International Labour Organization

Preventative measures for key chemical hazards

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Objectives

At the end of the session, you will be able to:

1. Describe the main priority actions for the 10 key chemical groups identified in the ILO Global Chemicals Review.
2. Provide examples of preventative measures at both policy and workplace levels.

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Question:

Can you name any conventions applying to specific chemicals?


Asbestos

Asbestos: Main policy level actions

Ratify and implement the ILO Asbestos Convention, 1986 (No. 162).

- Includes measures to be taken for the prevention and control of, and protection of workers against, health hazards due to occupational exposure to asbestos.
- Key provisions:
  - **Replace asbestos** or products containing asbestos with materials evaluated as less harmful.
  - **Prohibit (totally or partially) the use of asbestos** or products containing asbestos in certain work processes.
  - Implement measures to prevent or **control the release of asbestos dust into the air** and ensure that **exposure limits** or criteria are complied with.
  - Reduce exposure to **as low a level** as is reasonably possible.

Asbestos: Other policy level actions

- Include measures in **national OSH programmes.**
- Eliminate the **future use** of asbestos.
- Develop national programmes for **elimination of asbestos-related diseases**.
- Establish **regulatory controls** to prevent exposure, including during **asbestos removal** (abatement).
- Create **worker registries** with past and/or current exposures to asbestos.
- Carry out medical surveillance of exposed workers.
- Improve **early diagnosis, treatment, and rehabilitation services** for asbestos-related diseases.
- Promote **prevention through safety by design** to minimise occupational hazards for the future.

The ILO position on safety in the use of asbestos

1. The ILO position is governed by **international Conventions and Recommendations**, as well as **ILO Codes of Practice**. These provide solid legal bases and practical guidance.
2. The **ILO Asbestos Convention, 1986 (No. 162)**, provides for the measures to be taken for the prevention and control of, and protection of workers against, health hazards due to occupational exposure to asbestos.
3. The **Occupational Cancer Convention, 1974 (No. 139)**, provides for the measures to be taken for the control and prevention of occupational hazards caused by carcinogenic substances and agents.
4. A **Resolution concerning asbestos** was adopted by the International Labour Conference at its 95th Session in 2006.
   - Asbestos is carcinogenic and workers continue to face serious risks from exposure, particularly in asbestos removal, demolition, building maintenance, ship breaking and waste handling activities.
   - The Resolution calls for the elimination of the future use of asbestos and the identification and proper management of asbestos currently in place.
   - The ILO encourages Member States to ratify and implement Conventions Nos. 162 and 139, as well as promoting the elimination of future use of asbestos and the identification and proper management of all forms of asbestos currently in place.
   - Member States are encouraged to include protection measures in their national programmes on occupational safety and health.

Asbestos: Occupational exposure limits (OELs)

- **Update, implement and enforce** OELs for various forms of asbestos
- Ensure **global harmonisation** of these OELs.
- Established OELs include:
  - The European Union's single maximum limit value for airborne concentrations of asbestos is 0.1 fibres/cm^3, as an 8-hour TWA (currently under review by the European Chemicals Agency (ECHA).

Asbestos: Workplace level

- **Replace asbestos** with safer substitutes and prevent potential exposure to any other type of **asbestos already in place**.
- **Promote the elimination** of the use of asbestos among contractors and suppliers.
- **Monitor the work environment** for contamination with various forms of asbestos.
- Ensure compliance with **exposure limits** and **technical standards** for working with asbestos.
- Establish **engineering measures** for control of the exposure to asbestos at source.
- Provide **special training** for workers, who may potentially be exposed.
- Provide appropriate **PPE**, free of charge.
- Ensure registration and **medical surveillance** of workers exposed to asbestos.
- Promote the **identification** and **proper management** of all forms of asbestos already in place.


Silica

Silica: Main policy level actions

- **Phase out the practice of sandblasting**.
  - Sandblasting has been **banned in several countries** (mostly high-income) for decades.
  - Many LMICs have yet to ban sandblasting and enforcement of the ban has proven to be **challenging, especially in informal settings**.
- **Reinforce regulations** and **promote workplace inspections** to ensure effective implementation of the sandblasting ban and other measures to reduce workers' exposures to silica.
- Silica OELs vary between different countries. **Update, implement and enforce OELs** for silica and ensure global harmonisation of these OELs.

Silica: Workplace level actions

- Apply the **Hierarchy of Controls.**
- Carry out **regular workplace sampling** for respirable dust using best practice methods.
- Implement **engineering controls** to remove respirable c-silica from the environment, e.g. water spraying systems to capture dust at the impact site.
- Perform periodic and **life-long screening and health surveillance** of workers exposed to respirable c-silica, to include chest radiography, pulmonary function testing and tuberculosis testing.

Primary prevention through **physically removing** or **substituting** the hazard is the most effective options. For example, when conducting abrasive blasting, substitute the silica-containing abrasive with steel grit or steel shot.

Heavy metals

Heavy metals - Lead: Policy level actions

Refer to policy actions and examples set forth by the Global Alliance to Eliminate Lead Paint. Lead Paint is identified as an Emerging Issue of Concern under SAICM with the target of global elimination.

- Ratify and implement the **ILO Safety and Health in Construction Convention, 1988 (No. 167)**. Provisions provided for protecting the health of workers from chemical hazards through the implementation of appropriate preventive measures in the construction sector.
- Promote the **phase out of lead** from remaining sources of exposure, such as lead paint.
- Strictly control lead exposure in industries such as the production and **recycling of lead acid batteries**.
- **Integrate lead into national OSH programmes**, specifically when it comes to requirements for training and PPE for workers conducting lead paint abatement on legacy paint.

Heavy metals - Lead: Occupational exposure limits (OELs)

- **Update, implement and enforce OELs** for lead and ensure global harmonization of these OELs.
- OELs specifically for **lead acid battery recycling** are especially needed.
- Established OELs include:
  - EU Directive 98/24/EC: 0.15mg/m^3 per 8-hour TWA and 70 µm lead/100 ml blood. Apply these for all workers and indicate when suspension from lead work is required.
  - Lower limits may be recommended and used at a national level, with still lower limits for young persons and women. For example, the ACGIH recommends a limit of 30 µm lead/100 ml, which is the same limit used for women of reproductive age in the UK.

Heavy metals - Lead: Workplace level actions

- **Eliminate** the use of lead where possible.
- **Substitute lead** for a less hazardous material, for example apply non-leaded paint rather than a coating containing lead.
- Use **engineering controls**, such as totally enclosed process and handling systems, processes which keep production of dust, fumes and vapours to a minimum and ventilation systems.
- Utilise **administrative controls**, such as reducing worker hours and durations of exposure.
- Employ other **safe work practices,** related to hygiene, cleaning and storage.
- Provide **effective PPE** designed to effectively protect people of all body types. For example, impermeable protective clothing is essential for work with lead alkyls if there is the risk of skin contact.

Spotlight on e-waste priority actions

- Restrict and phase out the use of e-waste substances, in addition to adopting and implementing strict OELs.
- Actions to reduce occupational exposure and protect worker health must be locally tailored and take into consideration the large differences in the scale of e-waste sites, which range from vast facilities to tiny family operations.

Spotlight on e-waste priority actions

- Share good practices from already existing regulations, such as the **EU Directive on Restriction of Hazardous Substances**.
- Address the **early life-cycle stages** of e-waste e.g. foster development of electronics made with minimal use of hazardous substances and by green manufacturing processes *(UNEP 2020)*.
- Properly address the situation of informal workers who handle e-waste through **comprehensive OSH training**.
- Implement **extended producer responsibility** measures to ensure safe handling for e-waste.

Reduce dependence on open burning techniques by the provision and use of electric-powered, automated wire-stripping machines *(Caravanos 2015)*

Solvents

Solvents: Policy level actions

Develop national laws or regulations that prescribe the measures to be taken for the prevention and control of, and protection against, occupational hazards due to solvents.

- **Eliminate** and **substitute** the use of hazardous solvents where possible.
- Refer to other national examples, such as the EU, who has **banned or restricted a number of hazardous solvents.**
- Develop **targeted research programmes** to identify and prioritize preventative actions to reduce worker exposures.
- Update, implement and enforce OELs for various forms of solvents and ensure global harmonisation of these OELs.

Solvents: Workplace level actions

- **Ventilation** is important, as solvents quickly create high concentrations of vapours in confined spaces. Mechanical ventilation and encapsulation systems may be necessary.
- Store solvents in **properly labelled suitable containers**, using dispensers where possible to keep evaporation to a minimum and reduce spillage.
- Dispose of **solvent-soaked rags** in closed containers.
- **Train workers** in specific handling and use of solvents.
- Provide appropriate safety equipment, including **fire extinguishers** and **absorbent materia**l, for situations such as spillage or emergency.
- **Prohibit eating, smoking or drinking** when hazardous solvents are handled.
- Make PPE available and store it away from solvent vapours.

Dyes

Dyes: Policy level actions

Develop national laws or regulations that prescribe the measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to hazardous dyes.

- Refer to existing national regulations, for example, **azo dyes** releasing one of the **22 known carcinogenic aromatic amines** are banned from clothing textiles in the European Union (Annex XVII of the REACH regulation; No, 1907/2006).
- Approve the use of **less hazardous dyes** as much as possible. For example, in textiles, benzidine-based dyes should be **replaced with safer substitutes**.
- Develop **evidence-based OELs** for hazardous dyes and methods to implement and enforce them. Ensure global harmonisation of these OELs.

Dyes: Workplace level actions

- Prevent **secondary exposure to dust** from powdered dyes from settled deposit by using appropriate **storage methods**, **ventilation methods** and **cleaning**.
- **Train workers** about sensitisation, how to handle dyes safely and how to report health symptoms.
- Make appropriate **PPE** available free of charge, as well as training on how it should be used.
- Carry out **health surveillance** for workers at risk of being exposed to reactive dyes.

Consider if there are less hazardous forms of dye available. Choosing low-dusting dyes such as those in granular, dust-suppressed or liquid form can be a very important factor in reducing exposure.

Manufactured nanomaterials (MNMs)

Manufactured nanomaterials (MNMs): Policy level actions

Develop national laws or regulations that focus on enhanced risk assessment and reduce occupational exposure to MNMs in the workplace.

- Gather and make **publicly available information** about MNM health hazards. An example includes Nanodatabase.
- Make resources available for **increased workplace research** on MNMs and their occupational health impacts, including gender and sex differentiated studies.
- Establish **regulatory data requirements** on MNMs in the workplace, taking into account their properties and life cycles, to inform future hazard and risk assessments.
- **Strengthen social dialogue** and promote concerted actions at the international level to work towards **common definitions** and **toxicological grouping strategies** for MNMs.
- Ensure **legislation for harmonised labelling** for MNMs.

MNMs: OELs

Comprehensive regulatory OEL values for MNMs in workplaces do not currently exist.

- Develop **evidence-based** and **globally harmonized** OELs for MNMs and methods to **implement and enforce.**
- Assess if workplace exposures exceed the proposed OEL values in annex 1 of the **WHO Guidelines on Protecting Workers From Potential Risks Of Manufactured Nanomaterials**.
- NIOSH recently proposed a **quantitative framework** to group nanoscale and microscale particles by hazard potency to derive OELs. This demonstrated that the development of OELs for MNMs remains a priority.

MNMs: Workplace level actions

- Consider, as a first control measure, changing the process in such a way that **no MNMs are released into the air**.
- Use **engineering controls** when there is a high level of inhalation exposure or when there is no, or very little, toxicological information available.
- Prevent **dermal exposure** by **occupational hygiene measures** such as surface cleaning and the use of appropriate gloves.
- Conduct **worker exposure assessments** using comprehensive exposure assessment using evidence-based methods.
- **Educate potentially exposed workers** on the risks of MNMs and how best to protect themselves.
- Use **PPE** in the absence of appropriate engineering controls, especially respiratory protection, as part of a respiratory protection programme that includes fit-testing.

Perfluorinated chemicals (PFAS)

Perfluorinated chemicals (PFAS): Policy level actions

Develop regulations to address PFAS use at the workplace, focused on eliminating and substituting with safer alternatives.

- Refer to the 2020 EU Commission's new set of comprehensive actions to address the use of and contamination with PFAS due to *"a full spectrum of illnesses and the related societal and economic costs"*.
- Refer to and implement the **Stockholm Convention** and other related policies for PFAS:
  - PFOS and PFOA have been listed under the Stockholm Convention for **global elimination**.
  - PFOS and PFOA have also been **phased out** in the EU under the **POPs Regulation**.

PFAS: Other policy level actions

- Consider listing additional types of PFAS under the **Stockholm Convention** for global elimination.
- Implement or prioritise the use of **safer non-persistent alternatives** for all PFAS uses that cannot be contained.
- **Harmonize classification and labelling**, applying the GHS as relevant.
- Develop evidence-based OELs for PFAS.

Firefighting foams are a major source of PFAS contamination. Fully effective alternatives are now available, such as non-persistent, fluorine-free foams.

PFAS: Workplace level

- Provide targeted preventative measures to occupations especially exposed to PFAS, such as **firefighters** and workers in the **chemicals industries** and **products manufacturing**.
- Ensure that **appropriate training** is given when non-persistent alternatives are used.
- Supply effective **PPE** designed to effectively protect all body types, including different genders.
- Ensure **medical surveillance** of exposed workers, using new approaches to biomonitoring, such as **general suspect screen (GSS)**. GSS integrates exposure knowledge and serum suspect screening and has proven to be an effective technique in female firefighters.

Endocrine-disrupting chemicals (EDCs)

Endocrine-disrupting chemicals (EDCs): Policy level actions

- Develop **national laws** or **regulations** that prescribe measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to EDCs.
- **Harmonize international policies** on the **labelling** and **regulation** of EDCs.
- Create a list of EDCs with a priority of phasing out the ones that are **most potent** and **used most extensively**, with the highest risk of exposure.
- Gather, update and **make publicly available information** about use of EDCs, their health hazards and regulatory measures taken in certain countries
- Use **existing measures** from industries such as agriculture, manufacturing and waste management to prevent exposures to EDCs.

UNEP has produced a list of 45 substances identified as EDCs, belonging to 18 chemical groups.
These could be a starting point to build on for harmonised global labelling and regulation of EDCs.

EDCs: Policy level actions

- Regularly synthesis and disseminate relevant **scientific evidence** in a policy-ready format to bring governments and world of work stakeholders to the same level of awareness.
- **Strengthen dialogues** and converted actions at all levels to enable an effective and efficient way forward.
- Carry out research on **gender-specific endpoints** and **mainstream gender considerations** on OSH regulations for EDCs.
- Develop **evidence-based OELs** for EDCs and methods to implement and enforce them. Ensure global harmonization of these OELs.
- Evaluate exposures to EDCs to ensure that decision-makers know how chemicals are being used, can access **robust biomonitoring data** so that exposures can be characterized, and can implement OELs and other **exposure mitigation programmes** as needed.

EDCs: Workplace level actions

- Ensure EDCs in the workplace are **identified**, properly **classified** and **labelled**, so workers and employers understand they are working with EDCs.
- Prevention measures will differ based on the type of EDC workers are using.
- Apply the **Hierarchy of Controls** as relevant to ensure workers are protected from the harmful effects of EDCs.

Pesticides

Pesticides: Policy level actions

Refer to, and ratify/implement the following conventions/codes:

- **ILO Safety and Health in Agriculture Convention, 2001 (No. 184)**. This Convention prescribes standards on the safe use of chemicals used in agriculture, including pesticides.
- **Stockholm Convention** on **Persistent Organic Pollutants**. The Convention aims to eliminate or restrict the production and use of persistent organic pollutants (POPs)
- **Rotterdam Convention** on the **Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade**. The Rotterdam Convention is a multilateral treaty to promote shared responsibilities in relation to the importation of hazardous chemicals.

Pesticides: Policy level actions

- **FAO and WHO International Code of Conduct on Pesticide Management**.
- Key provisions:
  - Avoid using pesticides whose handling and application require the use of PPE that is **uncomfortable**, **expensive** or **not readily available**.
  - Collect **reliable data** and **maintain statistics on health effects** of pesticides and pesticide poisoning incidents.
  - Introduce the necessary **policy** and **legislation** for the regulation of pesticides, their marketing and use throughout their life-cycle, and make provisions for its effective coordination and enforcement.
  - Consider **prohibiting the importation**, **distribution**, **sale** and purchase of HHPs, if they pose an unacceptable risk to humans and the environment.

Pesticides: Policy level actions

- Finalize the **harmonized list of HHPs** from the already advanced drafts in existence.
- **Strengthen international support for LMICs** to develop, adopt and implement legally binding instruments to control HHPs in order to prevent worker exposure.
- Combat **illegal trafficking** of illicit pesticides.
- Enhance resources and capacities for treatment of existing **HHP stockpiles**.
- **Implement** GHS to classify and label HHPs and effectively communicate hazards, without requiring workers to read warning text. Train workers on GHS interpretation.

Pesticides: Policy level actions

- Promote **integrated pest management (IPM)** and **integrated vector management (IVM)** through investment in training, communication and further research, and monitoring of their effectiveness.
- Improve the availability and distribution of **low-risk biological alternatives**.
- Use **good agricultural practice schemes** and other non-regulatory options to promote substitution of HHPs by pest management approaches and products that pose less risk.
- Consider using **financial incentives** (e.g. subsidy or taxation instruments) to favour low risk products, such as biological control agents and most biopesticides, over high risk products.
- **Update, implement and enforce OELs** for HHPs and ensure global harmonization of these OELs.

Pesticides: Workplace level

- Start with **elimination** e.g. **biological controls** and **plant-based fertilisers** and also techniques such as **crop covering**. Also prioritise substitution using **less toxic pesticides**.
- Apply **engineering controls** where possible, specifically for less toxic pesticides.
- Introduce preventive occupational measures, including **farmer training** on IPM with good agricultural practices and greater use of ecologic alternatives.
- Promote communication and awareness-raising efforts to **train workers** in contact with HHPs about the health hazard.
- Introduce procedures to **limit environmental exposure**, for example, managing the timing of application and introducing buffer zones.
- Ensure availability of appropriate PPE and application equipment.

Engineering controls include nozzle placement, droplet size, equipment calibration, baffles, deflectors, air induction nozzles and tree-sensing technology.


Air
pollution

Air pollution: Policy level actions

Develop national laws or regulations that prescribe that measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution.

- **Air pollution regulation** to **eliminate the source of pollutant release** represents a priority and requires coordinated international and national regulation.
- Ratify and implement the **ILO Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration Convention, 1977 (No. 148)**.
- Key provisions:
  - Establish criteria for determining the hazards of exposure to workplace air pollution and specify exposure limits on the basis of these criteria.
  - Eliminate any hazards due to air pollution in the working environment, by technical measures applied to new plant or processes in design or installation, or added to existing plant or processes; or, where this is not possible, by supplementary organisational measures.

Air pollution: Policy level actions

- Promote the creation of **green jobs**, reduce the use of solid fuels in work processes and the move to cleaner and more sustainable energy sources and processes.
- **Implement guidelines at the national and local level** to release warnings that reduce or stop work outdoors in periods of severe air pollution.
- Raise **awareness of employers and workers** about ambient air pollution and their responsibility for occupational health and safety.
- Recognise exposure to ambient air pollution while working outdoors as an **OSH issue** and use **OSH regulations and standards** to provide protection of workers.
- Provide **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.

Air pollution: Policy level actions

- **Engage with private sector, businesses and workplace** undertakings for preventing emissions of air pollution and improving their overall environmental performance.
- **Stimulate initiatives** combing occupational safety and health, environmental protection and green workplaces and technological transfer and innovations to prevent ambient and workplace air pollution.
- **Update, implement and enforce OELs** for air pollution and ensure global harmonisation of these OELs.
- **Air quality standards** and **OELs** have been established for a large number of workplace air pollutants by organizations and national committees.

Air pollution: Workplace level

- **Reduce the exposure**, through spending less working time outdoors, rotating workers and restricting work during episodes of severe air pollution, including dust storms.
- Provide **respiratory symptom protection programme**, including appropriate respirators, fit-testing and training of workers.
- Implement **medical surveillance** of workers,
- Carry out **health surveillance** of the working environment and **record levels of air pollution** from the municipal sources.
- **Report cases** of occupational diseases that can be caused by ambient air pollution among exposed workers (asthma, chronic obstructive pulmonary disease, lung cancer) and follow up with the **employment injury scheme**.

End of session activity

Group work

Group work

- You have been appointed as head of large farm. The farm grows crops which are treated with a number of different pesticides. There have been a number of poisoning incidents in the past year, with workers taken to hospital.
- You are concerned about these poisoning incidents and want to improve worker safety. How would you go about this?

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Key ILO resources

- Exposure to hazardous chemicals at work and resulting health impacts: A global review (2021).
- The GHS in the world of work: Mapping synergies between ILO Instruments and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).
- ILO Instruments on Chemical Safety – Analysis and synergies with other international frameworks on the sound management of chemicals (2020).
- The Sound Management of Chemicals and Waste in the World of Work (2019).
- All You Need to Know: Convention No. 170.
- Guidelines on occupational safety and health management systems (2001).
- Major hazard control: A practical manual (1993).
- Safety in the use of chemicals at work: code of practice (1991).
- Prevention of major industrial accidents: code of practice (1991).
- ILO indicators of progress in implementing SAICM (2021).

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Thank you

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