The role of World Health Organization concerning advice and actions on chemicals and chemical safety

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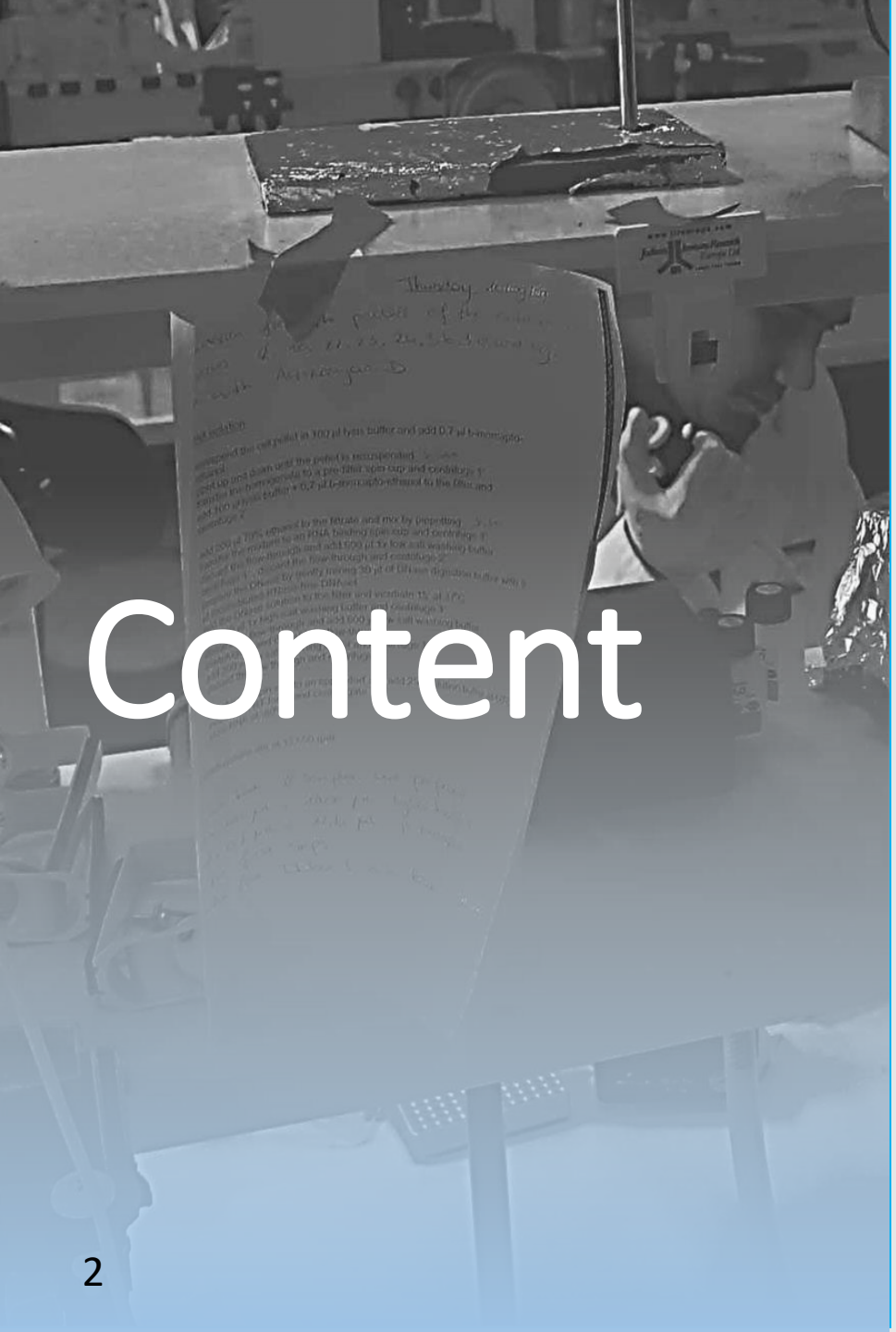
Regulatory Toxicology II: European and International Perspectives

09 April 2024

World Health Organization

European Region



Content

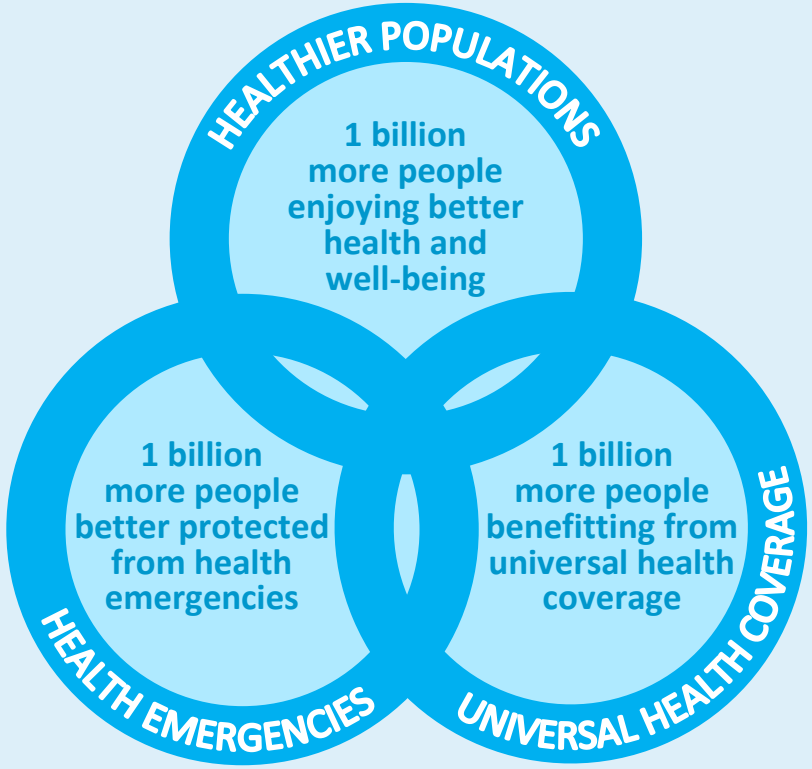
- WHO core functions
- Living in a “chemical” world
- Global and regional policies
- WHO chemicals of public health concern
- Chemical risk assessment
- Supporting international agreements
- Information collection and sharing
- Advocacy

WHO and health and environment

The UN agency that connects nations, partners and people to *promote health*, *keep the world safe* and *serve the vulnerable,* so everyone, everywhere can attain the highest level of health

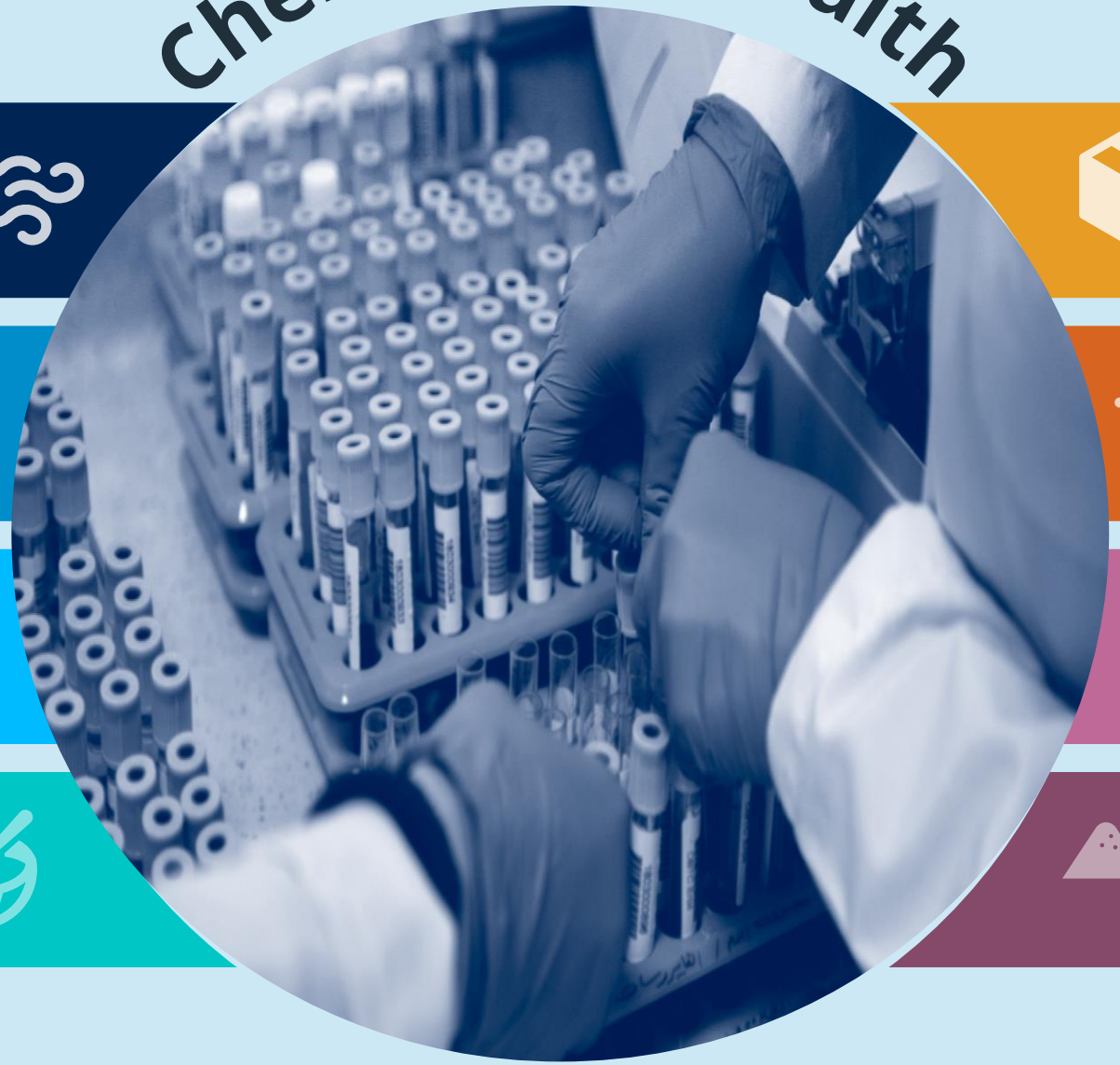
Core functions of WHO:

- Global leadership and advocacy
- Normative guidance
- Knowledge management for policy making
- Research and knowledge
- Policy and technical assistance
- Monitoring and evaluation



World Health Organization
European Region

Chemicals & health



Ambient air
(inhalation)

Water
(inhalation, ingestion, dermal)

Household/ indoor air
(inhalation)

Food
(ingestion)

Consumer products
(dermal, ingestion, inhalation)

Dust
(dermal, ingestion, inhalation)

Building materials
(dermal, ingestion, inhalation)

Soil
(dermal, ingestion)

Chemical Universe

~500 chemicals extensively characterized for their hazards and exposures

250 000 000 unique chemicals substances (CAS)

The total number of industrial chemicals in commerce globally was between 40 000 and 60 000 (in in 2019)

62% of the volume of chemicals consumed in the member countries of the EEA in 2016 were hazardous to health

Risk

Hazard

~100 000

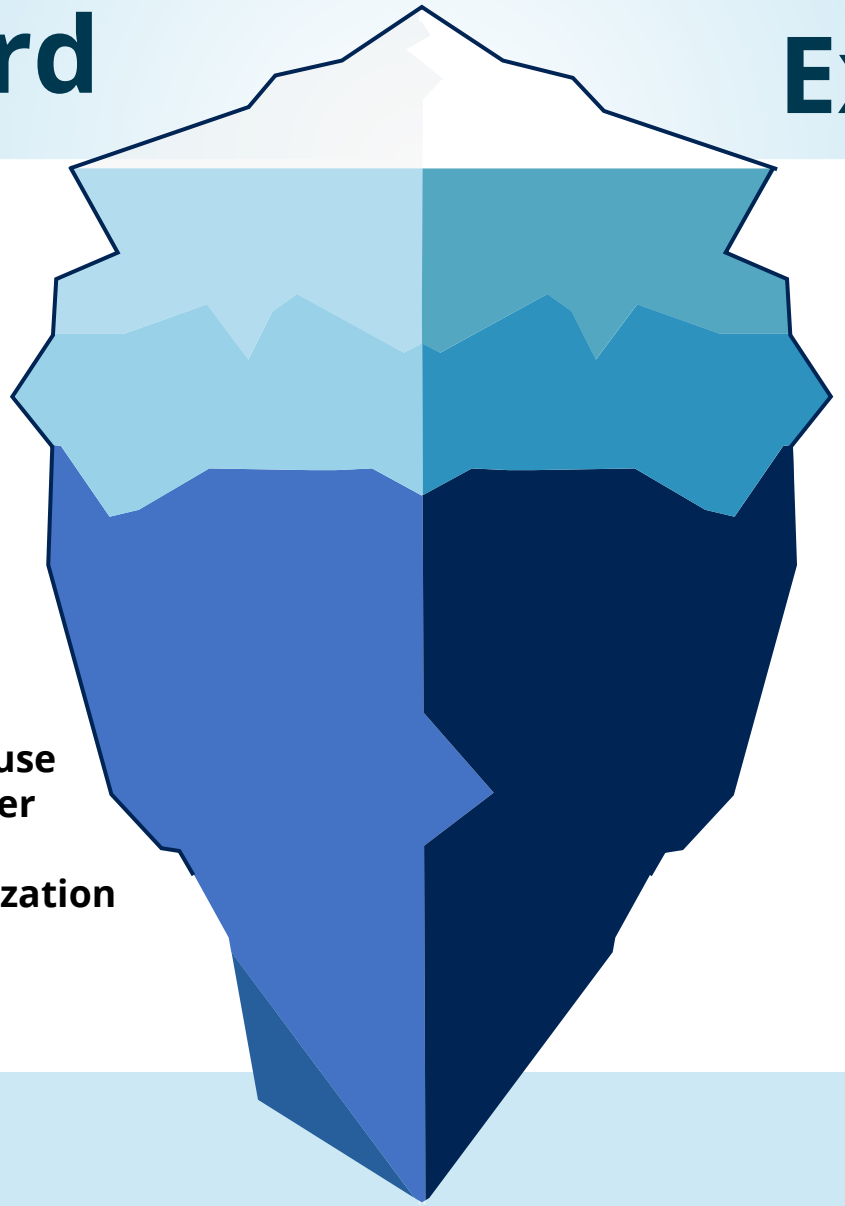
on the market

~22 600

chemicals with a use over 1 tonne per year

~4 700

chemicals with a use over 100 tonnes per year prioritized in hazard characterization and evaluation



Exposure

~10 000

fairly well characterized for a subset of their hazards and exposures

~20 000

limited characterization for their hazards and exposures

~70 000

poor characterization for their hazards and exposures

Socioeconomic impacts of exposure to hazardous chemicals

Health impacts

Single chemical (lead) health impact:

1.06 million
deaths from long-term effects

24.4 million
disability-adjusted life-years (DALYs) lost

63.2%
of the global burden of idiopathic developmental intellectual disability

10.3%
of hypertensive disease

Several selected chemicals burden calculated for 2019 as:

Heavy metals

Occupational exposure

POPs

Poisonings

2 million lives and
53 million DALYs lost

Estimated burden from exposure to chemicals in the environment is:

9 million deaths per year to

Exposure to chemicals in the 21st century

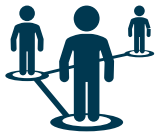
Thousands of chemicals, more “unknown”

Increased production and growing burden on population

Global trade and transport

Volume of chemicals hazardous to human health (e.g. endocrine disruptors, carcinogens) is not decreasing

Exposure to complex mixtures — wide mix of chemicals originating from various sources



Public awareness about chemicals and exposure

Information availability — social networks

Fast interventions/ regulations

Mandate for action: global policy frameworks (1)

SDGs

3 GOOD HEALTH AND WELL-BEING

SDG target 3.9:

By 2030 substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination.

6 CLEAN WATER AND SANITATION

SDG target 6.3:

By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse globally.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

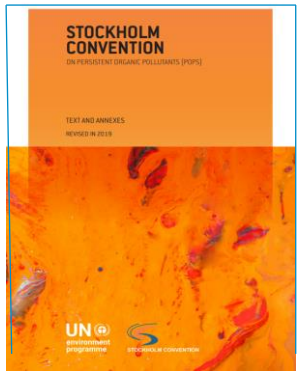
SDG target 12.4:

By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

Source: WHO, 2017.

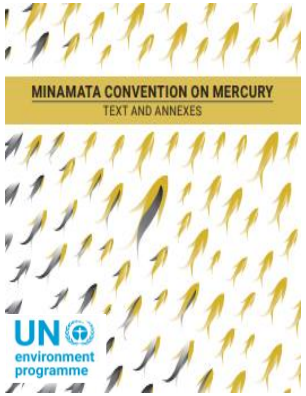
Mandate for action: global policy frameworks (2)

Legally binding multilateral agreements



Stockholm Convention on persistent organic pollutants

Global monitoring plan



Minamata Convention on mercury

Monitoring of mercury and mercury compounds to support evaluation of human exposure to mercury

Voluntary policy frameworks

Strategic Approach to International Chemicals Management

Encourages Member States to take actions focused on filling gaps in knowledge and methodologies for risk assessment, increasing biomonitoring and surveillance

Global Framework on Chemicals – For a planet free of harm from chemicals and waste

By 2030, …generate … and make available comprehensive and accessible monitoring and surveillance data and information on concentrations and potential exposure sources of chemicals in humans…

HIGH-LEVEL DECLARATION

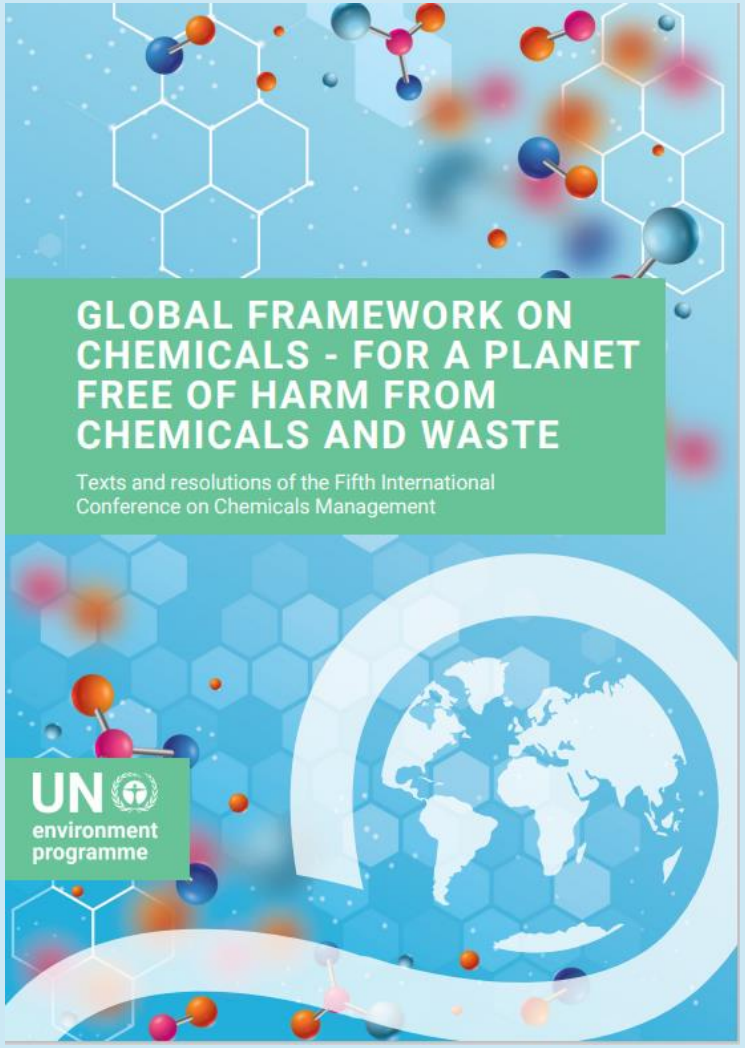
Pollution is the world's largest risk factor for disease and premature death, with pollution from chemicals contributing to millions of those deaths, illnesses and disabilities each year.

We will prevent exposure to harmful chemicals, and phase out the most harmful ones, where appropriate. We will actively promote and support …. the development of safe chemical and non-chemical alternatives and substitutes

We will actively promote research and innovation for the development of safe and sustainable chemicals, materials, products and processes

Strengthening the development and provision of safe and sustainable chemicals with reduced adverse impacts for downstream industry users, workers, and consumers

Global Framework on Chemicals – For a planet free of harm from chemicals and waste



A vision for a planet free of harm from chemicals and waste, for a safe, healthy and sustainable future

By 2030, Stakeholders generate to the extent possible, and make available comprehensive and accessible monitoring and surveillance data and information on concentrations and potential exposure sources of chemicals in humans (disaggregated by sex, age, region, other demographic factors, and other relevant health determinants as feasible) (Target B7).

The Bonn Declaration for a Planet Free of Harm from Chemicals and Waste
The Global Framework on Chemicals - for a Planet Free of Harm from Chemicals and Waste
Resolutions of the Fifth International Conference on Chemicals Management

GFC_Main_Brochure__28_Feb_2024 (chemicalsframework.org)
Homepage | GFC (chemicalsframework.org)

WHA Resolution (2023) The impact of chemicals, waste and pollution on human health

CALLS UPON Member States:

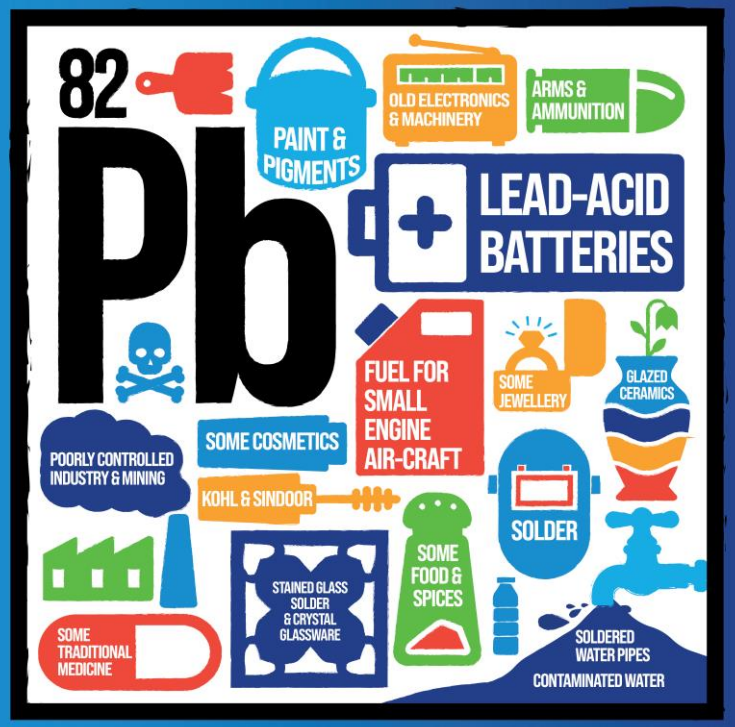
To strengthen implementation of the WHO Global Strategy on Health, Environment and Climate and the WHO Road Map to enhance the engagement of the health sector in the Strategic Approach to International Chemicals Management towards the 2020 goal and beyond, taking a health-in-all policies approach;

Encourage the health sector to strengthen partnerships and collaborative efforts to develop/update regulatory frameworks, including the harmonization of protocols for national human biomonitoring and surveillance programmes particularly for chemicals of concern, such as cadmium, lead, mercury, highly hazardous pesticides and endocrine disrupting chemicals

WHO 10 chemicals of public health concern

- Air pollution
- Arsenic
- Asbestos
- Benzene
- Cadmium
- Dioxins and dioxin-like substances
- Inadequate or excess fluoride
- Lead
- Mercury
- Highly hazardous pesticides

SOURCES OF LEAD EXPOSURE



SAY NO TO
LEAD POISONING!

World Health Organization

#BanLeadPaint

FACT: LEAD IS TOXIC

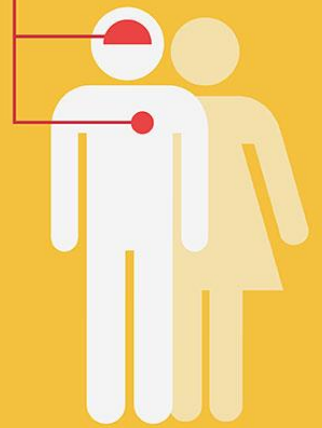
It is harmful to everyone and **DAMAGES:** BRAIN, KIDNEYS, LIVER, BLOOD, REPRODUCTIVE SYSTEM

Young children
are most vulnerable. Their nervous systems are still developing and they absorb **4-5 times more than adults**, which can cause:

- intellectual disability
- underperforming at school
- behavioural issues

In adults
lead exposure increases the risk of:

- ischaemic heart disease
- stroke



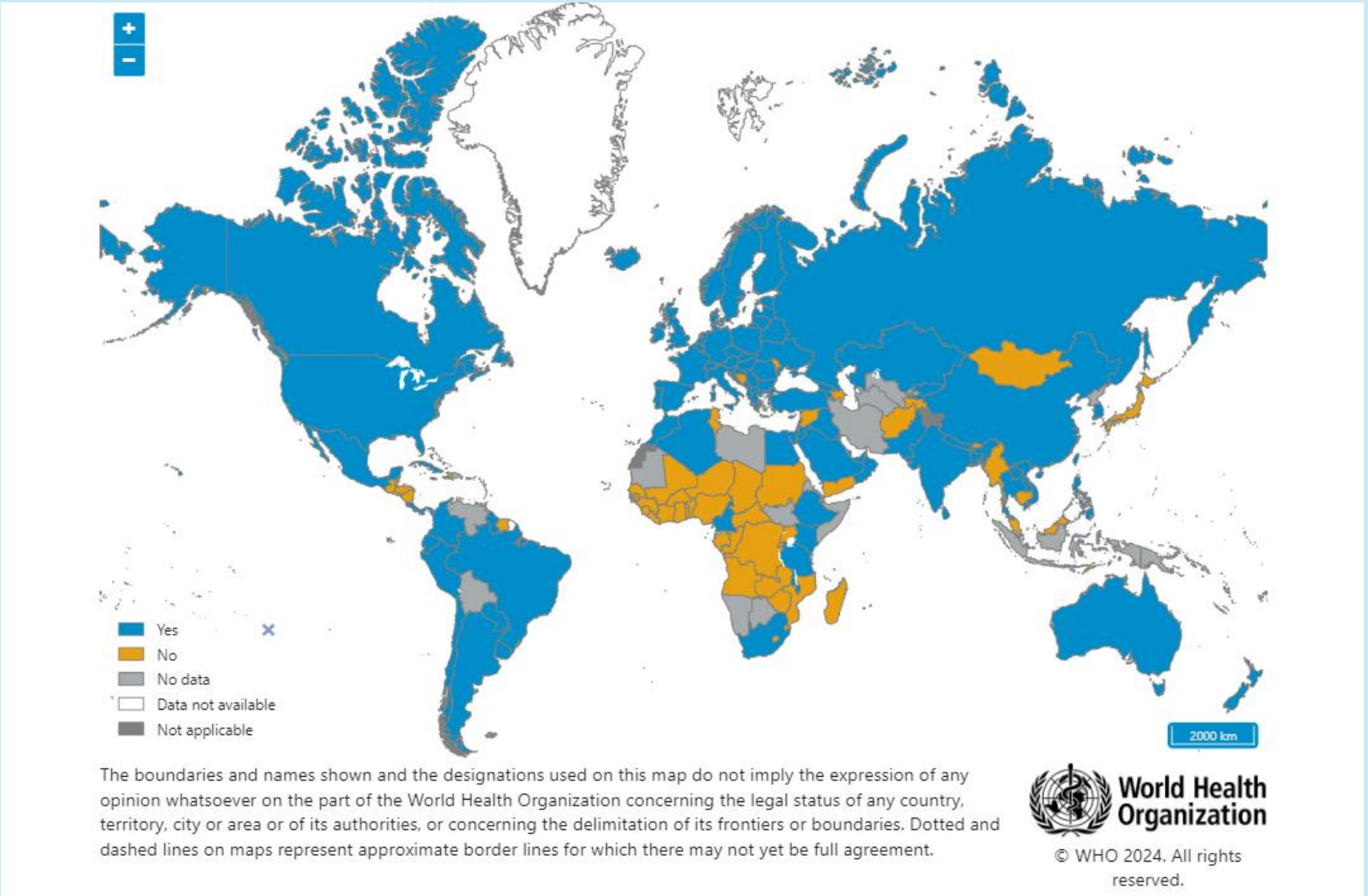
In pregnant women
lead exposure damages many organs but also affects:

- the developing foetus

There is no safe level of lead exposure

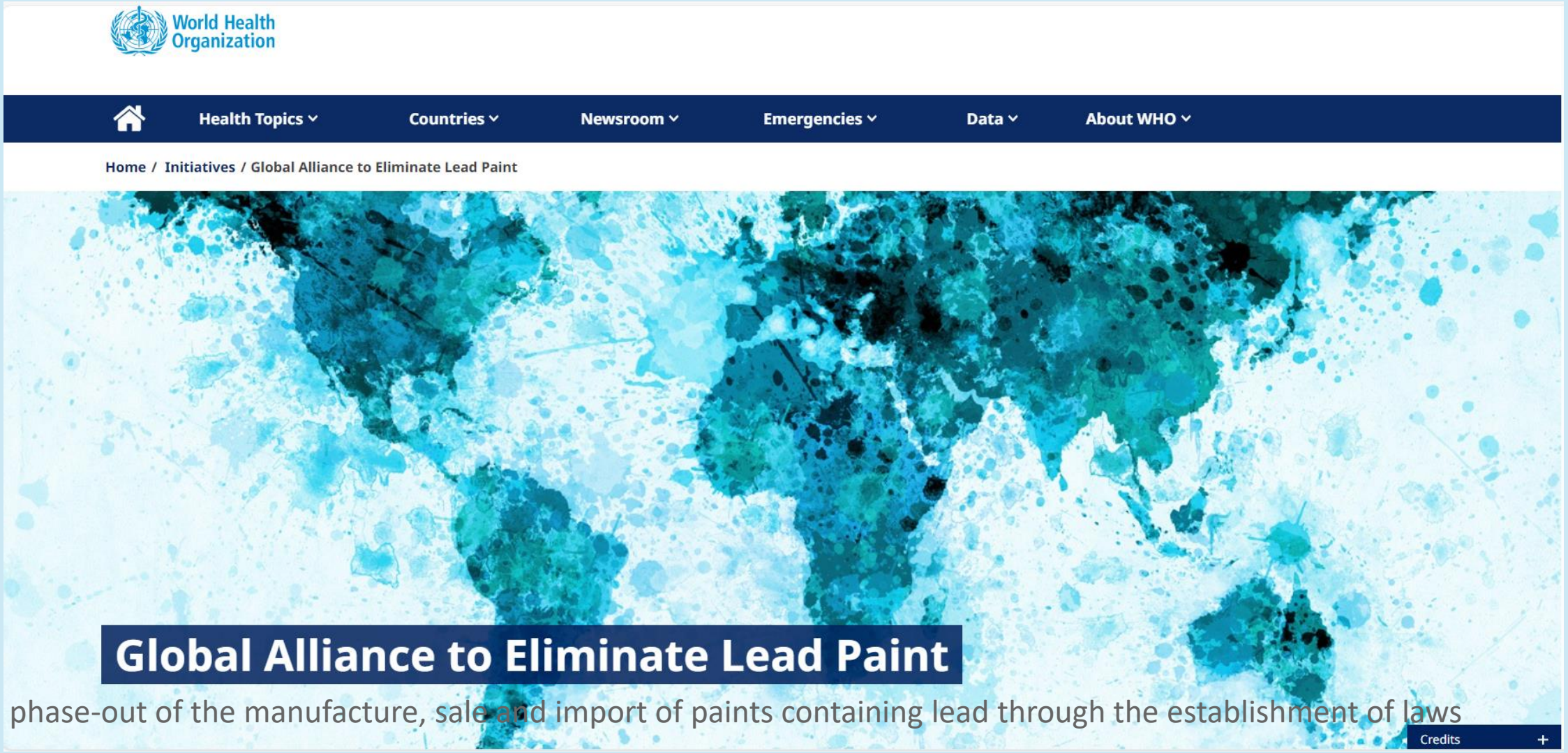
World Health Organization

As of 16 Jan 2024: 48% of countries have confirmed that they have legally binding controls on the production, import, sale and use of lead paints



Chemical Safety and Health (who.int)

legally-binding_controls_on_lead_paint.pdf (who.int)



A voluntary partnership formed by UNEP and WHO to prevent exposure to lead through promoting the phase-out of paints containing lead

[Global Alliance to Eliminate Lead Paint (who.int)]

Prohibition of lead in paint - promotion of safer alternatives

GEF/SAICM project (2018 – 2022)

- To promote national legislation on prohibition of lead in paints
- Implemented with technical support from UNEP, WHO and other members of the Global Alliance to Eliminate Lead Paints

12 countries in WHO European Region

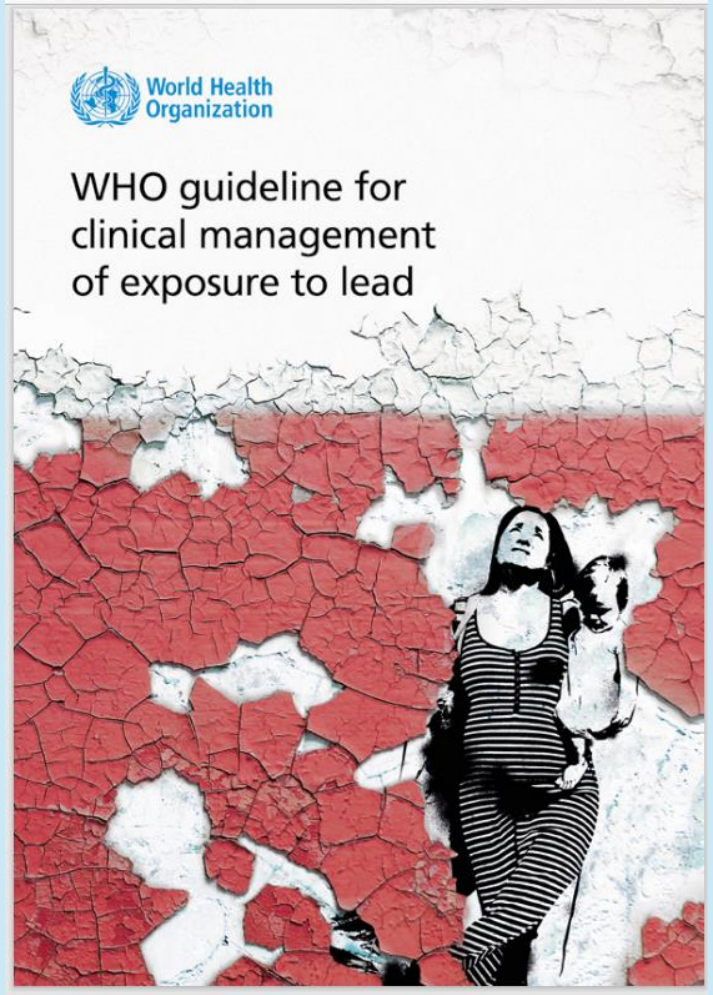
5 countries adopted legislation

6 developed and submitted to authorities

WHO ECEH support:

- Technical advice and assistance to countries
- Country-specific support
- Stakeholder dialogues – civil society and industry

WHO guidelines – robust public health recommendations



The purpose: to assist physicians in making decisions about the diagnosis and treatment of lead exposure for individual patients and in mass poisoning incidents.

Evidence-informed recommendations on:

- the interpretation of blood lead concentrations;
- use of gastrointestinal decontamination;
- use of a chelating agent; and
- use of nutritional supplements

Guideline for clinical management of exposure to lead (who.int)

MERCURY EXPOSURE IMPACTS HEALTH

Eating contaminated fish and shellfish...

Is toxic to the brain and affects brain development in unborn babies and young children.

Using certain skin lightening soaps and creams...

Is toxic to the kidneys.

Mercury is used in small-scale gold mining...

This form of mercury is toxic to the brain and kidneys.

The same applies to mercury fumes from broken thermometers and blood pressure devices.

World Health Organization

WHAT IS THE MINAMATA CONVENTION?

It is an international agreement that aims to protect people and the environment from mercury.

The health sector is working to:

1. Phase out thermometers and blood pressure devices that contain mercury
2. Promote oral health and reduce dental amalgam use
3. Implement strategies to protect small-scale gold miners and other vulnerable groups
4. Monitor mercury exposure and provide health advice

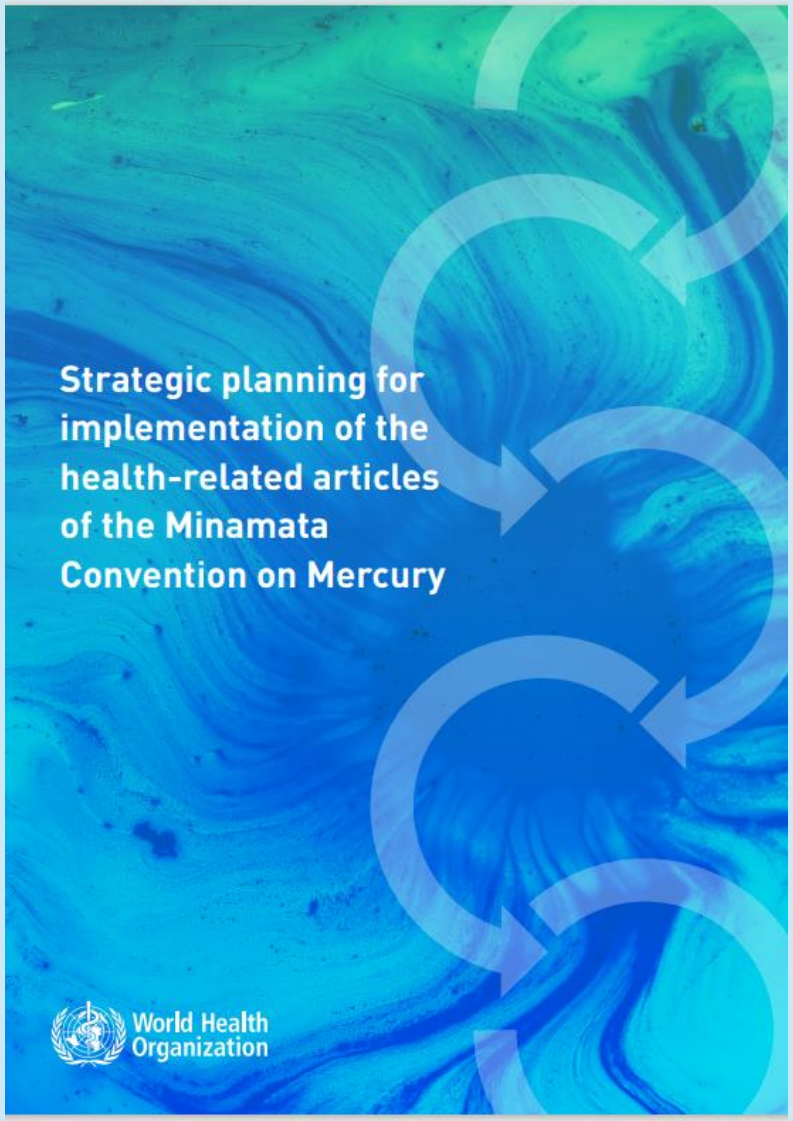
Everyone can contribute:

Dispose of mercury-containing products safely.

Choose mercury-free products when possible.

World Health Organization

Health aspects in the Minamata Convention



Identifies the importance of the health sector in its implementation

Several health-related articles, in which health sector plays a leading role in implementation

Several obligatory articles with or without a set timeframe for implementation: mercury-added products, ASGM, mercury wastes, etc

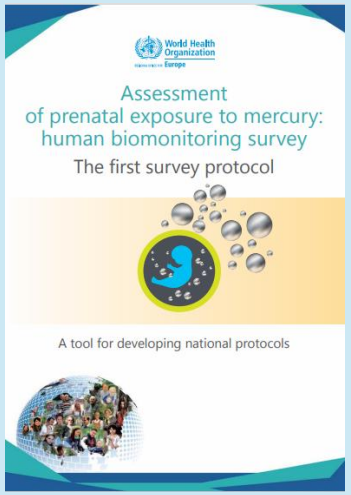
Voluntary articles, such as Art. 16 on *Health aspects*: broad provisions relating to identification and protection of populations at risk from mercury exposure, including occupational exposure and health care

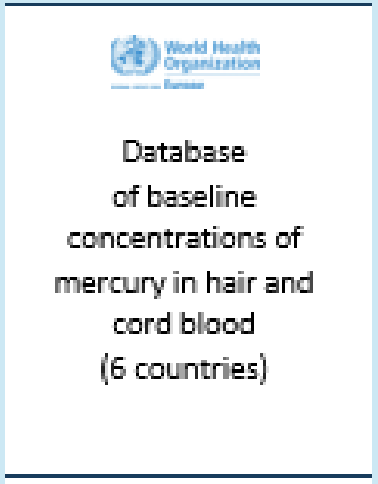
9789241516846-eng.pdf (who.int)

Facilitating MEAs – the Minamata Convention

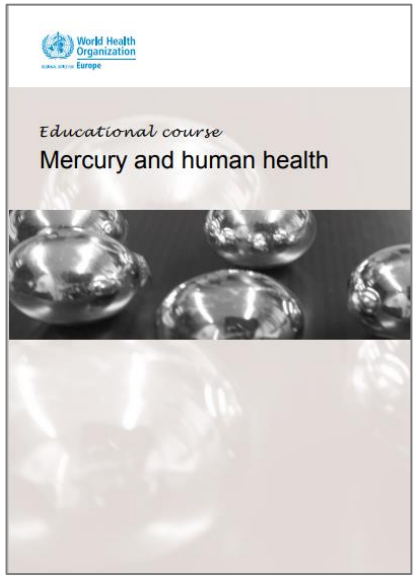
Assessment of prenatal exposure to mercury – mercury human biomonitoring

-standard operating procedure and
-national survey protocol
-pilot study in six countries globally
-database of baseline concentrations





Minamata Convention implementation in the health sector

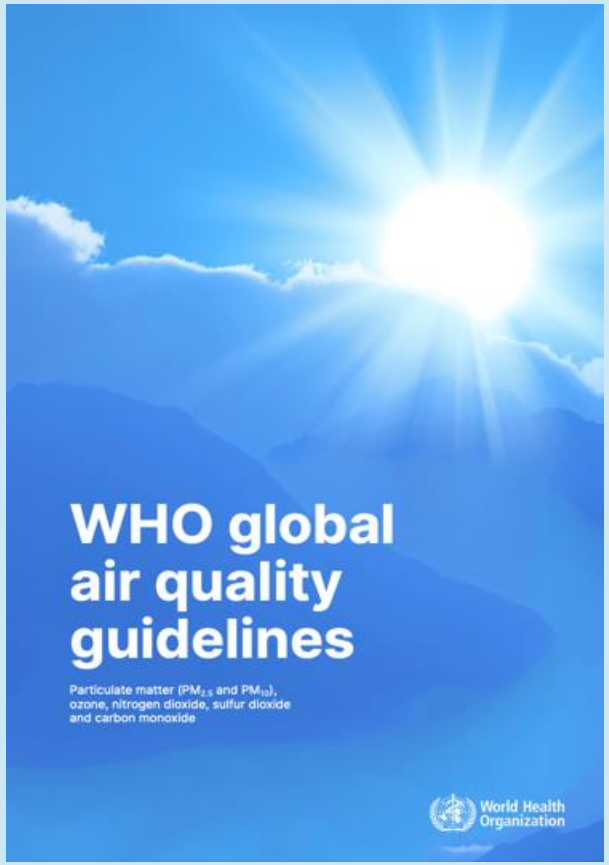


Educational course - 4 modules:

- Human exposure to mercury
- Health effects of mercury
- Minamata Convention and the health sector's role in int implementation
- Mercury in the health sector

New GEF project on phasing-out mercury-containing devices from the health sector (2024)

Air pollution – WHO air quality guidelines



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

New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution
WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide

WHO air quality guidelines

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

- **Air quality guideline levels** for both long- and short-term exposure in relation to critical health outcomes
- **Interim targets (IT)** to guide reduction efforts for the achievement of the air quality guideline levels
- **Good practice statements** for certain types of particulate matter, for which evidence is insufficient to derive quantitative air quality guideline levels, but points to their health relevance

WHO AQ guidelines development process

Meta-analysis

Systematic review (SRT)

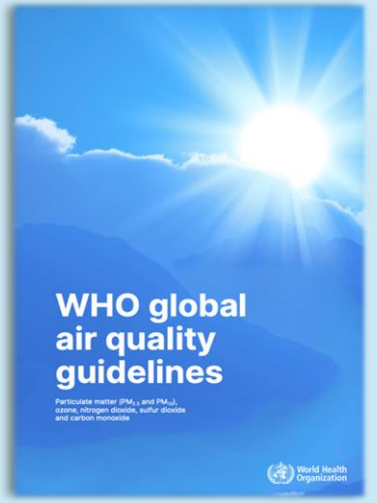
Formulate review questions/
Select health outcomes

Scope of the guidelines

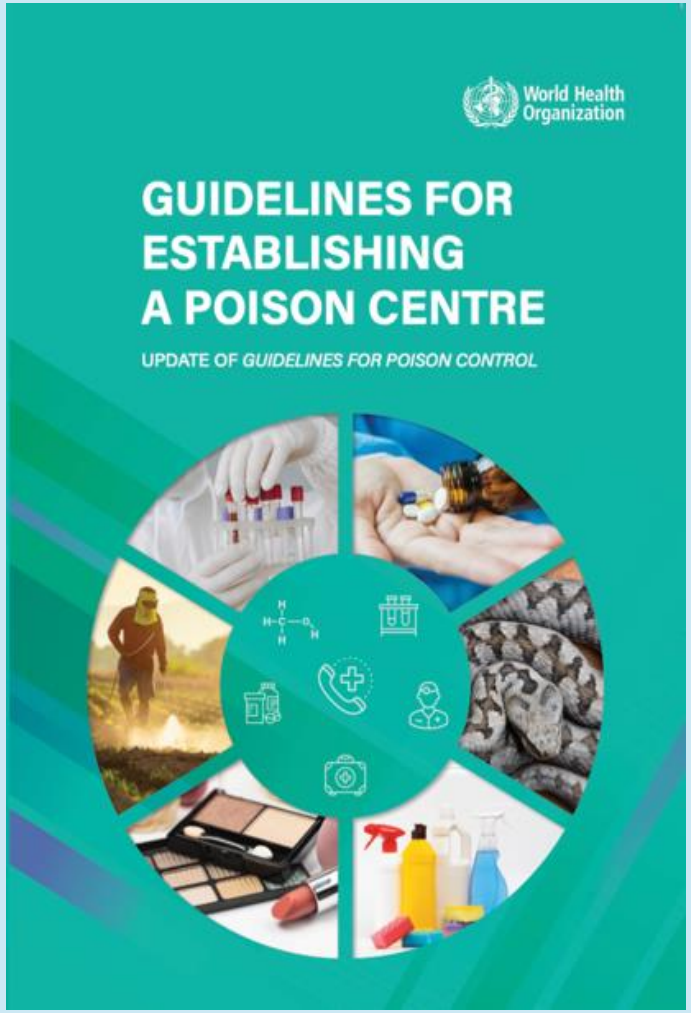
Set up groups (GDG and ERG)
DOI/COI management

Assess certainty of the body of evidence (adapted GRADE)

Formulate recommendations - identify AQG levels



WHO guidelines in support of WHO strategy – at least one poison centre in each country

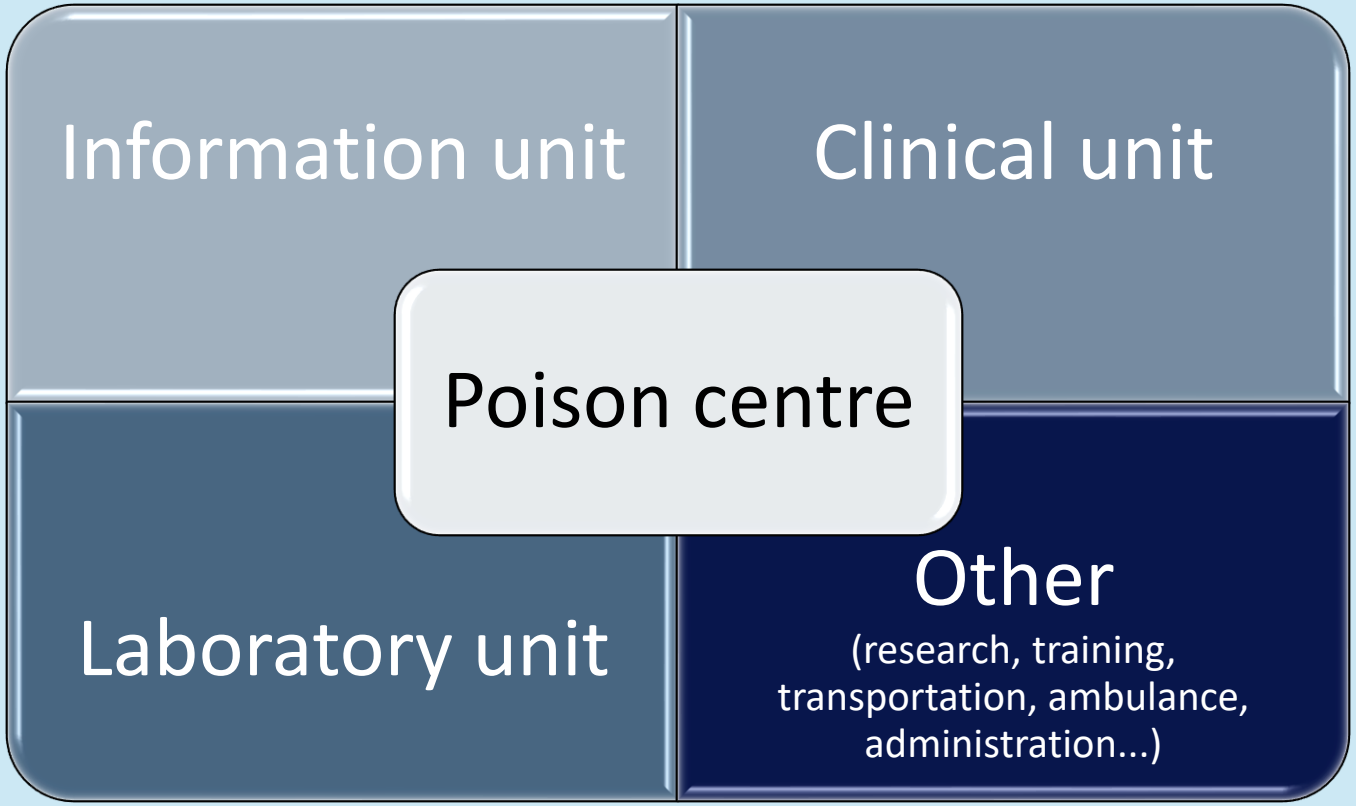


Update of the 1997 Guidelines for Poison Control

Published in 2021, the guidelines provide updated info of the roles of poisons centres, including on:

- Poisons information centres
- Clinical services
- Analytical toxicology & lab services
- Toxicovigilance & prevention
- Chemical incidents
- Antidotes and antivenoms
- Data collection and databases
- Toxicological information sources
- Poisons centre staff training and Quality assurance
- Potential sources of funding
- Economic benefits

Functionalities and benefits

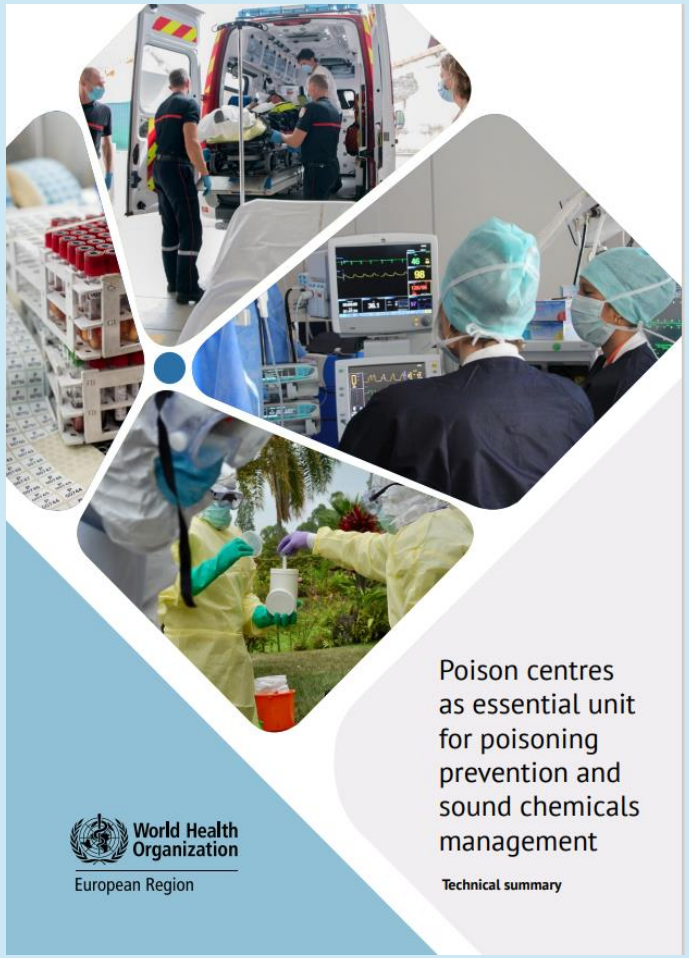


Benefits

- Reduce morbidity and mortality from poisoning
- Promote awareness of special requirements concerning the control and regulation of chemicals, including the labelling and packaging of products
- Provide an epidemiological basis for local toxicovigilance and contribute to sound management of chemicals
- Availability of specific antidotes, therapeutic agents, and medical equipment
- Stimulate the interest of local communities in the prevention of poisoning, answering questions about hazardous chemicals and chemicals in products, pharmaceuticals, etc.
- Professional advice – cost savings

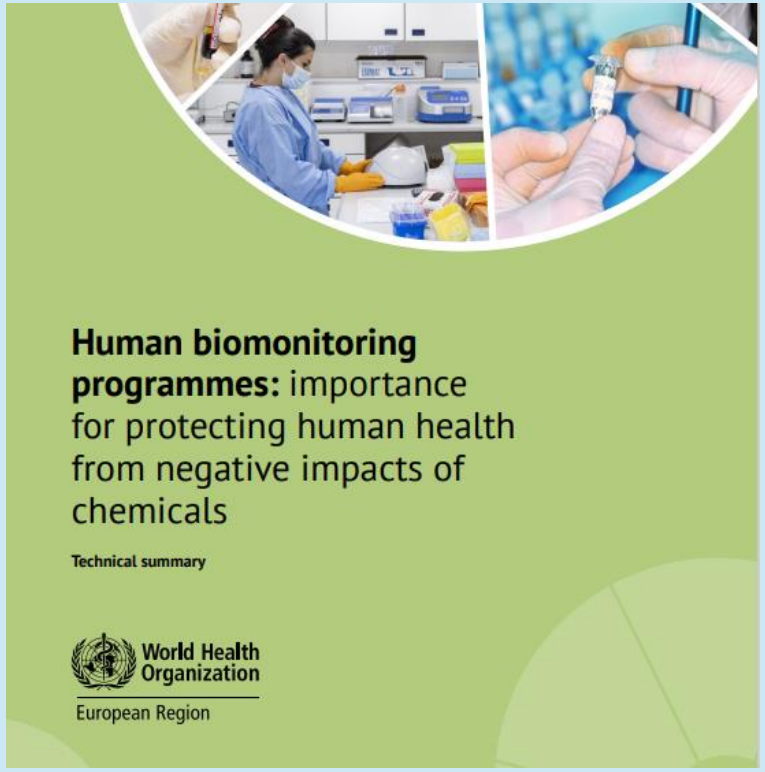
Evidence , capacity building and advocacy

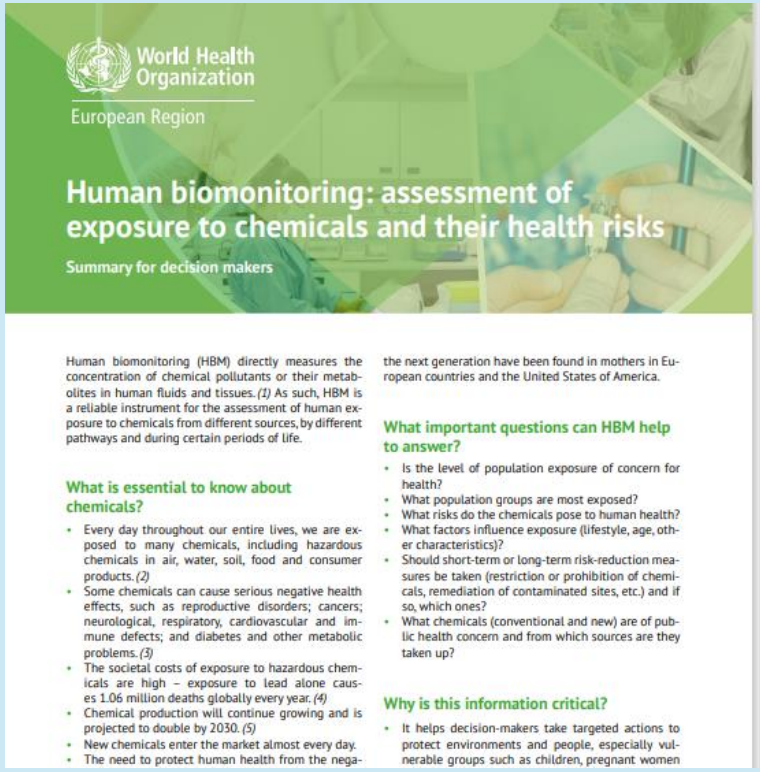
Poison centres – summary for policy makers and technical brief



Evidence , capacity building and advocacy

Human biomonitoring – a tool to support action to address substances of concern





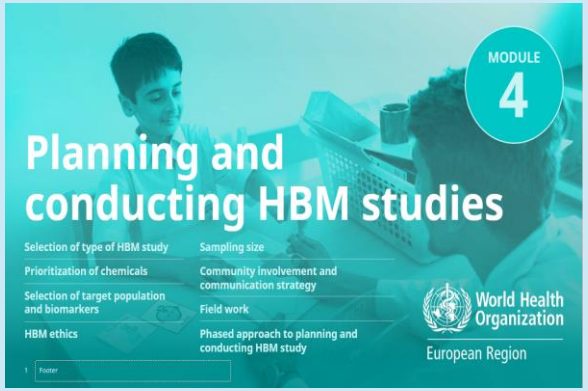
The modules


Human biomonitoring
Basics: educational course


MODULE 1
Introduction
Chemicals in the environment and consumer products
Environment-health paradigm
World Health Organization
European Region


MODULE 2
Principles and objectives of HBM
World Health Organization
European Region


MODULE 3
Biomarkers
Basics of toxicokinetics and toxicodynamics
Types of biomarker
HBM in the exposome
World Health Organization
European Region


MODULE 4
Planning and conducting HBM studies
Selection of type of HBM study
Prioritization of chemicals
Selection of target population and biomarkers
HBM ethics
Sampling size
Community involvement and communication strategy
Field work
Phased approach to planning and conducting HBM study
World Health Organization
European Region


MODULE 5
Laboratory analysis, data management
Laboratory analysis and quality assurance and control (QA/QC)
Biobanking
Data management and analysis
World Health Organization
European Region


MODULE 6
Interpretation and evaluation of results
World Health Organization
European Region


MODULE 7
Existing experience and initiatives
Global: Stockholm Convention on Persistent Organic Pollutants (POPs), Minamata Convention on Mercury
Multicountry: HBM4EU, Arctic countries
National (Belgium, Canada, Czechia, Germany, Japan, Republic of Korea, Slovenia and the United States)
World Health Organization
European Region

Information included in the course

Chemicals in the environment and consumer products
Definitions related to HBM
General principles
Exposure paradigm

Objectives of HBM
Risk assessment using HBM and its communication

Types of biomarkers
Exposure paradigm
HBM in the exposome

Quality assurance/quality control
Sampling storage and analysis
Data storage and analysis
Biobanking

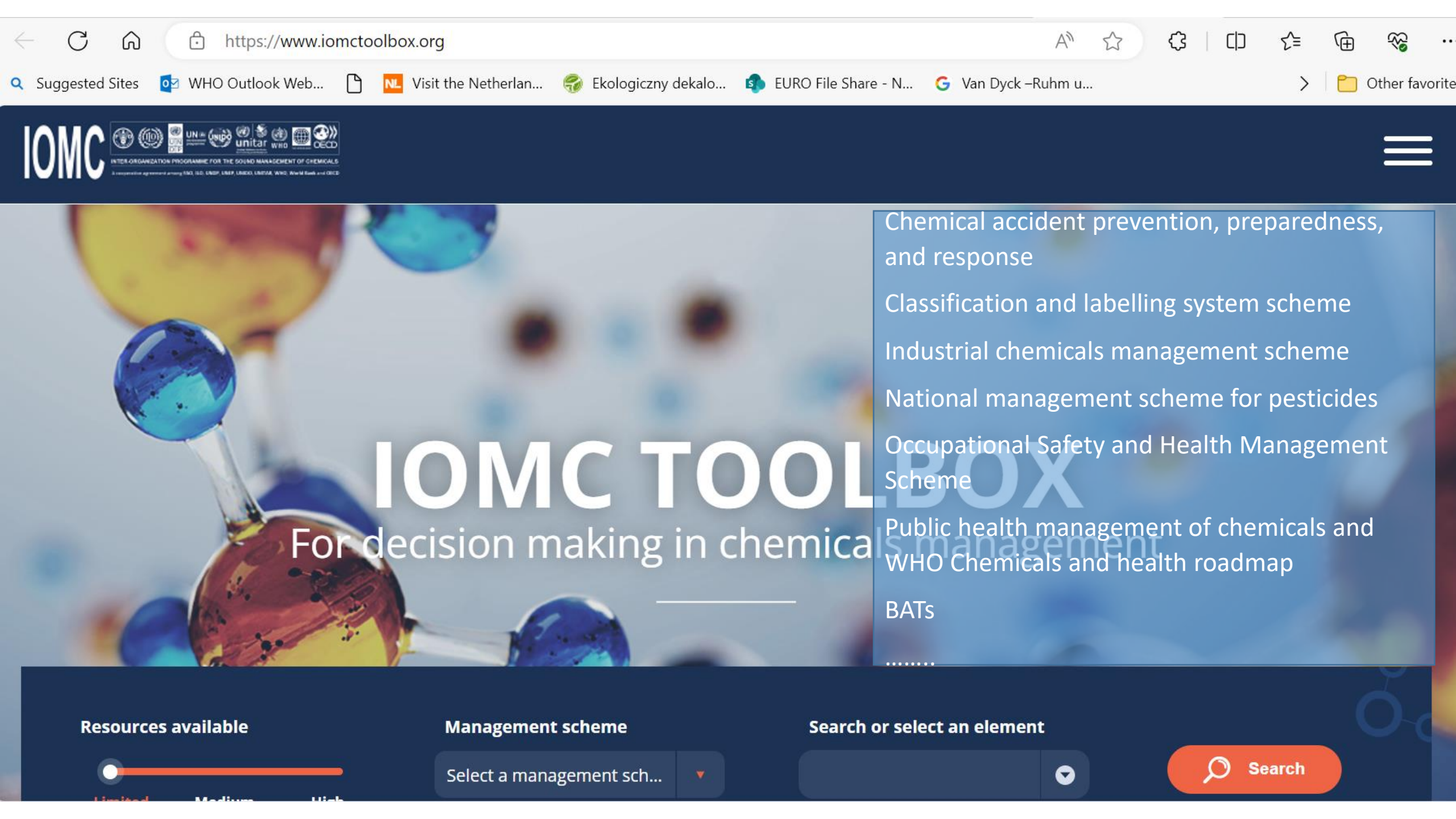
Benefits and challenges of HBM

HBM in policy- and decision-making on risk reduction

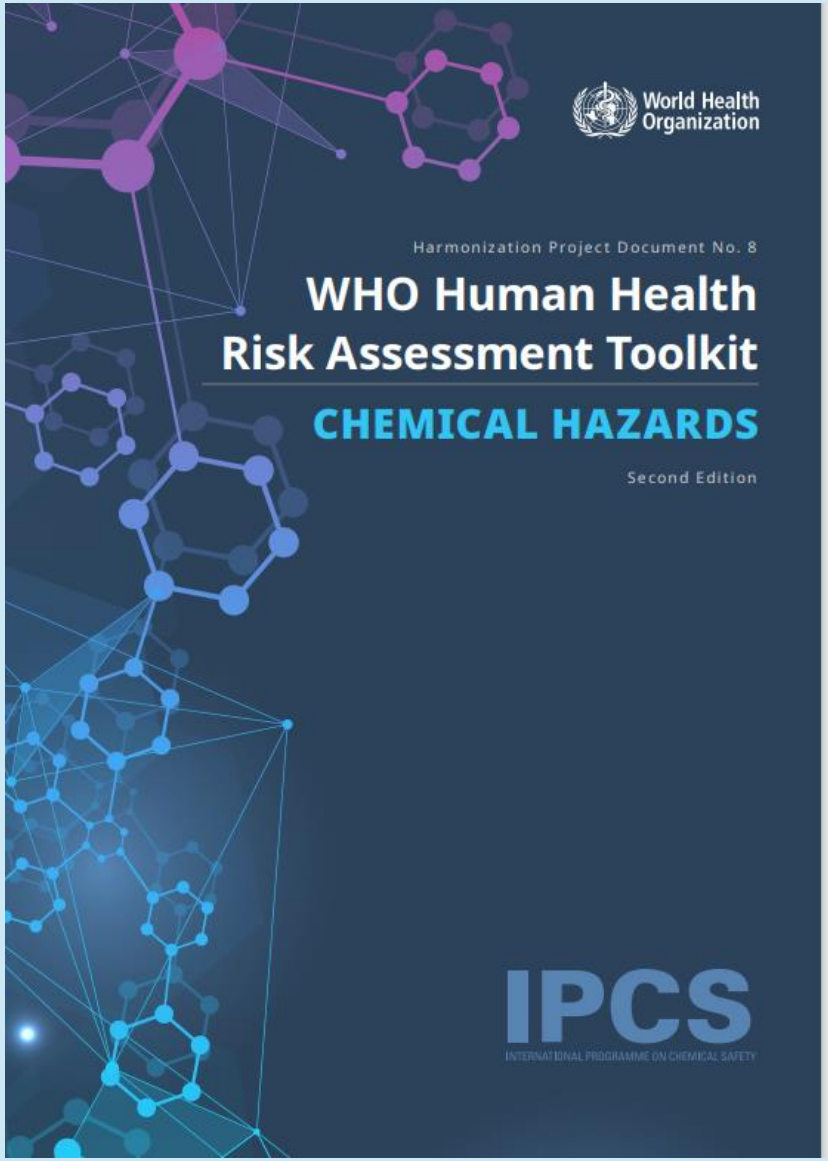
HBM ethics
Types of HBM surveys
Community involvement
Target populations and sampling sites
Organization of field work

Interpretation of HBM results and risk communication

Experience at global, regional and national level


https://www.iomctoolbox.org
Suggested Sites
WHO Outlook Web...
Visit the Netherlan...
Ekologiczny dekalo...
EURO File Share - N...
Van Dyck –Ruhm u...
Other favorite
IOMC
INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS
IOMC TOOLBOX
For decision making in chemicals management
Chemical accident prevention, preparedness, and response
Classification and labelling system scheme
Industrial chemicals management scheme
National management scheme for pesticides
Occupational Safety and Health Management Scheme
Public health management of chemicals and WHO Chemicals and health roadmap
BATs
.....
Resources available
Limited
Medium
High
Management scheme
Select a management sch...
Search or select an element
Search

WHO Human Health Risk Assessment – Updated WHO Toolkit



the role of human health risk assessment in informing EH decision-making including regulatory action, responses to chemical incidents and management of poisonings

provides users with the guidance to identify, acquire and use the information needed to assess chemical hazards, exposures and the corresponding health risks in their given health risk assessment contexts at local and/or national levels

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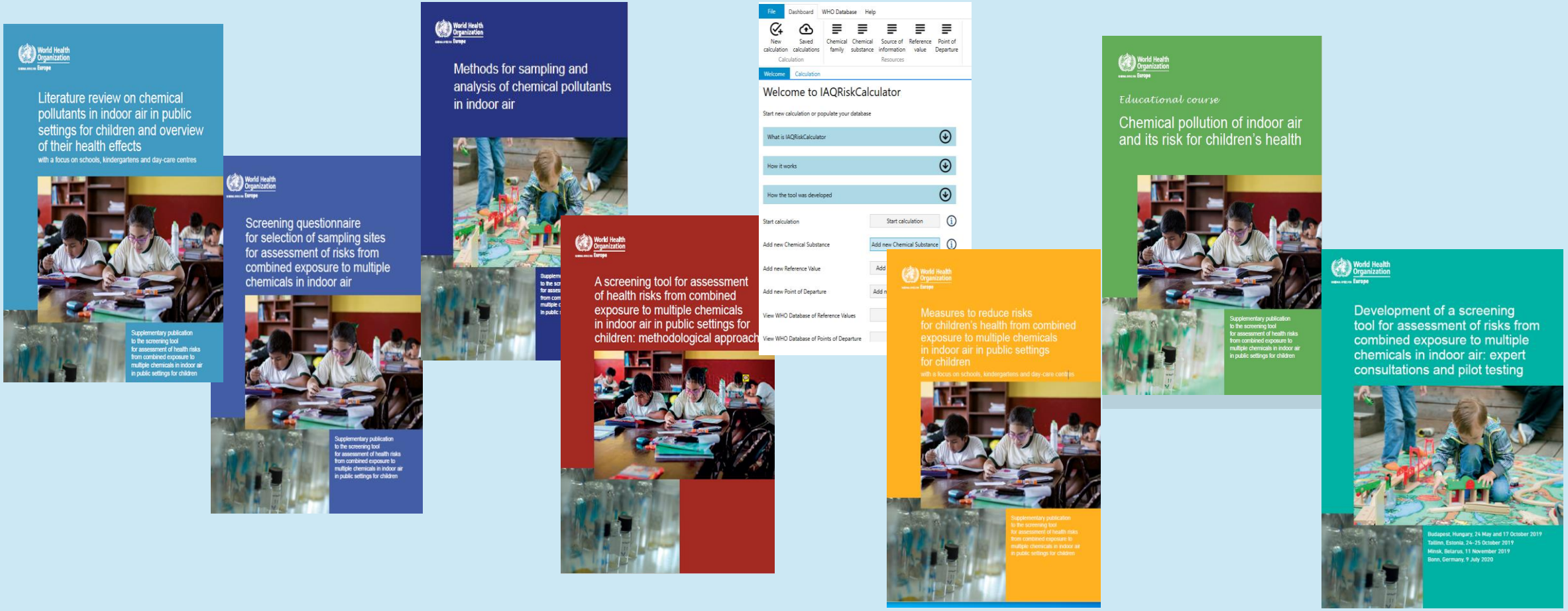
Risk assessment of indoor air pollution to children’s health



Seventh Ministerial Conference on Environment and Health

Budapest, 5-7 July 2023

- Tackle climate change, **environmental pollution** and loss of biodiversity
- *Build forward better* from COVID-19, including actions for urban resilience
- Protect vulnerable populations and vulnerable life stages

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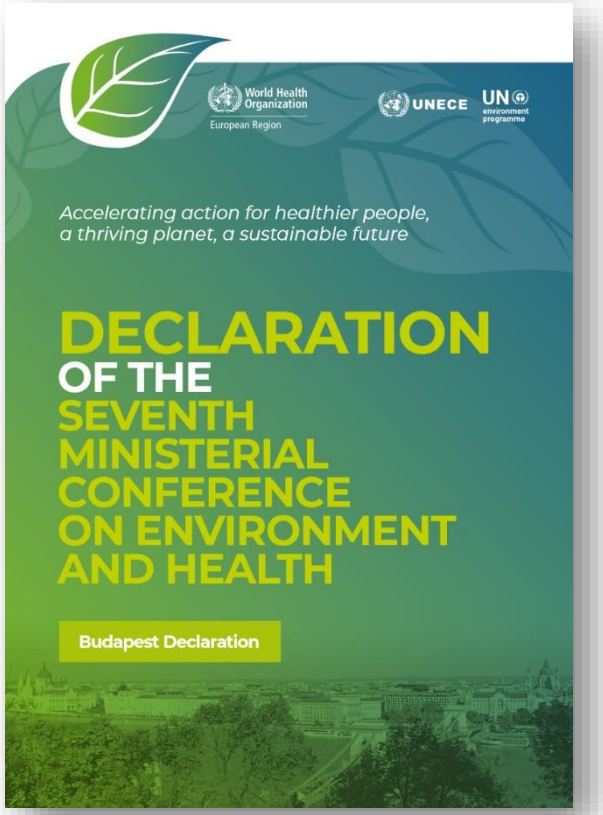
European Region

The Budapest Declaration – the context



The substantial and persistent burden of ill health due to environmental risk factors, both non-communicable diseases and infectious diseases

The “triple crisis” brought by the intertwining of climate change, environmental pollution and biodiversity loss, with unprecedented and rapidly unfolding impacts on our lives, threatening eco-systems, human and animal health and well-being across generations in our Region

The convergence of the COVID-19 pandemic with the environmental and climate crises that exacerbates existing environment and health pressures and inequalities

Interdependencies between the health of humans, animals, plants, and ecosystems at large, and the need to enhance the understanding and evidence on the interlinkages between drivers of biodiversity loss, ecosystems degradation, climate change and the emergence and spread of infectious diseases

*S*uccessfully tackling complex, multidimensional challenges requires urgent, inclusive, intersectoral and transformative action for a healthy, green and sustainable recovery from the COVID-19 pandemic, as advocated by the One Health and Planetary Health approaches

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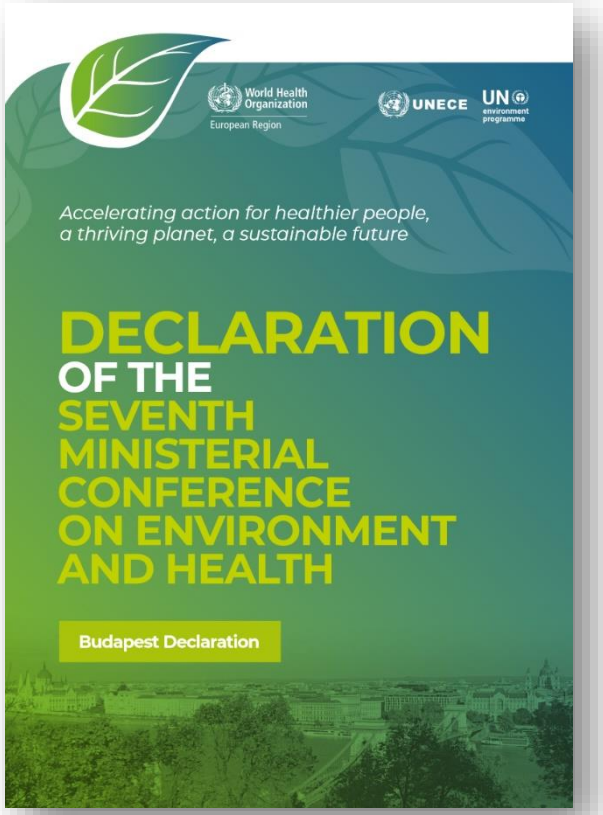
The Budapest Declaration - commitments



To accelerate the just transition towards resilient, healthy, equitable and sustainable societies, taking into account the COVID-19 lessons, taking a dual track approach:

- to increase efforts in prevention, preparedness, and early detection of and response to emergencies… [and] to enhance health systems' resilience;
- to increase efforts to address the environmental determinants of health

To prioritize action on the health challenges related to the triple crisis, including by strengthening the engagement of the health sector in these agendas:

- actions to reduce the health impacts of pollution, through addressing both established and emerging environmental risk factors
- integrate nature and biodiversity in EH policies, and in the implementation of the One Health
- provide universal and equitable access to essential services

Strengthen interlinkages between EH, including through transformative EH governance, workforce; research and innovation; adopting whole-of-government and whole-of-society approaches…

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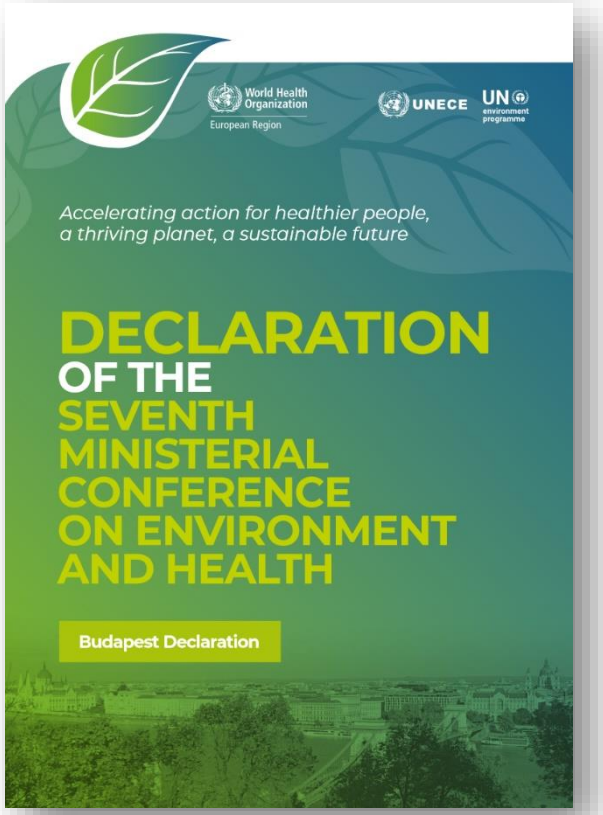
The Budapest Declaration - acting through joint action and partnerships



… continue to promote … engagement of civil society, academia, the private sector, local communities and other stakeholders in the decision-making process…. tools for communication, awareness-raising and promotion of literacy about the links between health, environment and climate change

Support ratification and/ or advance the implementation of multilateral agreements, such as the Protocol on Water and Health, the Convention on Long- Range Transboundary Air Pollution, … international Conventions on hazardous chemicals, their mixtures, waste, as well as the Convention on Biological Diversity…

… welcome the resolution 5/14 entitled “End plastic pollution – Towards an international legally binding instrument”, adopted by the fifth session of the United Nations Environment Assembly.

… mobilize the necessary resources …, and call upon the governing bodies of WHO and UNECE for their support, in close collaboration with UNEP … and other relevant UN and international organizations…

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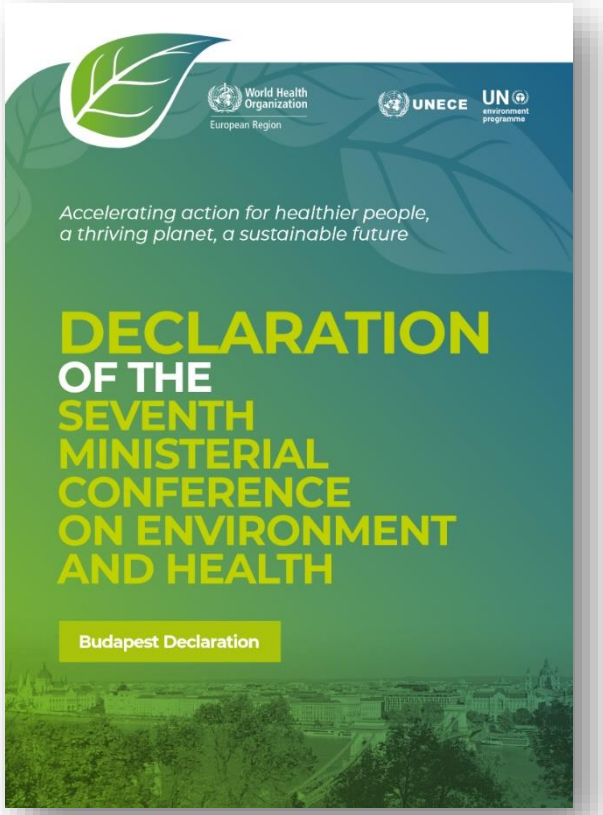
Roadmap for healthier people, a thriving planet and a sustainable future 2023- 2030”: Environmental Pollution



We will continue and enhance efforts to reduce the burden of diseases caused by different types of pollution…, by:

- Developing/implementing preventive regulation of chemicals/mixtures and waste at the national and regional level as well as in the context of international and regional Conventions and ensuring involvement of the health sector in sound chemicals and waste management
- enhancing efforts to reduce emissions and releases of chemicals to the environment, especially persistent and so called ‘forever’ chemicals
- promoting the establishment and use of human biomonitoring
- ensuring access to poison centres equipped with essential capabilities
- reducing water pollution
- addressing the environmental dimension of antimicrobial resistance (AMR), including through the operationalization of the One Health Approach

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EUROPEAN ENVIRONMENT AND HEALTH PROCESS

UNECE

UN environment programme

EHP PARTNERSHIPS

EHP Partnership on Human Biomonitoring in the WHO European Region

The aim of the EHP Partnership on Human Biomonitoring is to extend application of human biomonitoring as a scientific tool to inform decisions, to share experience and to build capacity in the Region in use of human biomonitoring in regulating hazardous chemicals and protecting public health

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WHO chemical safety networks

Regional, Country Offices & HQ

Close coordination to provide support across all levels of WHO

WHO Collaborating Centres

More than 30 collaborating centres around the world actively supporting WHO's work on chemical safety

WHO Risk Assessment Network

Provides a forum for scientific and technical exchange for 92 institutions in 52 Member States

WHO Chemicals & Health Network

More than 70 MoH have joined to share experience of implementing the WHO Chemicals Roadmap.

WHO Poisons Centre Network

Joins more than 300 poisons centres around the world

Disease specific interest groups

Diverse groups such as the NCD Alliance, World Heart Federation; Mercury-free dentistry have a growing interest in chemical safety

Thank you

Acknowledgment: Dr Irina Zastenskaya,

Technical Officer in Chemical Safety

World Health Organization

European Region

A health perspective on the role of the environment in One Health

The role of the environment in One Health.

The role of the environment from a health perspective, focusing on animal-mediated diseases:

- a reservoir where substances are accumulated and transported;
- a focal point for ecological and chemical processes; and
- a health mediator where disease agents from the environment are transferred to and affect animals and humans.

Anthropogenic stressors, including land use change, biodiversity loss, climate change and pollution, further affect the role played by the environment in the human-animal health interface.

While One Health has traditionally focused on communicable diseases, the human-animal-environment interconnections provide insights into noncommunicable diseases, such as those caused by the human consumption of animals and animal products contaminated by chemicals, and injuries.