

CHILDREN AND CHEMICALS

TRAINING FOR HEALTH CARE PROVIDERS



Children's Health and the Environment
WHO Training Package for the Health Sector
World Health Organization
www.who.int/ceh

WHO/CED/PHE/EPE/19.12.15

1

Notes:

- Please add details of the date, time, place and sponsorship of the meeting for which you are using this presentation in the space indicated.
- This is a large set of slides from which the presenter should select the most relevant ones to use in a specific presentation. These slides cover many facets of the problem. Present only those slides that apply most directly to the local situation in the region.

Learning objectives

- Learn about chemical hazards – what they are and the risks they may pose to children
- Identify the scenarios – how, where and when are children exposed?
- Learn about diseases caused by acute and chronic toxic exposures in children
- Know how to assess, prevent and manage children's toxic exposures

This presentation deals with children and chemicals – a topic of great concern for parents and communities, and also for policy-makers, that has been the subject of a number of international recommendations.

This module is also an introduction to other more detailed modules on chemicals, e.g. lead, mercury and pesticides.

Health care providers can play a key role in reducing children's exposures to chemicals.



Outline

- Sources of exposure
- Toxicology
- Exposures
- Health effects
- Treatment
- Prevention

Note:

When selecting the slides to include in your presentation, please choose only those of relevance to the region and/or interests of your audience.

Image:

- © WHO / SEARO / Sanjit Das

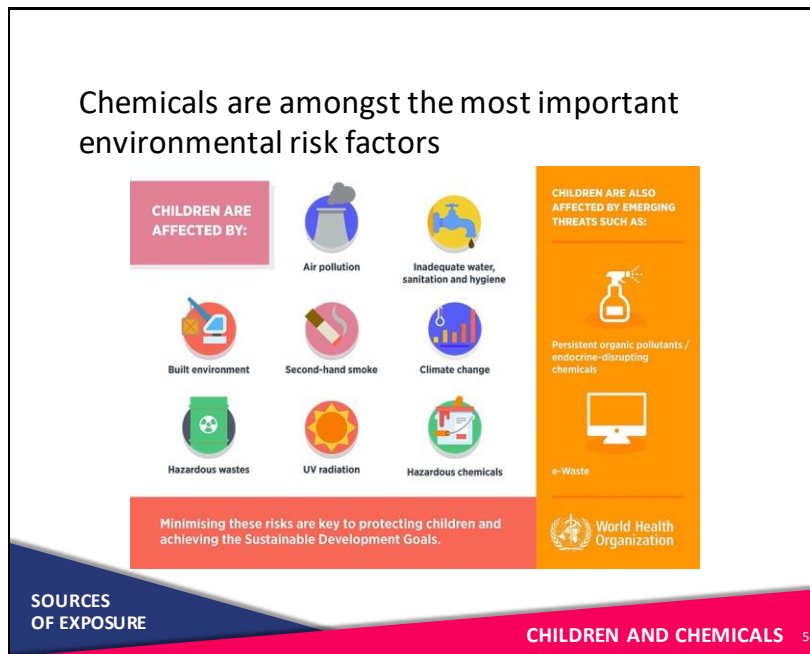


Outline

- Sources of exposure
- Toxicology
- Exposures
- Health effects
- Treatment
- Prevention

Image:

- © WHO / SEARO / Sanjit Das



At the global level, WHO has identified main environmental threats to children's health. All of these threats have either a strong chemical component or are related to the use of chemicals.

These threats are as follows:

- **Chemical hazards.** Exposure to both the "old" and "new" chemicals, of anthropogenic and natural origin, in consumer products or materials that are present in the places where children spend time, can be dangerous
- **Household and ambient air pollution.** Particulate matter and gases such as ozone, sulfur dioxide, nitric oxides, polycyclic aromatic hydrocarbons and carbon monoxide, are some of the typical air contaminants, byproducts of the polluting fuels combustion, whose effects on children's morbidity and mortality have been clearly demonstrated.
- **Tobacco smoke** is very rich in particles and polycyclic aromatic hydrocarbons.
- **Water.** Although in developing countries the main concern is microbiological contamination, a number of chemical water pollutants have a tremendous impact on public health, namely: arsenic, lead, fluoride and pesticides.
- **Sanitation and hygiene.** Lack of both safely managed sanitation and hygiene hinders the maintenance of clean environments – the washing, cleaning and removal of chemicals, dirt and pollutants.
- **E-waste** and other dangerous industrial or agricultural residues may be responsible for an increasing number of contaminated urban and rural sites. Landfills can accumulate dangerous metals and persistent pollutants.

References:

- Pronczuk-Garbino J, editor (2005). Children's health and the environment: A global perspective. A resource manual for the health sector. Geneva: World Health Organization. (<https://www.who.int/publications-detail/children's-health-and-the-environment>, accessed 8 December 2019).
- UNEP, WHO (2010). Healthy environments for healthy children: key messages for action. Geneva: United Nations Environment Programme, World Health Organization. (<https://www.who.int/publications-detail/healthy-environments-for-healthy-children>, accessed 8 December 2019).
- Laborde A, Tomasina F, Bianchi F, Bruné MN, Buka I, Comba P et al. (2015). Children's health in Latin America: the influence of environmental exposures. Environ Health Perspect. 123(3):201-9. doi:10.1289/ehp.1408292.
- WHO (2017). Inheriting a sustainable world? Atlas on children's health and the environment. Geneva: World Health Organization. (<https://www.who.int/publications-detail/inheriting-a-sustainable-world>, accessed 8 December 2019).

Figure:

- WHO (2018). Environmental risks include air pollution, chemical, poor water, sanitation and hygiene. (<https://www.who.int/phe/infographics/protecting-children-from-the-environment/en/>, accessed 30 August 2019).

Chemicals are used in everyday life

Risks

- Adverse health effects
- Unwanted exposure to consumer products, residues or byproducts in the environment
- Persistence

Benefits

- Promote hygiene
- Protect crops
- Control vectors
- Treat diseases
- Creates useful materials

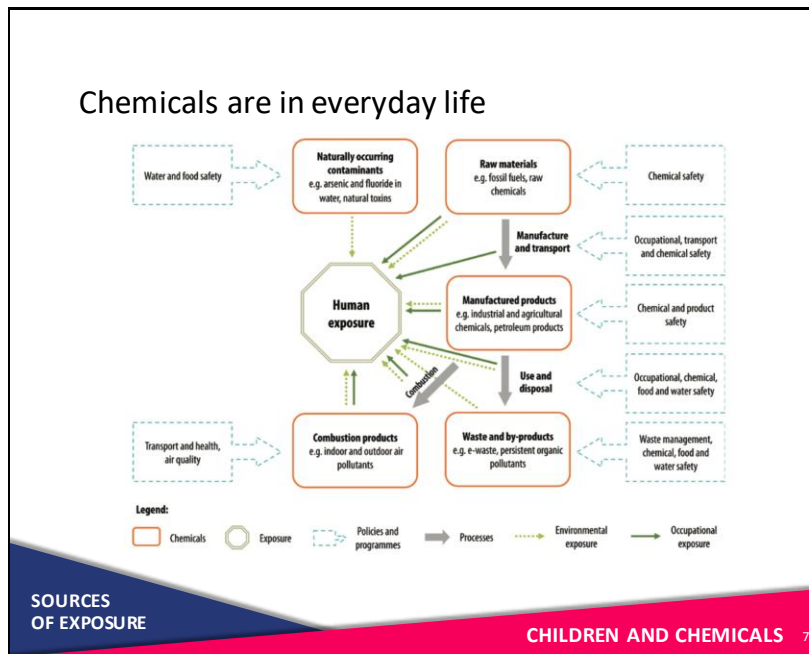
SOURCES
OF EXPOSURE

CHILDREN AND CHEMICALS 6

Chemicals are used in everyday life – they bring in numerous benefits, such as protecting human and animal health, promoting hygiene, protecting crops and controlling vectors of disease. However, chemicals may also pose risks to human and animal health. Exposures to chemicals in the micro- and macro-environments of children may cause functional and organic damage, especially during periods of vulnerability. Many become unwanted pollutants and some of these are persistent in the environment.

References:

- Pronczuk-Garbino J, editor (2005). Children's health and the environment: A global perspective. A resource manual for the health sector. Geneva: World Health Organization. (<https://www.who.int/publications-detail/children's-health-and-the-environment>, accessed 8 December 2019).
- UNEP, WHO (2010). Healthy environments for healthy children: key messages for action. Geneva: United Nations Environment Programme, World Health Organization. (<https://www.who.int/publications-detail/healthy-environments-for-healthy-children>, accessed 8 December 2019).
- WHO (2017). Inheriting a sustainable world? Atlas on children's health and the environment. Geneva: World Health Organization. (<https://www.who.int/publications-detail/inheriting-a-sustainable-world>, accessed 8 December 2019).



Children may be exposed to chemicals through different media such as air, water, food or soil dust. Exposures can happen during transport, use and disposal, or due to combustion or other process. Different chemicals of exposure include:

- naturally occurring metals, vegetal and animal toxins
- manufactured products, e.g. hydrocarbons, pesticides, pharmaceuticals, cleaning products, and
- waste, combustion and other byproducts.

This complex diagram shows how chemical exposures may be addressed by different prevention policies and programs. These programs are the key to promoting healthy environments for children and preventing chemical exposures.

Anthropogenic sources are those of human origin. These include the pollution of the environment due to industry, traffic and pesticides. Some chemicals are naturally present in the environment, but they can also cause adverse effects in humans. Natural chemicals can also be augmented by human activity, like mercury from mining or nitrogen and fertilizer. Examples of natural chemicals:

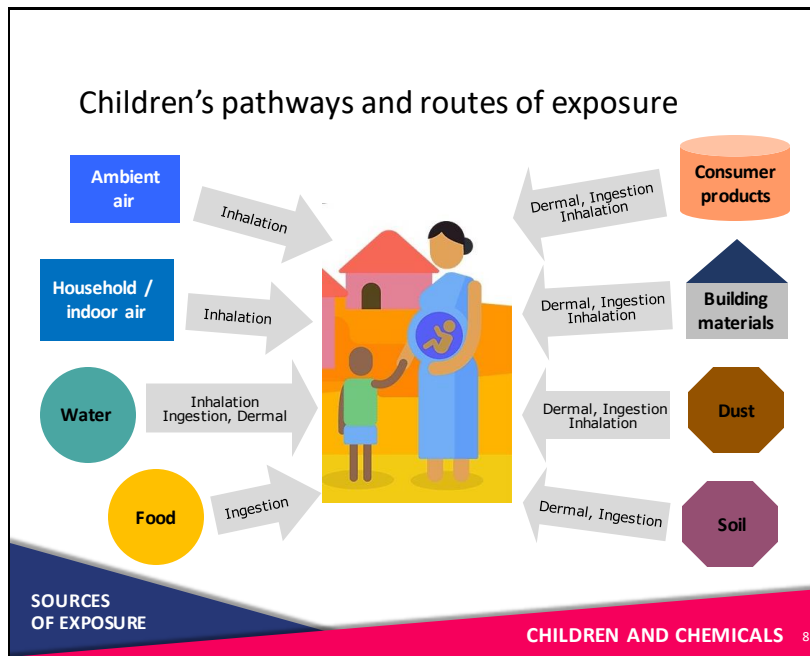
- Arsenic in water causing arsenicosis
- Fluoride in water causing fluorosis
- Fluoride in the air produced from the burning of fluoride-rich coal
- Blue-green algae toxins in recreational waters
- Aflatoxins in food, such as maize or other stored grains
- Cyanogenic or cardiac glycosides in some foodstuff, e.g. cassava, foxglove, oleander
- Envenomations due to bites and stings

References:

- WHO (2016). The public health impact of chemicals: knowns and unknowns. Geneva: World Health Organization. (WHO/FWC/PHE/EPE/16.01, <https://www.who.int/ipcs/publications/chemicals-public-health-impact/en/>, accessed 8 December 2019).
- Etzel RA, editor (2019). Pediatric environmental health, 4th edition. Itasca, IL: American Academy of Pediatrics.

Figure:

- Prüss-Ustün A, Vickers C, Haefliger P, Bertollini R (2011). Knowns and unknowns on burden of disease due to chemicals: a systematic review. Environ Health. 10:9. doi:10.1186/1476-069X-10-9.



Note to user: For each source of exposure, give examples that are pertinent to the area and/or your personal experience on the subject.

Air: It is important to differentiate between indoor and outdoor pollutants. Indoor pollutants include particulate matter, gases, vapours as well as biological material and fibres. These contaminants are produced by tobacco smoke, stoves and construction materials. Pesticides and other chemicals for household use are present in the home. Outdoor pollutants vary according to density of traffic, extent of industrialization, time (of the year and of the day) and climate. The six main outdoor pollutants are: ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), lead, sulfur dioxide (SO_2), carbon monoxide (CO) and nitrogen oxide (NO_2).

Water: Used for drinking, cooking, preparation of infant formula, bathing and swimming. Groundwater or surface water may be contaminated by point sources of pollution, e.g. industrial discharge, or non-point sources such as agricultural and rural run-off, soil contamination and atmospheric deposition. Some contaminants of concern are: arsenic, chromium, lead, mercury, nitrates, benzenes, pesticides, polychlorinated biphenyls (PCBs) and disinfectants such as chloramine and chlorine.

Food: Food may have a large range of contaminants, from additives, such as colourings, flavourings and preservatives to pesticides as residues or as contaminants and mycotoxins and other natural toxins in doses high

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_29146

