www.cleanairblueskies.org/>



When	Activity	Methodology
Step 3	<p>For the group you have been assigned to, ask participants to work with this manual and the air pollution and health modules and other resources to develop a concept note or an idea pitch. Encourage participants to use their own creativity and develop other activities and ideas that are not in any of the resources.</p> <p>You can split your breakout group further into pairs or groups of three to work on a workshop agenda.</p> <p>Ask participants to think about the following when creating a workshop:</p> <ul style="list-style-type: none"><li>• format</li><li>• objectives</li><li>• air pollution and health content to present</li><li>• activities</li><li>• timing</li><li>• resources</li><li>• cost</li><li>• types of participants, presenters, facilitators.</li></ul> <p>Circulate around the room to get an idea of what they are working on and answer any questions.</p> <p>The participants can use the flipchart provided or a laptop to brainstorm and develop their final outline. They may put it in presentation format to be stored on a USB key and available for the plenary.</p>	Work in groups
Step 4	<p>Participants will present their outlines in the plenary. Account for time needed for questions and comments.</p> <p>You may also think to have an informal voting/award for the best ideas asking participants to choose their preferred project!</p>	Presentation in plenary

# Materials





## Media materials: engaging with your audience even more!

Videos can provide an excellent way to bring real-world air pollution and health cases into the classroom with a storytelling approach. Below are some useful tips on how to choose videos and facilitate discussion and analysis for a fruitful learning experience.

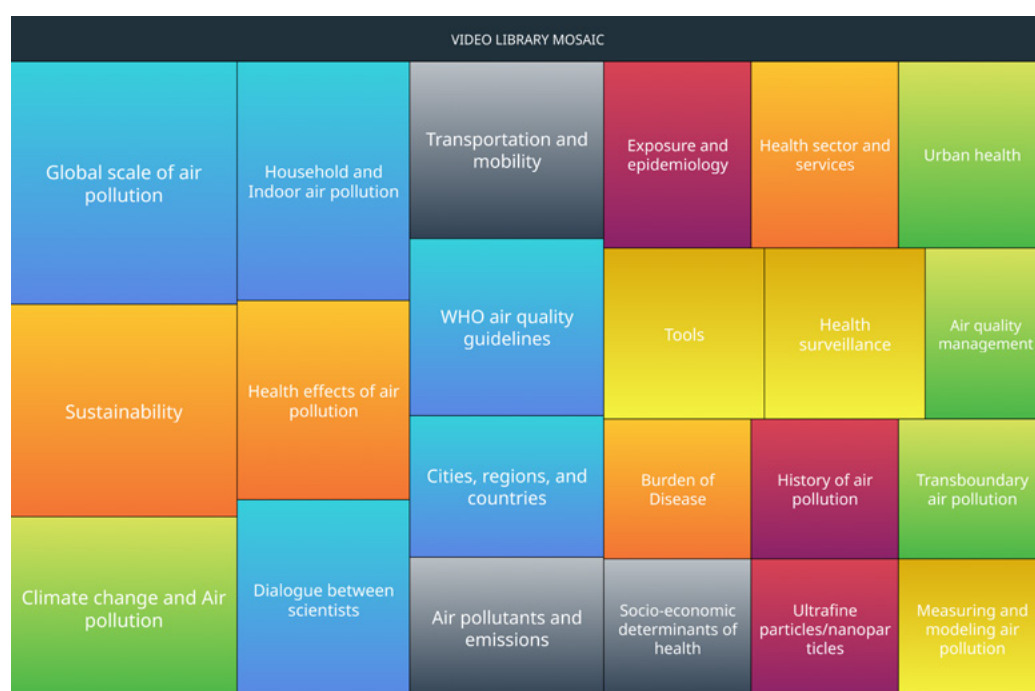
### WHO air pollution and health video playlist

You can find a full package of WHO air pollution and health videos [on this playlist](#) (42).

### Air pollution and health video series on WHO website

Many videos are available on the [WHO website](#) on air pollution and health (43). The set of videos below comes from the WHO air pollution and health video series. They contain relevant content from 40 global experts on air pollution and health and can easily be integrated into your own presentations to keep your audience engaged, facilitating deep dives into specific topics or questions or to make an introductory presentation.

Fig. 10.  
Global experts on air  
quality and health:  
WHO video series



Source: <https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health/videos/mosaic> (43).



### Choosing a video

It is important to choose a video that reflects the learning objectives of your training. It is also important to select one in which both the content and the producers are considered credible. Many modules in the training toolkit already include one or more videos to be shown.

Be sure to watch the video before showing it to the trainees, in order to take notes of salient points as it relates to learning objectives and content of the module you have selected. Ensure that the length does not exceed time limits for the training schedule. The videos should be of good quality to catch the viewers' attention.

If you decide to not use a WHO video, you can consider showing a news report, a documentary or an educational/instructional video. Another option is to select a video or photo story created by a trainee prior to the training.

### Set-up

Explain to trainees why you are showing the video and what to look for. Link the video to the learning objectives of the modules you are presenting.

### Starting and stopping

While it is beneficial to watch a video all the way through, it might also be useful to start and stop at specific moments in order to initiate an analytical discussion about its contents. The moments that are selected should ideally be related to the key themes described in the module being presented.

If a video is short in duration, it may be possible to just watch the clip in its entirety. Afterwards, you can ask probing questions, such as "how does air pollution impact your body?"

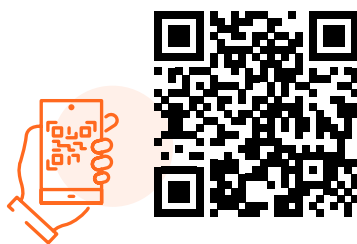




## Resources from the BreatheLife campaign



The BreatheLife global clean air campaign is an important channel for disseminating communications resources and capacity building materials (44). Cities, organizations, individuals, health professionals and stakeholders from the health, energy, environment, transport, waste and land-use sectors will find tools for raising awareness and tracking the progress being made around the world. The website includes articles, videos, infographics and an interactive tool to check city pollution levels. Health professionals can also find data and up-to-date research to stay informed on patient air pollution risks and policies and standards they can support locally. Health professionals can submit BreatheLife stories illustrating local actions in their area to address air pollution and improve health, which will be posted on the website and featured in the regular newsletter. They can also lobby for their city, region or country to join BreatheLife to demonstrate commitment to bringing air quality to healthy levels and collaborate on the clean air solutions that will help us get there.



Source: <https://breathelife2030.org/>.





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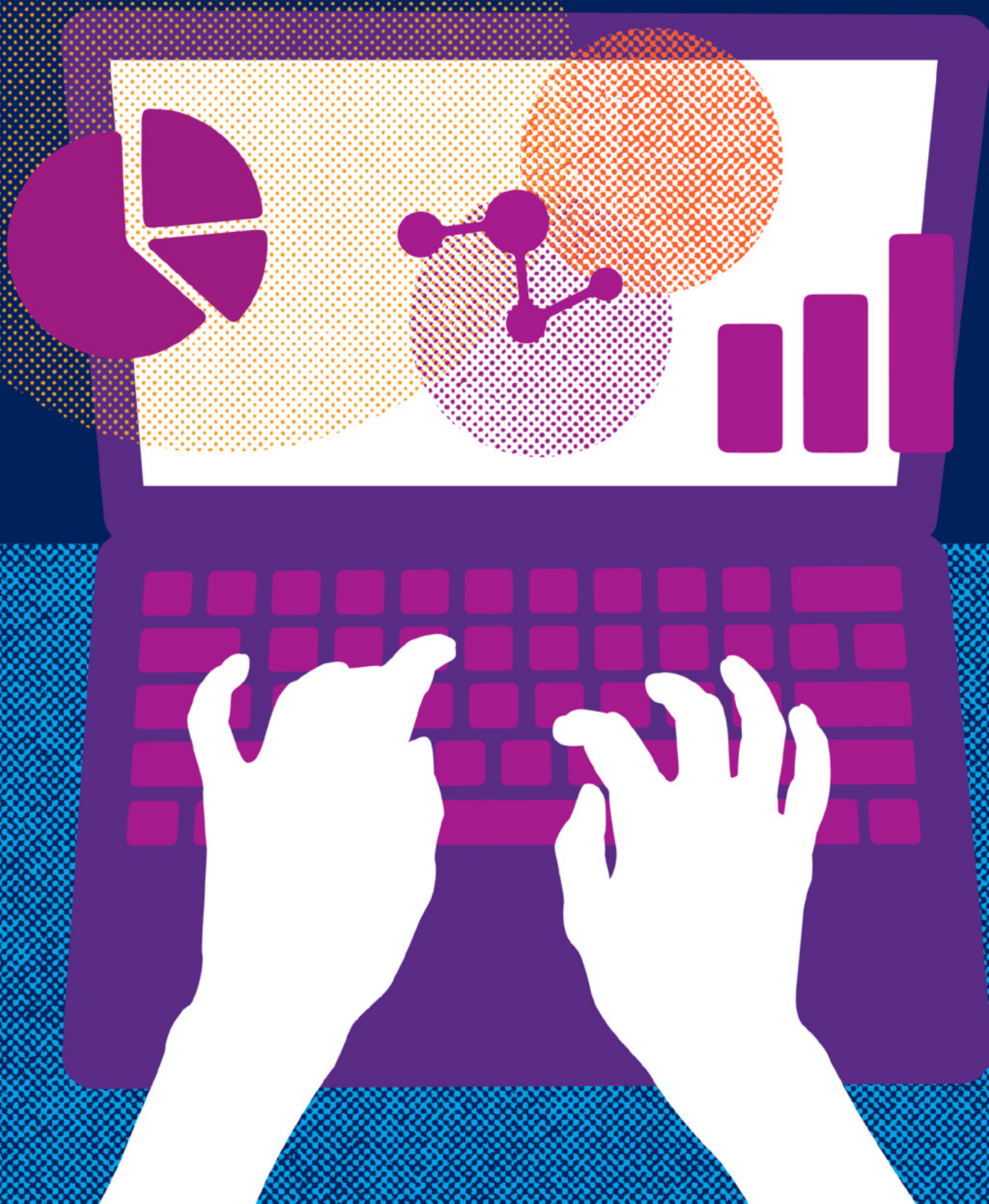
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# Annexes





# Annex 1. Checklist for in-person training equipment and venue

The training toolkit is designed to achieve enhanced learning outcomes and value for trainees by running training modules, interactive activities with small group exercises, as well as field visits.

The checklists below include the most common requirements that are important to consider for effective in-person training delivery. Adjustments to these lists might be required according to the specific needs of your event, so revise them carefully and feel free to make the appropriate modifications.

## Checklist for training equipment

Equipment requirement	Tips	Who should provide
Laptops and charging cables	Include on the laptop all presentations and materials you need (including downloaded videos in case of internet connections issues)	Training organizer/host
Projector with charging cable		Training organizer/host or venue
Projector cable for laptop	Make sure you have the right cables for the specific projectors/laptop – use an adaptor if needed	Training organizer/host
Audio speakers	Important if you use videos	Training organizer/host
Clicker	Consider buying spare batteries	Training organizer/host
Clock	To manage time wisely	Training organizer/host
Bell, chimes or gentle noise maker	To attract trainees' attention when needed	
Flipchart, whiteboard	For breakout groups or when presenting	Training organizer/venue



Equipment requirement	Tips	Who should provide
Good internet connection	Important for interactive activities and access to information	Venue
Electrical outlets		Venue
Portable air quality (optional)	Can be used for demonstrations and field visits	Training organizer
Coffee machine and water jugs	For break times	Venue
Water, notepads and pen for participants		
Certificates of attendance		
Attendance list to be signed		

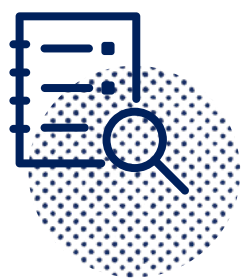
## Checklist for training venue

Venue requirement	Rational	Tips
Easy to find and access location	Convenient for trainees	
Easy to find parking with enough capacity	Makes it convenient for access	
Plenary room		Check the size and number of chairs available, tables for presenters, etc.
Breakout rooms	Useful for group discussions and other small groups activities	Identify the number of rooms needed according to your agenda and number of participants
Storeroom for equipment	To prevent theft of equipment.	
Internet access	For research and interactive activities	The more reliable the better!
Tea, coffee, water facilities	For break time	Otherwise consider hiring a catering service!





Venue requirement	Rational	Tips
<b>Sustainable features</b>	Leading by example on choosing environmentally friendly venues	Look for suppliers that provide environmentally friendly products
<b>Access to public transport if possible</b>	To make it less costly for participants to get to	See if the venue is near a bus or metro station
<b>Additional stationery if required (papers, pens, markers etc.)</b>	To take notes	
<b>Air conditioning/fans/heating that are adjustable</b>	To make the room temperature comfortable	
<b>Catering</b>	To provide food onsite	
<b>Cloakroom/space for participants belongings</b>	To prevent theft of personal items	
<b>A flexible room layout with plenty of space to move around for activities</b>	To provide options for different activities	
<b>Good acoustics and sound proofing</b>	To be able to hear well and not be interrupted by external noise	
<b>Good room lighting</b>	To be able to see presentations well	
<b>Inclusive data projector, flipcharts and audio system</b>	For presentations	
<b>Printing capacity for instantaneous print-out</b>	For training documents that might be developed during the training or that need to be printed on the day of training	
<b>Tables/desks</b>	For writing	
<b>Wall mounted clock visible by the trainers</b>	To allow trainers to keep track of time while training	
<b>Accessibilty for persons with disabilities</b>	To allow for inclusiveness	



# Annex 2. Sample agendas for in-person workshops

## Three-day workshop

Time	Day 1	Day 2	Day 3
Morning	Check-in and registration	Recap Day 1	Recap Day 2
	Opening session and group photo	<b>Training module</b> Health effects of air pollution: a general overview	<b>Interactive session</b> <b>Activity 2.12:</b> Train-the-trainers session
	<b>Interactive session</b> <b>Activity 1.3:</b> Human map	<b>Interactive session</b> <b>Activity 2.7:</b> Air pollution and health clinical case scenarios	
Break			
	<b>Interactive session</b> <b>Activity 1.2:</b> Pre-training quiz	<b>Parallel session 1</b> <b>Training module</b> Air pollution and cardiovascular diseases	<b>Parallel session 2</b> <b>Training module</b> Air pollution and the respiratory system
	<b>Parallel session 3</b> <b>Training module</b> Air pollution: from the womb to childhood	<b>Parallel session 3</b> <b>Training module</b> Air pollution: from the womb to childhood	<b>Interactive session</b> <b>Activity 2.12:</b> Train-the-trainers session (cont.)
	<b>Training module</b> Introduction to ambient air pollution		<b>Interactive session</b> <b>Activity 1.2:</b> Post-training quiz
Lunch			
Afternoon	<b>Training module</b> Introduction to household air pollution	<b>Training module</b> The role of health workers	<b>Interactive session</b> <b>Activity 1.5:</b> Graffiti wall (evaluation)
	<b>Interactive session</b> <b>Activity 1.4:</b> Mapping air pollution sources		Close of workshop
Break			
	<b>Interactive session</b> <b>Activity 2.7:</b> eScience café: bring in the experts	<b>Activity 2.6:</b> Field visit	
	Wrap up Day 1	Wrap up Day 2	

With parallel sessions, you run several activities at the same time. This allows you to split your audience based on different interest or goals. This agenda should be considered as a sample and is fully adaptable based on your specific needs.



## One-day workshop Special focus on household air pollution

## One-day workshop Special focus on ambient air pollution

Time	Day 1	Day 1
Morning	Check-in and registration	Check-in and registration
	Opening session	Opening session
	<b>Interactive session</b> Activity 1.2: Pre-training quiz	<b>Interactive session</b> Activity 1.2: Pre-training quiz
	<b>Training module</b> Introduction to household air pollution	<b>Training module</b> Introduction to ambient air pollution
Break		
	<b>Training module</b> Health effects of air pollution: a general overview	<b>Training module</b> Health effects of air pollution: a general overview
Lunch		
Afternoon	<b>Interactive session</b> <b>Activity 2.11:</b> Country or regional action planning for clean air	<b>Interactive session</b> <b>Activity 2.11:</b> Country or regional action planning for clean air
	<b>Interactive session</b> <b>Activity 2.7:</b> Air pollution and health clinical case scenarios	<b>Interactive session</b> <b>Activity 2.7:</b> Air pollution and health clinical case scenarios
Break		
	<b>Training module</b> The role of health workers	<b>Training module</b> The role of health workers
	Closing session	Closing session

These one-day agendas should be considered as samples and are fully adaptable based on your specific needs. For example, you can decide to shorten the training modules slide deck choosing the most important information to be conveyed and be able to use more modules in a single day.

These sample agendas, with some adjustment, can also be used for online education opportunities.

*Note:* Week-long trainings require more effort to keep the attendance of the trainees – more group activities and short breaks need to be integrated.

The main components of the agenda can include:

- training modules (which can be run in parallel);
- interactive activities;
- session to train the participants to become trainers;
- debriefing session (for organizers only);
- wrap up and next steps; and
- evaluation of the day, i.e. how the training went. This is not about evaluating the knowledge of the trainees.

Wrap up includes reviewing the main messages, the activities done, the objectives achieved and a walk through the next steps, including the precise schedule for the next day. Managing the uncertainty around time, which inevitably occurs with in-person activities, is critical to keeping the attention and interest of your audience. Trainees should know when they are meeting again at any time, to ensure respecting starting times, as well as when they can expect to finish the day or the session.



# Annex 3. Sample budget

Item	Units	Cost per unit	#Units	Amount (local currency)
Trainer fees and salary for organizers and trainers (if applicable)				
Travel cost to training site for trainers and/or trainees				
Accommodation				
Field visit cost: transportation and extra logistic help				
Venue <ul style="list-style-type: none"><li>• Plenary rooms</li><li>• Breakout rooms</li></ul>				
Training equipment <ul style="list-style-type: none"><li>• Audio-visual</li><li>• Printing of training materials</li></ul>				
Laptop				
Internet access				
Stationery				
Printing (e.g. agendas, certificate of attendance, training materials)				



# Annex 4. Pre-training survey

## Air pollution and health: building the capacity of the health workforce

### Pre-workshop online survey

#### Purpose

The purpose of the following survey is to allow organizers to:

1. Identify experiences in the field of air pollution and health trainees might have encountered in daily practice.
2. Learn more about trainees' expectations regarding the air pollution and health workshop.
3. Assess trainees' willingness to become an advocate for air quality and health and take part in the dissemination of knowledge among peers and community.

#### Timing

We request that the survey, which will take approximately 10 minutes, be completed by \_\_\_\_\_

#### Contact point and more information

Questions on the survey can be sent to: \_\_\_\_\_

#### Identification of experiences

1. What is your role within the health sector? (multiple choices possible)

☐ Doctor

☐ Nurse

☐ Midwife

☐ Community health worker

☐ Health care manager/administrator

☐ Environmental health specialist

☐ Public health professional

☐ Epidemiologist

☐ Policy-maker

☐ United Nations representative

☐ Trainer/educator

☐ Student/future health professional

☐ Other: \_\_\_\_\_



1a. What is your specialty (family medicine, cardiology, pneumology, endocrinology, paediatrics, occupational medicine, public health, etc.)?

1b. Are you a member of a health and/or environmental NGO or association? (one option)

☐ Yes

☐ No

1c. If yes, please provide its name and your role:

2. How many years of experience approximately do you have within the health sector? Please provide the number (e.g. 1, 2, 3, ...)

3. Do you have direct contact with patients or people seeking medical advice? (one option)

☐ Yes

☐ No

If yes:

3a. In which settings do you interact with patients? Check all that apply. (multiple choices possible)

☐ Out-patient clinic

☐ Hospital or other in-patient institution

☐ Emergency room

☐ Home setting

☐ Community setting

☐ Pharmacy

☐ Other:

3b. How many patients per month approximately do you see? Please provide the number (e.g. 10, 20, 30, ...)



4. Please assess the degree to which you agree or disagree with the following sentences. (one option)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
I am knowledgeable about air pollution in general	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am knowledgeable about the health effects of air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In my daily work I have been confronted with air pollution and health related issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have wondered whether the air quality in my community could play a role on people's health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think air pollution is considered a risk factor in my community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know how to address adverse health effects related to air pollution exposure at the individual level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know how to address adverse health effects related to air pollution exposure at the population level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I currently counsel patients or engage in community outreach on the health effects of air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
I believe health workers have a role in counselling their patients and the community on the health effects of air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have enough tools to advise my patients and the community on the health effects of air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have advocated towards the institutions in my local/regional/national context on the health effects of air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I believe health workers should receive trainings on air pollution and health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Have you previously attended a training course and/or other educational opportunities on air pollution and health? (one option)

☐ Yes

☐ No

5a. If you said yes, please provide a brief description (name of event, year and context).

---

5b. Do you think that training other health workers on air pollution and health in your region: (select all that apply) (multiple choices possible)

☐ Could increase the knowledge of health workers and their engagement in scientific research?

☐ Is not a field that health workers should be concerned about?

☐ Could help professionals identify prevention strategies for patients and individuals to mitigate their exposure risk?

☐ Could improve patients' and individuals' awareness of air pollution health impacts?

☐ Will not produce any substantial improvement on patient health?



- ☐ Could strengthen the role of the health community in advocating for clean air and strengthen the health argument when it comes to air pollution policy actions by other sectors?
- ☐ Could motivate health workers in advocacy and risk communication activities within their communities?
- ☐ Could improve public policy to reduce the health impacts of air pollution?



6. Where do you think the people in your community get most of their health-related information? (multiple choice possible)

- |  |   |
|--|---|
| <input type="checkbox"/> Friends and family      | <input type="checkbox"/> Social media and influencers |
| <input type="checkbox"/> Doctor                  | <input type="checkbox"/> Television                   |
| <input type="checkbox"/> Nurse                   | <input type="checkbox"/> Radio                        |
| <input type="checkbox"/> Community health worker | <input type="checkbox"/> Internet searches            |
| <input type="checkbox"/> Pharmacist              | <input type="checkbox"/> Education system             |
| <input type="checkbox"/> Telephone help lines    | <input type="checkbox"/> Other:                       |
| <input type="checkbox"/> Religious institution   |   |
| <input type="checkbox"/> Print media             |   |

7. Do you think that the current level of training in health education programmes addresses air pollution in your country? (one option)

- |                                      |                                    |
|--------------------------------------|------------------------------------|
| <input type="checkbox"/> Very strong | <input type="checkbox"/> Weak      |
| <input type="checkbox"/> Strong      | <input type="checkbox"/> Very weak |

#### Description of the way forward and train-the-trainer activities

8. What are your expectations from this training course? (indicate a maximum of three choices) (multiple choices possible)

- ☐ Learn about how air pollution is a risk factor for health.
- ☐ Understand prevention measures to reduce exposure to air pollutants, both at the community and individual level.
- ☐ Learn how to organize and facilitate a training workshop for health professionals on air pollution and health.
- ☐ Have the opportunity to network with other like-minded colleagues.
- ☐ Learn how to build a campaign on air quality and health.
- ☐ Be empowered as an advocate to bring the health argument in all policies related to air pollution in your local/regional/national context.
- ☐ Learn more about WHO's role on air pollution and health issues.
- ☐ Other:



9. How do you envisage the organization of follow-up activities and/or training on air pollution and health targeting health workers after you have completed this training? (select all that apply) (multiple choice).

- ☐ I am considering personally organizing meetings, conferences and training opportunities.
- ☐ I am considering asking other people to organize meetings, conferences and training opportunities.
- ☐ I would like to produce a position paper or other scientific publication.
- ☐ I would like to do research on air pollution and health-related topics.
- ☐ I am interested in producing media and social media products.
- ☐ I plan to meet other colleagues to share my experience.
- ☐ I would like to advocate/work for the inclusion of air pollution in health curricula.
- ☐ I would like to carry out advocacy campaigns for clean air in my community.
- ☐ Other:
- 

10. How many people do you think you can train in a year on air pollution and health? (one option)

- ☐ Fewer than 10 ☐ 50–100
- ☐ 10–20 ☐ More than 100
- ☐ 20–50

11. Are you available to share and discuss the success and challenges of this training activities with colleagues from other countries? (one option)

- ☐ Yes ☐ No ☐ I don't know

12. Which air pollution related health topic(s)/disease(s) would you like to learn more about? Write down all suggestions.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

General comments:

---

---

---

**General information**

Country of origin:

---

Country of practice:

---

WHO region (one option)

- |  |   |
|--|---|
| <input type="checkbox"/> African Region  | <input type="checkbox"/> European Region              |
| <input type="checkbox"/> Region of the Americas/Pan American Health Organization | <input type="checkbox"/> Eastern Mediterranean Region |
| <input type="checkbox"/> South-East Asia Region                                  | <input type="checkbox"/> Western Pacific Region       |

Specify the gender you identify most with (one option)

- |                                 |                               |                                |  |
|---------------------------------|-------------------------------|--------------------------------|--|
| <input type="checkbox"/> Female | <input type="checkbox"/> Male | <input type="checkbox"/> Other | <input type="checkbox"/> Prefer not to say |
|---------------------------------|-------------------------------|--------------------------------|--|

Which language(s) do you speak? Select all that apply (multiple choice)

- |                                  |                                  |
|----------------------------------|----------------------------------|
| <input type="checkbox"/> English | <input type="checkbox"/> Russian |
| <input type="checkbox"/> French  | <input type="checkbox"/> Chinese |
| <input type="checkbox"/> Spanish | <input type="checkbox"/> Other:  |
| <input type="checkbox"/> Arab    | <hr/>                            |

What is the highest level of education you have completed? (one option) (mandatory)

- |   |  |
|---|--|
| <input type="checkbox"/> None                 | <input type="checkbox"/> Medical degree (MD)   |
| <input type="checkbox"/> Primary school       | <input type="checkbox"/> Doctorate degree (PhD)  |
| <input type="checkbox"/> High school graduate | <input type="checkbox"/> Other (e.g. professional degree, nursing school etc.), please specify |
| <input type="checkbox"/> Bachelor's degree    | <hr/>  |
| <input type="checkbox"/> Master's degree      |  |

E-mail address:

---



# Annex 5. Air pollution and health pre-/post-training quiz

## Reference interactive Activity 1.2

The following quiz questions have been developed to engage trainees in testing their own knowledge on air pollution and health before and after training. It can be used to launch discussion and also to assess the knowledge of trainees. The quiz can be administered in-person or for online training. It is good practice to add questions specific to the local or national context.

You are encouraged to choose any of the quiz questions below for their specific training purposes and directly copy and paste them into your material. The answers can be found at the end of the questions. You can also use your own ideas to develop new questions.

- 1. The WHO global air quality guidelines are:**
  - a. Legally national binding rules followed by all Member States globally.
  - b. Guidance to set up monitoring stations in cities.
  - c. Recommendations on air quality levels to be respected for public health protection.
  - d. Standard operating procedures for industrial activities.
- 2. Fine particulate matter is:**
  - a. A solid-liquid air pollutant also known as  $PM_{2.5}$ .
  - b. A solid-liquid air pollutant also known as  $PM_{10}$ .
  - c. A greenhouse gas contributing to climate change.
  - d. A gas with strong pungent odour.
- 3. Which of the following sources contribute to household air pollution?**
  - a. Using an inefficient biomass stove.
  - b. Kerosene lamps.
  - c. Burning coal for cooking.
  - d. All of the above.



- 4. What is the difference between primary and secondary air pollutants?**
  - a. Primary air pollutants are emitted directly from the sources of air pollution and secondary air pollutants are formed when primary pollutants react chemically in the atmosphere.
  - b. Primary pollutants are gases, while secondary pollutants are liquids.
  - c. Primary pollutants are air pollutants that are emitted directly from a source, whereas secondary pollutants are formed after translocation.
  - d. Primary pollutants come from a single source of origin, whereas secondary pollutants come from many sources.
- 5. Which of the following pollutants is secondary?**
  - a. Carbon monoxide (CO)
  - b. Sulphur dioxide (SO<sub>2</sub>).
  - c. Nitrogen oxides (NO<sub>x</sub>).
  - d. Ozone (O<sub>3</sub>).
- 6. Select the most important route of exposure for air pollutants:**
  - a. Inhalation.
  - b. Absorption.
  - c. Ingestion.
  - d. Injection.
- 7. Which is the health outcome of time series studies on short-term exposure to air pollution?**
  - a. Daily mortality.
  - b. Hospital admissions.
  - c. Visits to emergency departments/rooms and primary care facilities.
  - d. All of the above.
- 8. What are the general pathological mechanisms that are affected by air pollution exposure?**
  - a. Oxidative stress.
  - b. Effects on immune system.
  - c. Epigenetic regulation of inflammation.
  - d. All of the above.
- 9. Which demographic group does household air pollution affect the most, especially in low- and middle-income countries?**
  - a. Men.
  - b. Children and men.
  - c. Women and children.





- 10. Select the health effects of air pollution exposure for which the scientific evidence is strongest.**
- a. Stroke.
  - b. Ischaemic heart disease.
  - c. Chronic obstructive pulmonary disease.
  - d. Lung cancer.
  - e. Lower tract respiratory infections.
  - f. All of the above.
- 11. Why is air pollution linked to climate change? Select all that apply.**
- a. All air pollutants are greenhouse gases.
  - b. Some air pollutants are also short-lived climate pollutants (SLCPs).
  - c. They have largely the same sources of emission.
  - d. a+c.
  - e. b+c.
- 12. What is the definition of vulnerability in the context of air pollution and health?**
- a. The presence of innate or acquired characteristics that make a subset of a population at higher risk for air pollution health effects from the same level of air pollution.
  - b. The presence of external factors that make a subset of the population exposed to higher levels of air pollution.
  - c. The presence of both innate and external factors that makes a subject at more serious risk from air pollution exposure compared to the general population.
  - d. The absence of external factors that make a subset of the population exposed to higher levels of air pollution.
- 13. Which one of these fuels produces is considered clean for health at the point of use?**
- a. Wood in a traditional stove.
  - b. Dung.
  - c. Liquified petroleum gas (LPG).
  - d. Coal.
- 14. Fuel and stove stacking is the parallel use of \_\_\_\_\_ types of fuel and technologies in a single household and often at the same time.**
- a. Both clean and dirty.
  - b. Multiple clean.
  - c. Multiple dirty.
  - d. Two dirty.
- 15. TRUE OR FALSE: Breathing patterns play a significant role in how far a particle can travel into the respiratory tract.**
- ☐ True
- ☐ False



- 16. TRUE OR FALSE: Key principles of health advocacy for clean air include use the evidence base, maintain credibility, seek and clearly define effective interventions, activate collaborations.**
- ☐ True  
☐ False
- 17. TRUE OR FALSE: Health care workers can only be advocates for clean air at the micro-level.**
- ☐ True  
☐ False
- 18. TRUE OR FALSE: Physical activity is generally recommended even when air pollution levels are not optimal. However, it is important to consider modifying the intensity, timing and location of your exercise to avoid air pollution sources, including traffic.**
- ☐ True  
☐ False
- 19. Which is one of the reasons why children are particularly susceptible to air pollution?**
- a. More permeable respiratory tract.
  - b. Immune system is still in development.
  - c. High ratio of lung surface area to body weight.
  - d. All of the above.
- 20. Which of the following statements is correct?**
- a. Air pollution originates from indoor sources.
  - b. Air pollution originates from outdoor sources.
  - c. Air pollution originates from both outdoor and indoor sources.
- 21. Who among the following is a particularly susceptible individual to air pollution:**
- a. Children
  - b. Older people.
  - c. Individuals with a pre-existing disease.
  - d. All of the above.
- 22. TRUE OR FALSE: The air quality index is a tool commonly used for reporting and communicating air quality or air pollution in cities and sometimes regions; where available, it can be used for educational purposes for patients and communities.**
- ☐ True  
☐ False



**23. Which protection measures have the least effective evidence against air pollution?**

- a. Avoiding hot spots of air pollution.
- b. Exercising away from pollution sources.
- c. Commute in less trafficked roads.
- d. Dietary interventions.

**24. What areas of interventions can improve outdoor air quality in your city?**

- a. Transport.
- b. Household energy.
- c. Waste management.
- d. All of the above.

**25. TRUE OR FALSE: Citizen science is a form of science that meets the needs and concerns of citizens, and is developed and endorsed by the citizens themselves, and supported by scientists.**

- ☐ True
- ☐ False



## Quiz answers

1. c
2. a
3. d
4. a
5. d
6. a
7. d
8. d
9. c
10. f
11. e
12. b
13. c
14. a
15. True
16. True
17. False
18. True
19. d
20. c
21. d
22. True
23. d
24. d
25. True



# Annex 6. Field visit observation and questionnaire guide

## Reference interactive Activity 2.6

*Note for this activity:* The questions included below here are not to be considered a structured survey for research purposes. Instead, they are intended as a checklist of potential observations points as well as questions you may want to raise to community members as part of the field visit to start a conversation around the health impacts of air pollution. You do not need to go through all the questions. Personal boundaries and privacy of interviewees should always be respected.

### 1. Observation

- What are the sources of air pollution in the catchment area/house you are visiting?
- What are other sources of air pollution on the way to the field visit/catchment area?
- Who is the population exposed in and around the house/in your catchment area?  
Please describe their age, sex, health state, function or any other information that may be visible/available by observation only.
- Is there a population that is more vulnerable or more susceptible to air pollution in this catchment area?  
Please specify. Remember that susceptibility depends on innate/acquired factors such as life stage, while vulnerability depends on external factors such as low socio-economic status.
- If you are visiting a house, describe the house. What are the fuels and devices used for cooking, heating and lighting?  
Pay attention to polluting and/or clean options. Observe if there is any fuel stacking.
- What do you see, smell, taste?
- From an observational/visual point of view, do you notice a change in pollution levels at a certain distance from the source?

### 2. Questions

- Do you think that your activity/work, which generates air pollution, could be dangerous to your health?
- Are you aware that air pollution has a negative impact on your health?

☐

Yes

☐

No

- Do you know some of the health consequences of air pollution?
  - o Ask the interviewees to explain.



- How many hours a day are you exposed?
- When thinking about air pollution, are there aspects of your health or the health of your family members that you are most concerned about?
- Do you collect fuel for cooking? Which fuel and how many hours per week? What fuel do you use for cooking?
- Are you experiencing any of the symptoms listed hereby?

☐ Sore and running eyes

☐ Headache

☐ Sore throat

☐ Shortness of breath

☐ Wheeze

☐ Cough and phlegm production

☐ Tiredness and drowsiness, also unconsciousness and convulsions (with severe carbon monoxide poisoning)

- Do you have breathing difficulties?
- If you have breathing difficulties, do they improve when you leave this site?
- Is there a time or place when you have more breathing difficulties?
- Has is anyone at home experienced scalds or burns from cooking, heating or lighting devices?
- Do you use kerosene at home? If so, has anyone in your home ever been accidentally poisoned? How do you store the kerosene?
- Do you do something to prevent breathing in the polluted air?
- Consider exploring preventive measures such as avoiding the emission source where possible, and transitioning to cleaner fuels and technologies in the home.
- Have you or anyone at home recently had to visit a health care provider/health facility or a community health worker for any health problem or any illness?
- Does air pollution restrict your physical activity?
- Do you use medication for breathing or heart problems?
- Do you smoke?

### 3. Measurements

Measure air quality with low-cost sensors.

- What do the portable air quality monitors show regarding pollutant concentrations at the site?
- What are the measured air pollution levels? Is there any temporal variation?
- How does the concentration of pollutants compare to WHO air quality guidelines?
- Show individuals on the site the air quality data from the field visit site.
- From observation, please comment on if you think the demonstration of air quality levels contributed to increase community awareness on air pollution and its health effects. Would this be a good risk communication tool? Do you see any challenge/limitation/barrier?



#### **4. Diseases to consider**

##### **Respiratory**

- Acute lower respiratory tract infections
- Upper respiratory tract infections
- Pneumonia
- Chronic obstructive pulmonary disease
- Lung cancer
- Asthma
- Allergies

##### **Cardiovascular**

- Ischaemic heart disease
- Stroke
- Heart failure
- Hypertension

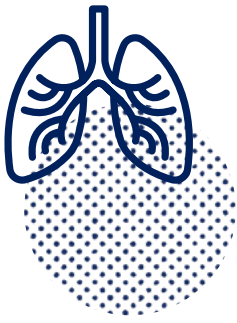
##### **Reproductive**

- Low birth weight

##### **Eye**

- Cataract





# Annex 7. Clinical case scenario: lower respiratory tract infections in Sri Lanka

This clinical case scenario was written by Sumal Nandasena (Ministry of Health, Sri Lanka) and reviewed by Nita Chaudhuri (WHO Consultant), Alejandro Jesus Estevez (Instituto Nacional de Salud Publica, Mexico), Paolo Lauriola (International Society of Doctors for the Environment), Kari Nadeau (Stanford University) and Samantha Pegoraro (WHO).

## Reference interactive Activity 2.7

This is an example of a clinical case scenario in a text format.

### Instructions

The clinical case consists of a series of vignettes.

Each vignette contains:

1. An initial narrative (description of the patient)
2. A predefined clinical hypothesis (if you think that ...)
3. New information (and then you discover that ...)
4. A clinical decision to be made (how does the new information change your hypothesis?)

☐

Strongly  
disagree

☐

Disagree

☐

Neither agree  
nor disagree

☐

Agree

☐

Strongly  
agree

The opinion of a number of experts appears at the end of each scenario, after you have selected your choice. You can then compare it with your own.

**Remember: There are no right or wrong answers!**



## Vignette 1

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum associated with dyspnoea, and diffuse whistling and wheezing. In the past 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy.

### If you hypothesise ...

Recurrent lower respiratory tract infection

### And then you learn that ...

The girl is the youngest in her family. The older brother attends primary school. Both live with their parents. There are no other people in the household.

### How does the initial hypothesis change?

☐

Strongly  
disagree

☐

Disagree

☐

Neither agree  
nor disagree

☐

Agree

☐

Strongly  
agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

#### Experts say

- **Neither agree nor disagree:** The child can experience repeated lower respiratory tract infections due to different underlying causes and exposure factors which would be worth exploring. The facts that she is living with her parents and a younger brother do not change the initial diagnosis at this point.
- **Neither agree nor disagree:** The child is in the susceptible population group, without any other risk factors described so far for recurrent respiratory infections.
- **Agree:** It is possible that there are many contagious diseases being transmitted because of the family members and preschool. However, the frequency is high.
- **Agree:** Since the child has reported repeated respiratory tract infections, she is likely to have risk factors triggering her condition.
- **Agree:** When a sibling has a respiratory infection, there is a higher chance of other vulnerable siblings contracting it in the family. In such a case, it would be essential that infected relatives do not contact the most vulnerable members of the family, such as the youngest one. Therefore, it is also necessary to investigate the environmental conditions first and foremost indoors and outdoors.



## Vignette 2

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the past 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. On the clinical basis, recurrent lower respiratory tract infection is diagnosed.

### If you hypothesise that ...

There are several risk factors for recurrent infections. One of the risk factors could be overcrowding in the home.

### And then you discover that ...

The child lives in a house with two rooms, a living area that also serves as a bedroom for the whole family and a cooking area. The entire house measures approximately 11 x 5 m. The kitchen area measures 3 x 5 m and is separated from the rest of the living space by a screen.

### How does the initial hypothesis change?



Strongly  
disagree



Disagree



Neither agree  
nor disagree



Agree



Strongly  
agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

### Experts say

- **Agree:** Environmental, living and housing conditions are among the determinants of children's respiratory health. Additional underlying physical conditions (e.g. immunity system deficiency) and risk factors contributing to the clinical symptoms are to be considered in any case.
- **Agree:** Overcrowding and having the kitchen shared with the bedroom space are important risk factors for repeated respiratory infections in children of this age group.
- **Agree:** Overcrowding and people living close to each other can be associated with an increased rate of infections; however, we should ask about the exposures from cooking etc.
- **Disagree:** There are several risk factors for a preschool child to contract a respiratory infection. One risk factor is overcrowding in the household. However, overcrowding is not a risk factor in this house since the living area in the living room/sleeping room is 11.1 m<sup>2</sup> per person. It is likely that some other risk factors persist.



## Vignette 3

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the past 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. The child lives in a house with two rooms – a living area/bedroom for the whole family and an area for cooking. The entire house measures 11 x 5 m. The kitchen (3 x 5 m) is separated from the rest of the living space by a screen.

### If you hypothesise that ...

Several other risk factors could explain recurrent respiratory infections. One of these could be exposure to dust from the floor and ceiling of the house.

### And then you discover that ...

The ceiling of the house is sealed with sealing sheets and the floor is concrete.

### How does the initial hypothesis change?



Strongly  
disagree



Disagree



Neither agree  
nor disagree



Agree



Strongly  
agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

#### Experts say

- **Disagree:** Prolonged dust exposure is a known cause of respiratory diseases, mostly occurring in occupational settings (e.g. street sweepers). In this vignette the floor is cemented and the roof is sealed, so these are unlikely to be a risk factor for repeated lower respiratory tract symptoms.
- **Disagree:** The acceptable house conditions described reduced exposure to dust from the ceiling and floor. The appearance of recurrent respiratory infections is noted. It is necessary to investigate exposure to other environmental risk factors.
- **Neither agree nor disagree:** It would be helpful to know more about what they mean by sealing sheets.
- **Disagree:** If the roof is not sealed, there is a high chance for dust particles to drop from the roof and the presence of spider webs. This will release small dust particles and allergens. The small dust particles would irritate and inflame the respiratory system. Since the roof of the house is sealed with sealing sheets, it is a less probable risk factor for the repeated respiratory infections in this child. On the other hand, if the floor is made of clay or only with a thin concrete layer, there is a high chance that small dust particles will be released while sweeping the house. Since the floor is cemented, it is a less probable risk factor for the repeated respiratory infections in this child.



## Vignette 4

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the last 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. The child lives in a house with two rooms – a living area/bedroom for the whole family and an area for cooking. The entire house measures 11 x 5 m. The kitchen (3 x 5 m) is separated from the rest of the living space by a screen. The ceiling of the house is sealed with sealing sheets and the floor is concrete.

### If you hypothesise that ...

Exposure to second-hand tobacco smoke is another risk factor for the development of respiratory symptoms.

### And then you discover that ...

The father does not smoke. No other relatives smoke in the house when visiting the family in question.

### How does the initial hypothesis change?



Strongly disagree



Disagree



Neither agree nor disagree



Agree



Strongly agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

### Experts say

- **Strongly disagree:** In this vignette, smoking is unlikely to be a cause for repeated lower respiratory tract infections.
- **Disagree:** There is no exposure to second-hand smoking for the child in the home, which reduces exposure to air pollutants other than the burning of solid fuels in the kitchen.
- **Strongly disagree:** Although smoking is important it does not seem to play a role here.



## Vignette 5

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the last 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. The child lives in a house with two rooms – a living area/bedroom for the whole family and an area for cooking. The entire house measures 11 x 5 m. The kitchen (3 x 5 m) is separated from the rest of the living space by a screen. The ceiling of the house is sealed with sealing sheets and the floor is concrete. The father does not smoke. No other relatives smoke in the house when visiting the family in question.

### If you hypothesise that ...

Exposure from air pollution in the home is a risk factor for the development of recurrent respiratory infection in the child.

### And then you discover that ...

Rice and curry is the main dish in this family. The dish is cooked by the mother about three times a day using an old wood stove.

### How does the initial hypothesis change?



Strongly  
disagree



Disagree



Neither agree  
nor disagree



Agree



Strongly  
agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

#### Experts say

- **Agree:** Exposure to air pollution in the home is one of the causes of respiratory diseases, such as pneumonia in children. In this vignette, the stove does not appear to be sufficiently modern to ensure good filtration of toxic products resulting from incomplete wood combustion. It is therefore likely that pollutants are released into the home and can cause the child's respiratory symptoms, especially if she spends a lot of time indoors.
- **Agree:** Repeated use of dirty fuels in the kitchen throughout the day increases exposure to household air pollutants and increases the risk of developing acute respiratory infections in children. Smoke from the kitchen should be prevented from drifting into the other room.
- **Agree:** Exposure to smoke and household pollution may decrease the immune response and lead to an inflammatory state of the lung tissue that could be the basis of the child's symptoms. It should also be taken into account that children are more



susceptible to airway damage because, for example, their lungs are still developing and are therefore more vulnerable to inflammation caused by air pollutants; or that children inhale more cubic metres of air per minute than adults, as they have a higher respiratory rate and are therefore more exposed to toxic substances in the air.

- **Neither agree nor disagree:** If the house is well ventilated and/or if the child spends little time indoors while the mother cooks and/or if the mother cooks outdoors, the risk is lower.



## Vignette 6

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the last 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. The child lives in a house with two rooms – a living area/bedroom for the whole family and an area for cooking. The entire house measures 11 x 5 m. The kitchen (3 x 5 m) is separated from the rest of the living space by a screen. The ceiling of the house is sealed with sealing sheets and the floor is concrete. The father does not smoke. No other relatives smoke in the house when visiting the family in question. Rice and curry is the main dish of this family, which is cooked about three times a day using an old wood stove. The mother often keeps her daughter beside her while she cooks.

### If you hypothesise ...

There is persistent smoke inside the house.

### You discover that ...

There is no chimney in the dwelling. There are no windows near the stove.

### How does the initial hypothesis change?

☐

Strongly  
disagree

☐

Disagree

☐

Neither agree  
nor disagree

☐

Agree

☐

Strongly  
agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

#### Experts say

- **Agree:** Ventilation through the use of a chimney and/or window would help decrease exposure levels to indoor environmental pollutants. However, this may not definitively solve the problem: “neighbourhood pollution” created by moving smoke outside exposes members of the village/neighbourhood to pollutant-related health damage. Moreover, windows could allow smoke removed from the chimney to recirculate back into the home.
- **Strongly agree:** Reduced ventilation within the home increases the concentration of pollutants and thus the risk of their effects on health.
- **Strongly agree:** Due to high concentrations of smoke, the child inhales the smoke that accumulates after each meal.





## Vignette 7

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the last 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. The child lives in a house with two rooms – a living area/bedroom for the whole family and an area for cooking. The entire house measures 11 x 5 m. The kitchen (3 x 5 m) is separated from the rest of the living space by a screen. The ceiling of the house is sealed with sealing sheets and the floor is concrete. The father does not smoke. No other relatives smoke in the house when visiting the family in question. Rice and curry is the main dish of this family, which is cooked about three times a day using an old wood stove. The mother often keeps her daughter beside her while she cooks. There is no chimney in the home, and there are no windows near the stove.

### If you think that ...

Other sources of indoor air pollution could aggravate the condition.

### And then you discover that ...

No mosquito nets are used but rather the family uses mosquito coils. Incense, which releases fragrant smoke when burned, is used in the household daily.

### How does the initial hypothesis change?

☐

Strongly  
disagree

☐

Disagree

☐

Neither agree  
nor disagree

☐

Agree

☐

Strongly  
agree

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

#### Experts say

- **Strongly agree:** Incense contributes to indoor air pollution and can be harmful to the respiratory health of children and adults.
- **Neither agree nor disagree:** Burning mosquito coils is recognized as a source of indoor pollution in some countries. Mosquito coils usually burn overnight and emit PM and volatile organic compounds etc. This can worsen indoor air quality. Mosquito nets are a physical barrier that protects against mosquito bites and do not impair air quality.
- **Agree:** Since the family does not use mosquito nets but rather mosquito coils, they breathe smoke while sleeping. Burning one mosquito coil would release the same amount of PM<sub>2.5</sub> as burning 75–137 cigarettes. A change of insect repellent method would be essential.



## Vignette 8

### Patient description

A 3-year-old girl complains of fever, productive cough and purulent sputum, associated with dyspnoea, and diffuse whistling and wheezing. In the last 6 months, the child has already complained of such symptoms four times and has been treated with antibiotic therapy. The child is the youngest in her family. Her older brother attends primary school. They both live with their parents. There are no other people in the household. The child lives in a house with two rooms – a living area/bedroom for the whole family and an area for cooking. The entire house measures 11 x 5 m. The kitchen (3 x 5 m) is separated from the rest of the living space by a screen. The ceiling of the house is sealed with sealing sheets and the floor is concrete. The father does not smoke. No other relatives smoke in the house when visiting the family in question. Rice and curry is the main dish of this family, which is cooked about three times a day using an old wood stove. The mother often keeps her daughter beside her while she cooks. There is no chimney in the home, and there are no windows near the stove. No mosquito nets are used but rather the family uses mosquito coils. Incense, which releases fragrant smoke when burned, is used in the household daily.

### If you think that ...

Outdoor air pollution sources could aggravate the condition.

### You discover that ...

The house is about 1 km from the motorway. There are no industries or factories near the house.

### How does the initial hypothesis change?



Strongly  
disagree



Disagree



Neither agree  
nor disagree



Agree



Strongly  
agree

---

BELOW IS THE SECTION THAT PRESENTED ONCE THE USER SELECTS  
AN OPTION IN THE NEW CLINICAL DECISION POINT

#### Experts say

- **Agree:** Living near outdoor sources of pollution from vehicle traffic, together with indoor sources of pollution, is a health risk factor as it increases exposure to air pollutants.
- **Neither agree nor disagree:** 1 km would not be a distance that has a high chance of induced high levels of air pollution but this could contribute to the asthma issues.
- **Disagree:** The distance between the house and road traffic is an important determinant of outdoor air pollution. If the house is too close to a traffic-congested road, outdoor air pollution around the house is higher. If the house is away from the traffic-congested road outdoor air pollution around the house is low. Studies show that almost all the pollutants drop to the background level after 100–200 m horizontally. It is, therefore, unlikely that respiratory infections are aggravated by this source of air pollution.



## Further reading

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# Annex 8. Evaluation form of training session

Date: \_\_\_\_\_ Location of training: \_\_\_\_\_

Instructions: Please indicate your level of agreement with the statements listed below.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
1. The objectives of the training were clearly defined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The content was organized and easy to follow.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The training programme provided knowledge on air pollution and health that you didn't already know.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The knowledge gained will be used in your work practice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The content of the training was sufficiently in depth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The activities and exercises within the training helped in your understanding and application of the knowledge.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The training objectives were met.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The time allotted for the training was sufficient.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
9. The meeting room and facilities were adequate and comfortable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. You would organize an air pollution and health training session to educate other peers/ the community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What did you like the most about this training?

---

What aspects could be improved?

---

How do you hope to change your practice as a result of this training?

---

What additional training materials would you like to have in the future?

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Please share other comments, if any.

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**Thank you for your feedback!**

For further information: [aqh\\_training@who.int](mailto:aqh_training@who.int)

Air Pollution and Health Training toolkit  
for health workers (APHT)

Air Quality, Energy and Health  
Department of Environment,  
Climate Change and Health

World Health Organization  
20 Avenue Appia  
1211 Geneva 27  
Switzerland

