

Management of Work Related & Occupational Diseases Caused by Ambient Air



*Phase 2 lecture, 2020 - 2021
academic year, spring semester
08th June 2021, Ankara - TURKIYE*



Ahmet SALTİK, MD

Professor of Pubic Health

MSc, in Health Law

BSc, in Public Administration & Political Sciences

The Universal Declaration on Human Rights

proclaims that everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.

All of the 3.5 billion workers in the world have the right to breathe clean air at their workplaces, as well as at their homes, cities and villages.

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Classification of Occupational diseases

Occupational diseases by target organ systems

2.1. Respiratory diseases

2.1.1. Pneumoconioses caused by fibrogenic mineral dust (silicosis, anthraco-silicosis, asbestosis)

2.1.2. Silicotuberculosis

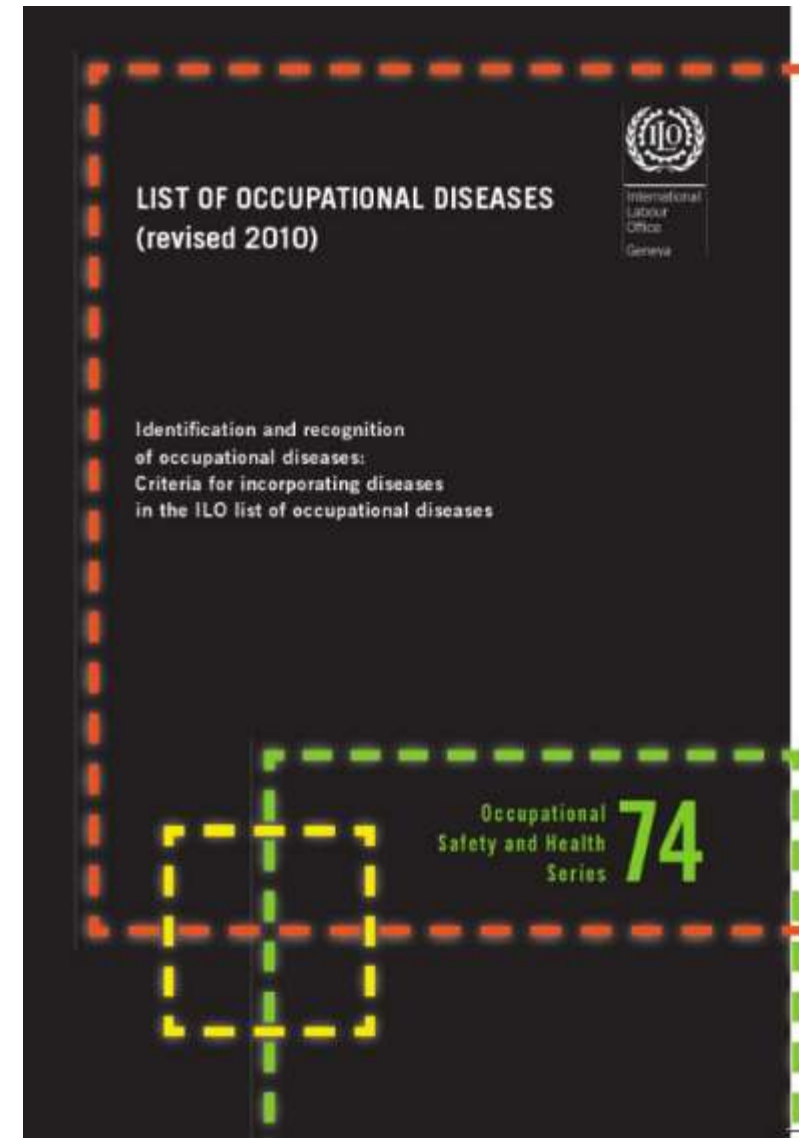
2.1.3. Pneumoconioses caused by non-fibrogenic mineral dust

2.1.4. Siderosis

2.1.5. Bronchopulmonary diseases caused by hard-metal dust

2.1.6. Bronchopulmonary diseases caused by dust of cotton (**Byssinosis**), flax, hemp, sisal or sugar cane (**Bagassosis**)

2.1.7. **Asthma** caused by recognized sensitizing agents or irritants inherent to the work process



Classification of Occupational diseases

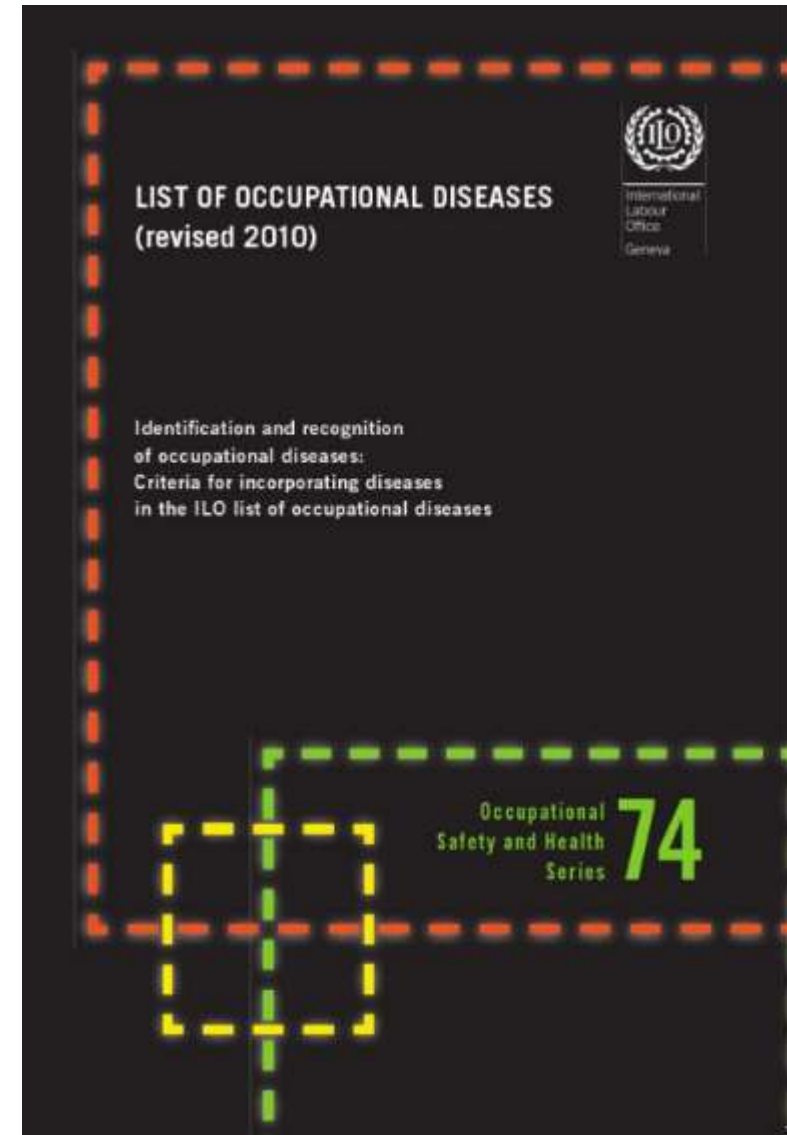
Occupational diseases by target organ systems

2.1. Respiratory diseases

2.1.8. Extrinsic allergic alveolitis caused by the inhalation of organic dusts or microbially contaminated aerosols, arising from work activities

2.1.9. Chronic obstructive pulmonary diseases (COPD) caused by inhalation of coal dust, dust from stone quarries, wood dust, dust from cereals and agricultural work, dust in animal stables, dust from textiles, and paper dust, arising from work activities

2.1.10. Diseases of the lung caused by aluminium



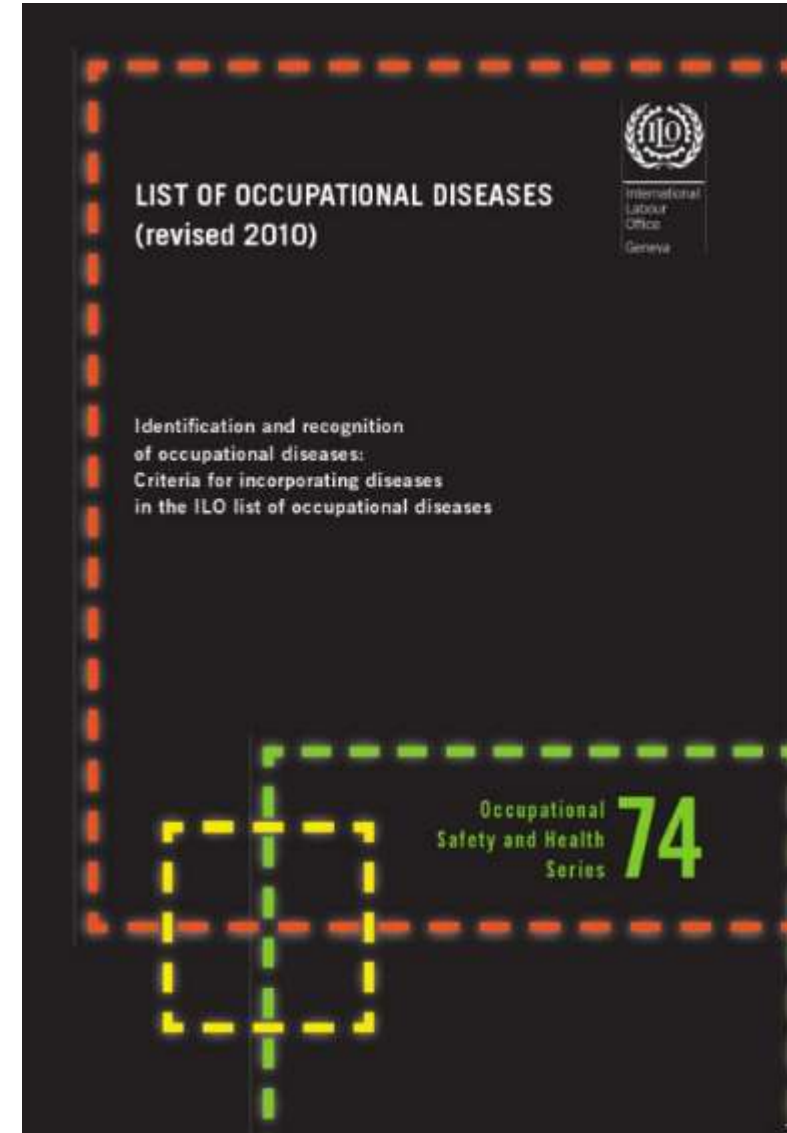
Classification of Occupational diseases

Occupational diseases by target organ systems

2.1. Respiratory diseases

2.1.11. Upper airways disorders caused by recognized sensitizing agents or irritants inherent to the work process

2.1.12. Other respiratory diseases not mentioned in the preceding items where a direct link is established scientifically or determined by methods appropriate to national conditions and practice, between the **exposure to risk factors** arising from work activities and the disease(s) contracted by the worker.



Pollution of air at the workplace..

- ***Pollution of air at the workplace***, being indoors in the work premises, or during work outdoors is harmful to health and can be prevented.
- For this reason the 13th WHO General Programme of Work (2019-2023) states that “with respect to air pollution (*i.e. outdoor, household and workplace air pollution*) and climate change mitigation,
- *WHO will scale up its work with different sectors -including transport, energy, housing, waste, labour and urban planning- at the national and local level to monitor air quality, develop strategies for transitioning to*
- healthier technologies and fuels and for ensuring that all populations breathe air that meets the standards of WHO’s air quality guidelines,
- *and that scientific evidence will be translated into effective policies.”*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

The prevention of occupational exposure..

- **The prevention of occupational exposure** to workplace air pollution follows a well-established hierarchy of interventions where priority is given to elimination or substitution of the occupational hazard, as the most effective intervention, followed by other engineering controls to reduce exposure, such as encapsulation, local and general ventilation and wet processes.
- *The least effective measures for control of air pollution are administrative controls, such as organization of work and rotation of workers to reduce exposure duration, training of workers, as well as the use of personal protective equipment for respiratory protection, as ultimate temporary measure.*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

The prevention of occupational exposure..

- WHO has estimated outdoor air pollution causes 4.2 million premature deaths worldwide every year among the general population, including **workers**.
- In 2016, 91% of the world population were living in places where the WHO standards for air quality were **not met**.
- The **main pollutants** of outdoor air include:
 - (1) particulate matter – fine particulate matter (PM2.5) and coarse particulate matter (PM10);*
 - 2) ozone (O3); nitrogen dioxide (NO2); and*
 - (3) sulfur dioxide (SO2).*

Air pollution is a human carcinogen!

- Outdoor air pollution can cause asthma, chronic obstructive pulmonary diseases and impaired lung function, lung cancer, heart attacks and stroke.
- *Children and adults with pre-existing asthmatic and respiratory condition and those with high risk of cardio- and cerebrovascular diseases are particularly **at risk**.*
- **Air pollution is recognized as human carcinogen (group A)** by the International Agency for Research on Cancer (IARC).

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Outdoor workers & ambient air pollution

- Outdoor workers are particularly vulnerable to **ambient air pollution**.
- *Worldwide at least 1.2 billion workers work outdoors most of their work time.*
- These include agricultural workers, street vendors and delivery workers, urban transport, traffic police, and road repair, construction, waste collection etc.
- *In addition to **breathing polluted air**, such **workers** are often exposed to other environmental risks, such as heat and cold, heavy rain, wind and other climatic conditions as well solar UV and allergenic pollens.*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Outdoor workers & ambient air pollution

- ❑ In addition, outdoor workers are exposed to a range of ***occupational hazards*** arising from their specific work activities – fumes, particles and fibres, toxic chemicals, noise, vibrations, manual handling of loads, awkward work posture, psychological harassment and accidents.
- ❑ *The evidence on the health impacts of **occupational exposure** to outdoor air pollution is scarce – few recent studies have found impairment in the lung function of exposed workers.*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Occupational exposure to outdoor air pollution

- ❑ Occupational exposure to outdoor air pollution is a particular concern, because the exposed population is large and because the conventional measures for engineering controls of workplace hazards, such as hazard elimination, encapsulation and ventilation are not applicable to the outdoor environment.
- ❑ *Also, employers and workers themselves may have little or no control over the sources of outdoor air pollution. However, all **workers**, including those working outdoors, should enjoy the right to favourable working conditions and to the highest attainable standard of physical and mental health.*
- ❑ **Decent work** means also being able to breathe clean air at work.

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Air pollution in indoor workplaces

- ❖ Air pollution in indoor workplaces is also a major concern and has been traditionally addressed by **the occupational health and safety** regulations and programmes.
- ❖ *Sources of air pollution in indoor workplaces include technological processes, burning of materials and waste, cleaning, transport vehicles and engines with internal combustion, heating etc.*
- ❖ **Air pollutants** at the workplace include a very wide range of chemical substances and preparations, gases, fumes and aerosols, particles, fibres etc.
- ❖ *The levels of exposure to air pollutants at the workplace can be much higher than outdoors.*
- ❖ **The health effects** can be systemic toxic effects and acute poisonings, allergies, such as asthma, chronic respiratory diseases, and **cancer**.

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Air pollution in indoor workplaces

- ❖ WHO estimates that health effects of **occupational exposure** to selected air pollutants at the workplace can cause more than 860 000 deaths a year.
- ❖ The real magnitude of the **health impacts** on **workplace air pollution** is likely to be much higher, but it is difficult to quantify the **global burden of disease** given the wide diversity of air pollutants and **occupational exposures** in the different workplaces, sectors and activities.



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Protection of workers' health from air pollution

- ✓ The WHO Air Quality Guidelines provide thresholds for health-harmful levels of **air pollution** for the general population.
- ✓ *The international labour conventions on occupational safety and health apply to **all workers and in all workplaces**, including outdoor workplaces.*
- ✓ Under the Occupational Safety and Health Convention, 1981 (No. 155) employers shall be required to:
 - ✓ *(1) ensure that, so far as is reasonably practicable, the workplaces, machinery, equipment and processes under their control are safe and without risk to health;*
 - ✓ (2) ensure that, so far as is reasonably practicable, the chemical, physical and biological substances and agents under their control are without **risk to health** when the appropriate measures of protection are taken;

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Protection of workers' health from air pollution

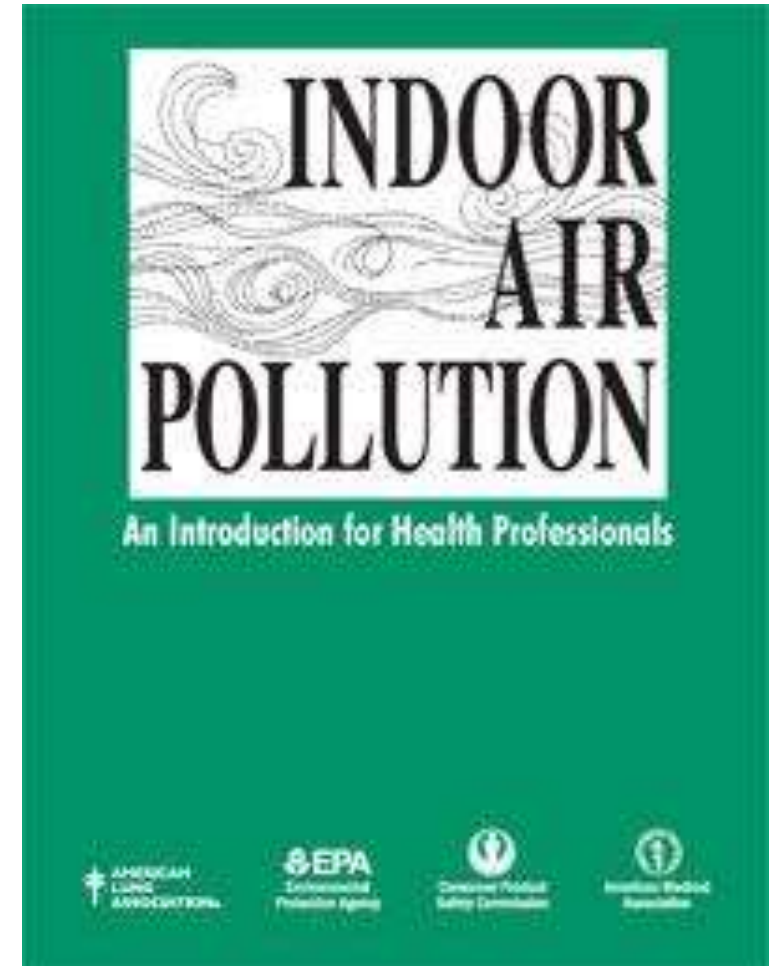
- (3) provide, where necessary, **adequate protective clothing** and protective equipment to prevent, so far as is reasonably practicable, risk of accidents or of **adverse effects on health**.
- Other international labour standards relevant to ambient air pollution and its health effects are the Convention concerning the Protection of Workers against Occupational **Hazards in the Working Environment Due to Air Pollution**, Noise and Vibration (C148 from 1977) and the Convention concerning Prevention and Control of **Occupational Hazards caused by Carcinogenic Substances** and Agents (C139 from 1976).



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Examples of workplace measures to protect workers from ambient air pollution

- ❑ Though, employers may have less influence on the quality of the outdoor environment than on the indoor environment,
- ❑ It is important to recognize that exposure to air pollution when working outdoors is also an **occupational hazard for workers** and it is necessary to apply protective measures “as far as reasonable practical”.
- ❑ Examples of workplace measures to **protect workers** from ambient air pollution include:



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Examples of workplace measures to protect workers from ambient air pollution

- ❑ Reduction of exposure – reducing the working time outdoors, rotation of workers, restricting work during episodes of **severe air pollution**, including dust storms.
- ❑ *Providing respiratory protection programmes – appropriate respirators, fit testing, training of workers.*
- ❑ **Medical surveillance** of workers - medical check-ups for underlying health conditions that can worsen with exposure to air pollution – for example asthma, COPD, cardiovascular diseases (*risk of heart attack and stroke*).

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Examples of workplace measures to protect workers from ambient air pollution

- ❑ Health surveillance of working environment – recording levels of air pollution from the municipal sources.
- ❑ *Reporting of cases of **occupational diseases** that can be caused by ambient air pollution among exposed workers (asthma, chronic obstructive pulmonary disease, lung cancer) & follow up with the employment injury scheme.*



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

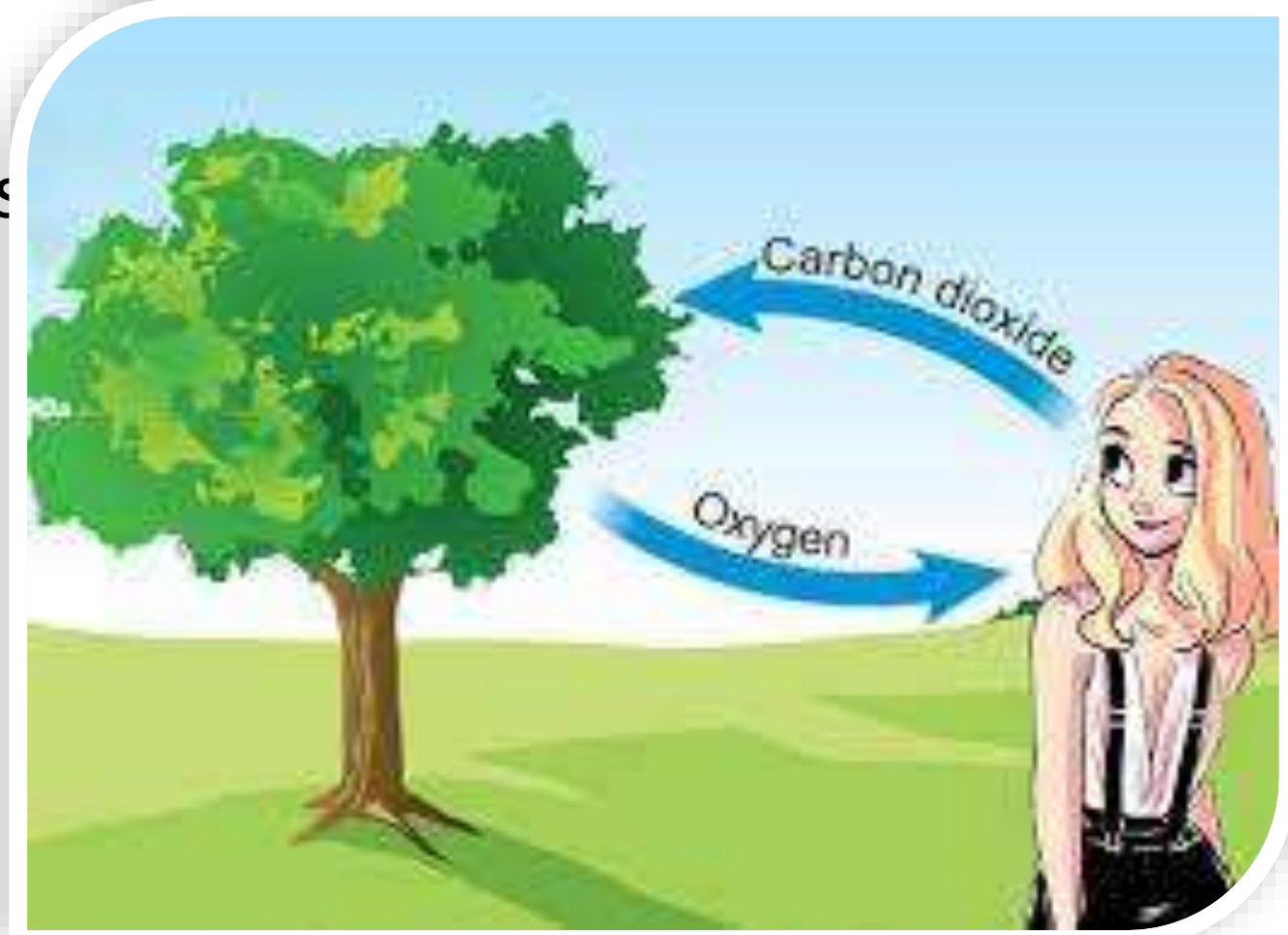
Reducing air pollution

- In addition, undertakings could contribute to by:
- **Reducing use of solid fuels** in work processes and moving to cleaner energy sources.
- *Applying technologies reducing black carbon emissions (e.g. from traditional brick kilns and coke ovens).*
- **Waste reduction**, separation, processing, management and recycling and reuse instead of open **incineration** of solid waste.



Reducing air pollution

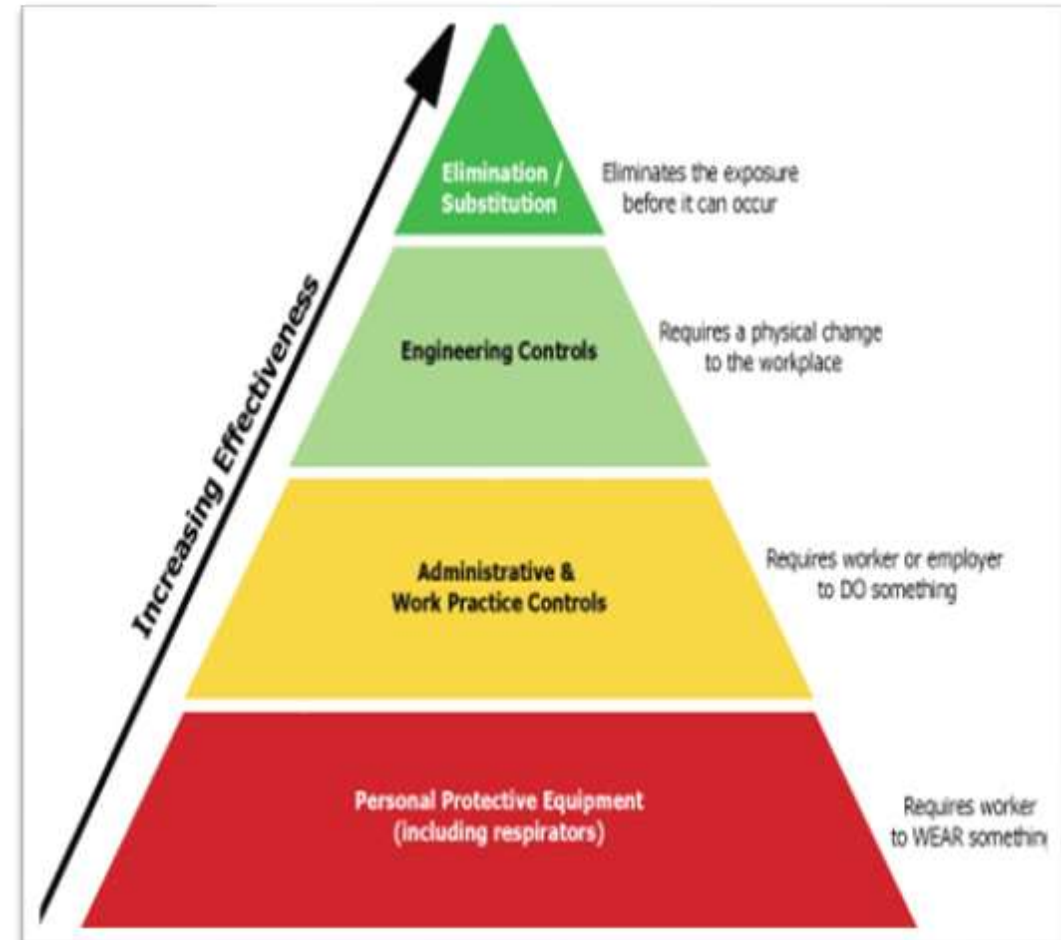
- Reduced open burning of agricultural residues and applying alternative techniques for crop management.
- *Replacing or supplementing diesel generators with devices using renewable energy.*
- Promoting walking and cycling for commuting of **workers to the workplace.**



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

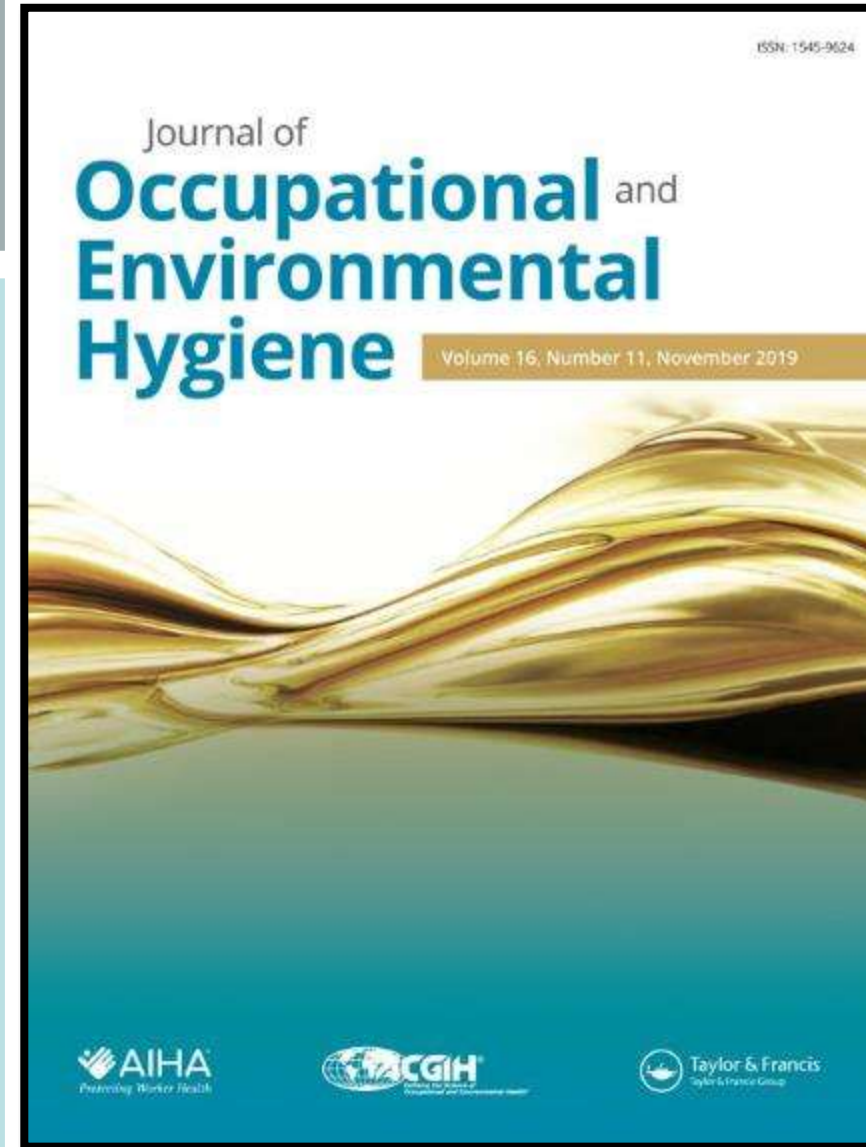
Measures at the national level to address occupational exposure

- ❑ Measures at the national level to address occupational exposure to air pollution could be:
 - ❑ *Warnings for reducing or stopping work outdoors in periods of severe air pollution.*
 - ❑ Raising awareness of employers and workers about ambient air pollution and their responsibility for occupational health and safety.
 - ❑ *Recognition of exposure to ambient air pollution while working outdoors as an **occupational safety and health issue** and using the existing occupational safety and health regulations and standards to provide protection of workers.*



Measures at the national level to address occupational exposure

- ❑ Providing toolkits and programmes for engaging businesses and workplaces in prevention and control of air pollution, for example by avoiding open air incineration and controlling other sources of air pollution at the workplace.
- ❑ *Engaging with private sector, businesses and workplace undertakings for preventing emissions of air pollution and improving their overall environmental performance.*
- ❑ Stimulating initiatives combining **occupational safety and health**, environmental protection and **green workplaces** and technological transfer and innovations to prevent **ambient and workplace air pollution.**



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

The prevention of occupational exposure to workplace air pollution

- ❑ The prevention of **occupational exposure** to workplace air pollution follows a well-established hierarchy of interventions where priority is given to elimination or substitution of the occupational hazard, as the most effective intervention, followed by other engineering controls to reduce exposure, such as encapsulation, local and general ventilation and wet processes.
- ❑ *The least effective measures for **control of air pollution** are administrative controls, such as organization of work and rotation of workers to reduce exposure duration, training of workers, as well as the use of personal protective equipment (PPP) for respiratory protection, as ultimate temporary measure.*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

The prevention of occupational exposure to workplace air pollution

- ❑ Air quality standards have been established for a big number of workplace air pollutants by several organizations, such as the *Threshold Limit Values* of the American Conference of Governmental Industrial Hygienists' (ACGIH) and Indicative Occupational Exposure Limits of the European Commission.
- ❑ *The international chemical safety data cards developed by WHO and ILO contain references to the available standards for occupational exposure to more than 1700 substances.*
- ❑ However, at the workplace the principle is to avoid exposure, if not possible to keep exposure levels as low as possible.

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

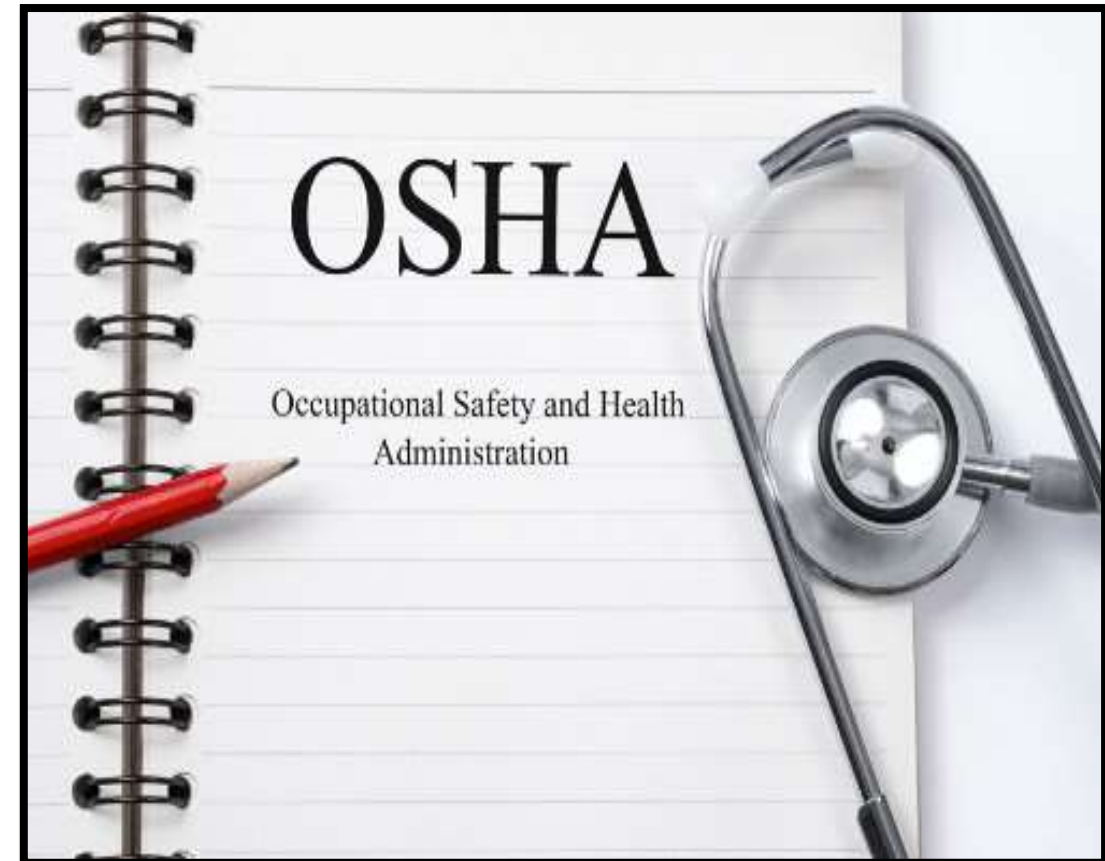
The prevention of occupational exposure to workplace air pollution

- ❑ Air quality standards have been established for a big number of workplace air pollutants by several organizations, such as the *Threshold Limit Values* of the American Conference of Governmental Industrial Hygienists' (ACGIH) and Indicative Occupational Exposure Limits of the European Commission.
- ❑ *The international chemical safety data cards developed by WHO and ILO contain references to the available standards for occupational exposure to more than 1700 substances.*
- ❑ However, at the workplace the principle is to avoid exposure, if not possible to keep exposure levels as low as possible.

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Workplace should have medical surveillance

- ❑ Workers, exposed to air pollution at their workplace should have medical surveillance, including pre-placements, periodic and final medical examinations and tests to identify
- ❑ *any pre-existing health conditions that can worsen as a result of exposure to air pollution,*
- ❑ as well as to determine as early as possible any health effects of the **occupational exposure** and to take measures for prevention of diseases and disability.



https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

Occupational Hazards in the Working Environment

- ❑ The International Labour Convention concerning the Protection of Workers against ***Occupational Hazards in the Working Environment Due to Air Pollution***, Noise and Vibration (C148 from 1977) requires parties (46 countries have ratified) to develop national laws or regulations and technical standards for the prevention and control of, and protection against, occupational hazards in the working environment due ***to air pollution***, noise and vibration.
- ❑ *There are also specific international labour conventions on prevention and control of occupational hazards caused by carcinogenic substances and agents (C139 from 1976) and on the use of **asbestos**.*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

NIOSH : *Occupational respiratory disease surveillance*

- ***Occupational respiratory disease surveillance***

is the ongoing, systematic collection, analysis, and dissemination of health and hazard data to monitor the extent and severity of occupationally-related lung disease and related workplace exposures for use in ***public health education and in disease prevention.***

- This **NIOSH** Topic page also includes information about ***occupational respiratory disease medical screening and monitoring*** – the systematic evaluation of exposed workers to detect potential ***health problems*** at an early stage and to facilitate action to ***prevent the development or progression of occupationally-related respiratory disease.***



<https://www.cdc.gov/niosh/topics/surveillance/ORDS/> 8.6.21

NIOSH : Occupational respiratory disease surveillance

- ❑ **NIOSH** conducts investigations of possible **health hazards in the workplace**.
- ❑ These investigations, called Health Hazard Evaluations (HHEs), are conducted under the authority of the **Occupational Safety and Health** Act of 1970 and the authority of the Mine Safety and Health Act of 1977, which authorize the Secretary of **Health and Human Services**, following a written request from employees, authorized representative of employees, or employers, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

What is NIOSH?

**National Institute for Occupational
Safety and Health**

**Mission is to prevent workplace
illness, injury, and death**

<https://www.cdc.gov/niosh/topics/surveillance/ORDS/> 8.6.21

Please keep in mind that;

- **Occupational diseases** are specific to occupation.
- *Occupational diseases are preventable and should be prevented.*
- **Occupational diseases** are diagnosed in the presence of suspicion and investigation.
- *If an occupational diseases is suspected, detailed occupational history should be taken*
- Blood, urine, and workplace measurements are performed for diagnosis of **occupational disease.**
- *Technical, operational, and medical measures should be applied to prevent occupational diseases.*

https://www.who.int/airpollution/events/conference/05_Protecting_workers_from_air_pollution_outdoors_and_indoors.pdf

