INFORMATION SHEET ON CHILDREN'S ENVIRONMENTAL HEALTH FOR MED-SCHOOL FACULTY

Pollution-free environments for healthy generations – what every medical-school faculty needs to know about children's environmental health

World Health Organization

Key facts

Early-life environment exposure affects lifelong health and risk for disease

Environmental threats during preconception, prenatal life and early childhood can have immediate and future health consequences.

Unhealthy environment causes death

In 2016, the environment was responsible for an estimated 13.7 million (or 24% of) deaths globally, including 1 in 4 deaths of children under 5 years of age and 23% of all disease burden.[1]

Prevention works

Reducing exposure to air pollution and hazardous chemicals and waste, while securing access to safe water and adequate hygiene and sanitation, decreases disease.

Action to reduce early exposure can protect health

Reducing and potentially eliminating the exposure of children to environmental threats in the early years of their lives, and even before conception, can protect their health and that of future generations.

What can medical-school faculties do?

The current generation of students is enthusiastic about improving the environment. Medical-school faculties have the privilege of working with trainees whose minds are open to learning about the effects of the environment on health.

Medical schools and their faculties can take the following specific actions to shape curriculum development in favour of children's environmental health:

- incorporate information on the environmental risks to children's health into core medical-school curricula and related public and environmental health interventions;
- incorporate questions into the national certifying examination about the link between exposure to contaminants in the environment and human health;
- identify and teach about the links between health outcomes and environmental and occupational sources of exposure in children;
- teach future physicians about systems for the surveillance of environmental diseases;
- publish methods of improving the identification, characterization, and prevention of environmental health exposure;
- in medical schools, advocate the adoption of green practices (such as waste reduction, recycling, reuse, sustainable purchasing, and smoke-free hospitals).

[1] Preventing disease through healthy environments. A global assessment of the burden of disease from environmental risks. Updated 2016 data tables. Geneva: WHO; 2016 https://www.who.int/publications/i/item/9789241565196, accessed 7 October 2022).

Select issues to include in a children's environmental health curriculum (examples)

Air pollution

Health effects

Air pollution can result in:

- reduced lung function and rate of lung growth, respiratory infections (for example, pneumonia), and exacerbation or aggravation of asthma;
- some adverse outcomes, including pre-term birth, low birth weight, still birth and small for gestational age;
- impairment of children's cognitive and neurological development;
- increased risk and incidence of otitis media;
- development of some childhood cancers, including leukaemia;
- some chronic health conditions later in life, for example lung disease.

Sources and pollutants

Pollutants with the strongest evidence for public health concern, include particulate matter (PM), ozone (O_3), nitrogen dioxide (NO_2), sulphur dioxide (SO_2). Carbon monoxide (CO) is particularly relevant in the context of household air pollution.

Household air pollution is generated from the use of unclean fuel and cooking, heating and lighting technologies (wood, crop waste, charcoal, coal, dung, and kerosene).

Also of concern is ambient air pollution, which derives mainly from fossil fuel (for example, coal, oil or natural gas) combustion, industrial processes, waste incineration, agricultural practices, and natural processes, such as wildfires, dust storms and volcanic eruptions.

There are many other indoor air pollutants, including volatile organic compounds from household products and building supplies, asbestos, pesticides, radon, biological pollutants and tobacco smoke.

Recommended actions

Be informed about existing and emerging evidence on the health effects of exposure to air pollution, paying particular attention to susceptible and vulnerable population groups, such as children, with the aim of educating students and peers.

Teach medical students and future health-care professionals how to assess exposure risks in pregnant women and/or child patients.

Teach about and provide opportunities for medical students to engage with other sectors, and provide leadership in health matters, advocating to local and national authorities for the adoption of air pollution policies in line with the WHO Air Quality Guidelines.

Teach medical students and raise awareness about local, national and international medical and health-related societies that are active in the field of air pollution and health.

Foster research in the field of air pollution and children's health.

Chemicals (heavy metals, persistent organic pollutants, pesticides and endocrine disrupting chemicals)

Health effects

Exposure to:

- lead in utero and during childhood can cause reduced intelligence quotient (IQ), behavioural changes, such as reduced attention span and increased antisocial behaviour, and reduced educational attainment;
- mercury and methylmercury in utero and during early life can cause neurological and behavioural disorders.

Acute pesticide poisoning is also a serious public health problem in many parts of the world, its health effects depend on the type and quantity of pesticide involved, duration and timing of exposure.

Children are particularly vulnerable to chemicals as their unique exposure pathways and developmental physiology increase their risk of exposure and effects on their development and health.

Many persistent organic pollutants (POPs) are also endocrine disrupting chemicals (EDCs) and may impact the immune, reproductive and neurodevelopmental systems.

Sources

Lead can be found, for example, in household paint, water, toys, and ceramics. Traditional medicine, battery recycling, the open burning of electronic waste, improper waste management and industrial emissions are also sources of lead contamination.

Exposure to methylmercury occurs mainly through the consumption of contaminated fish and seafood. Mercury may be present in items found in the home, such as, thermometers, cosmetics, and traditional medicines.

Young children at play may be exposed to pesticide containers and surface residues, and they may ingest contaminated soil and dust. Children may also be exposed to pesticides via their mothers (either in utero or through breastfeeding). However, WHO recommends exclusive breastfeeding up to 6 months of age as breastfeeding is critical and has many benefits for the infant and mother.[2]

POPs remain in the environment for long periods of time and magnify as they move through the food chain. They can be ingested through the consumption of dairy products and fatty tissue in fish and meat, as well as through inhalation and dermal absorption.

Recommended actions

Teach medical students about the significance of:

- reminding people that some fish and seafood can be contaminated with mercury and raise awareness of the essential need for uncontaminated local sources;
- advising people to limit their intake of POPs from food by following the advice of the local food-safety authorities;
- knowing how to identify traditional practices and folk medicines as sources of mercury, advise them of the potential harm from their use, and work with individuals and communities to identify substitute practices;

[2] Breastfeeding – Infant and young child feeding, 9 June 2021. Geneva: WHO: 2021 (https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding, accessed 7 October 2022)

- providing advice on the dangers of informal recycling of lead-containing products in and around the home;
- informing patients about the importance of avoiding the use of toxic chemicals in the home and of clearly labelling and safely packaging toxic substances and storing them out of children's reach to prevent poisoning;
- advising parents and caretakers about the importance of preventing children from accessing waste sites, especially hazardous waste sites;
- advocating health policies aimed at reducing chemical exposure, at the local, regional and community levels.

Water, sanitation and hygiene

Health effects

Lack of safe water, sanitation and hygiene (WASH) is a major risk factor for diarrhoea, parasitic infections and malnutrition in children, as well as school absenteeism.

Diarrhoea is the fourth leading cause of death among children under 5 years[3], while 24% of the world's population are infected with soil-transmitted helminths, causing impaired growth and physical development in children[4].

Infections associated with unclean births account for 26% of neonatal deaths and 11% of maternal mortality, totalling more than 1 million deaths each year[5].

Inadequate WASH in health-care facilities and the unsafe disposal of wastewater from health centres can contribute to the spread of antimicrobial resistance among patients and communities.

Inadequate WASH has a negative impact on social and economic well-being and, in health facilities, affects patient health-care-seeking behaviour and staff morale.

The unsafe management of health-care waste exposes health-care workers, waste handlers, patients and their families, and the community to preventable infections and the effects of toxic substances, including injuries.

Recommended actions

Teach medical students the importance of:

- promoting breastfeeding, and exclusive breastfeeding for the first 6 months of life;
- practising safe WASH, including frequent and effective handwashing with soap, safe treatment and storage of drinking water and safe disposal of children's excreta, and promote these practices among staff in health facilities;