**Environmental pollution poses a major challenge to the right of children to the enjoyment of the highest attainable standard of health**

**Contribution from WHO European Centre for Environment and Health (WHO/ECEH), WHO Regional Office for Europe**

Exposure to environmental pollution and other forms of environmental degradation interferes with the human right to a healthy environment with clean air, safe water, safe and healthy food and a safe working environment. Air and water pollution, lack of sanitation, hazardous chemicals, as well as global phenomena, such as climate change contribute to a substantial burden of disease and death worldwide.

As estimated by the WHO in 2016, globally 26% of deaths among children under the age of five (and 23% of all deaths) are due to modifiable environmental factors.[[1]](#footnote-1) While the burden of disease in children related to the environment is somewhat lower than in the previous WHO global estimate,[[2]](#footnote-2) children remain disproportionally affected, and annually around 1.7 million children under 5 years die because of environment-related diseases. Due to methodological limitations, these estimates do not adequately capture those exposures in early childhood, which may result in chronic, noncommunicable diseases later in life. The main environment-related conditions in children include lower respiratory infections, diarrhoeal diseases, and neonatal conditions. Lower respiratory infections, including pneumonia, bronchitis and bronchiolitis, are responsible for 935 000 deaths in children under the age of 5 per year (in 2013), accounting for 18% of deaths in that age group. Diarrhoeal diseases cause 20% of all deaths in children under 5 years; and a large proportion is caused by faecal-oral pathogens.

Exposure to environmental risk factors and their impacts are unequally distributed between countries and within societies, with a higher burden in low- and medium-income countries, as well as within the society, often related to social characteristics, such as income, social status, employment and education, but also non-economic aspects such as gender, age and ethnicity. For example, every year childhood lead exposure is estimated to account for about 9.8% of the global burden of idiopathic intellectual disability in children, with the highest burden in low- and middle-income countries. Exposure to lead-contaminated soil and dust from battery recycling and mining has caused mass lead poisoning and multiple deaths in young children in Nigeria, Senegal and other countries.[[3]](#footnote-3)

A large fraction of death and disease in children under age 5 is still linked to living in households without access to basic services such as safe water and basic sanitation, or where unclean fuels or unclean technologies are used for cooking. For example, in low- and middle-income countries, more than 50% of lower respiratory infections in children under 5 years could be attributed to exposure to air pollution, both household air pollution from the use of solid fuels for cooking and ambient air pollution.

An unacceptably high burden of disease attributable to environmental factors in children, especially those living in low- and medium-income countries, and more disadvantaged parts of society violates the right of children to *‘*the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health’*,* as stated in Convention on the Rights of the Child.[[4]](#footnote-4) This universally agreed set of non-negotiable standards and obligations advocates for the protection of children’s rights to help meet their basic needs and to expand their opportunities to reach their full potential. To pursue full implementation of these rights, appropriate measures have to be taken, including to: ‘combat disease and malnutrition, including within the framework of primary health care, through, inter alia, the application of readily available technology and through the provision of adequate nutritious foods and clean drinking-water, taking into consideration the dangers and risks of environmental pollution’.

In the context of environmental harm, these rights need to be specially protected because children: a) are more vulnerable because their organisms, especially brains, are rapidly growing and maturing, and because their exposure patterns/conditions differ from adults (due to specific behaviour, such as hand to mouth activity); b) may suffer from delayed and life-long health effects of early-life exposures to environmental factors, such as toxic chemicals or air pollution, especially when combined with other adverse experiences in childhood; and c) are powerless to control their exposure in utero and after birth. Furthermore, children depend on their parents or carers for protection; extend and quality of that protection depends largely on the awareness, knowledge and capacities they have.

**Specific children vulnerability**

Children are not little adults; they have special vulnerabilities to the toxic effects of the exposure to environmental pollutants due to dynamic developmental physiology, immature, yet high metabolic activity, and longer life expectancy. Exposure to environmental harm, especially to hazardous chemicals, at critical stages of physical and cognitive development may have severe long-term consequences for health; impaired child’s development and adverse health effects of early exposures, manifested only in adult life, are a serious public health concern with huge economic burden.

Several physiological features distinguish children from adults and explain the unique children’s vulnerability, and why the impacts on children’s health which might be quite different from adults’ health. The main features include:[[5]](#footnote-5) different rate of organ systems growth in early childhood; larger body surface to volume ratio in neonates; immature blood-brain barrier and nervous system; faster breathing rate; higher heart rate; particular susceptibility to toxic insult in developing organs; not well-developed liver for detoxification; and increased rate of cell division.

Period of prenatal development and early childhood is also a period of intense growth and maturation of main regulatory mechanisms, that is: nervous, immune, endocrine systems, as well as maturation of metabolic capacities. Studies indicate the ability of chemicals to damage organisms in utero and during early development with long-term consequences, though the mechanisms have been less investigated. The concept of the developmental origins of health and disease (DoHAD) describes how, prior to conception and during foetal life, infancy and early childhood, the environment induces developmental changes that have a long-term impact on health and the risk of disease.

**Environmental exposures of main concern**

Of particular relevance are early life exposures to air pollution and chemicals (such as mercury, lead, nitrate, many persistent organic pollutants, and chemicals with endocrine disrupting properties). Also, early life experiences related to the provision of inadequate water, sanitation and hygiene (WASH) services at home and educational facilities can compromise health and well-being and impact educational outcomes.

Children can be exposed to chemicals at home, in the school, the playground, fields and streets; in rural and urban environments; toxic chemicals can be present in household products, building materials, house dust; cosmetics, hygiene products, toys; food packaging, etc. Of major concern are chemicals which are persistent and bio-accumulative; a highly heterogeneous group of chemicals with endocrine disrupting properties is of special relevance to children, as they can have serious developmental and life-long health impacts.

As reviewed by WHO in 2013,[[6]](#footnote-6) the evidence is growing on adverse impacts of air pollution on pregnancy outcomes and diseases in children. New studies link long-term exposure to fine particulate matter (PM2.5) to adverse birth outcomes and childhood respiratory disease. The emerging evidence suggests possible links between long-term exposure to PM2.5 and motor vehicle pollution and neurodevelopment and cognitive function, as well as the role of motor vehicle pollution in the development of new cases of asthma in children. Exposure to air pollution and related health risks are not distributed equally; combined with other environmental and social factors, air pollution creates disproportionate disease burden in certain regions and less affluent parts of society.

Poor WASH is an established risk factor for many infectious diseases, including diarrhoea and worm infections. If they occur during pregnancy increase the risk for adverse pregnancy outcomes. As reported by WHO,[[7]](#footnote-7) a large survey on health-care facilities in 54 low- and medium-income countries, representing 66 000 facilities, showed that in about 40% of them water was not readily available, over a third lacked soap for handwashing, and a fifth lacked toilets. That lack of services compromises the provision of routine services such as child delivery, and the ability to prevent and control infections, including in the neonatal period. The situation in educational facilities, especially schools, is similar: in middle income countries of the WHO European Region, 37% of schools lack water supplies and 43% sanitation facilities. Poor WASH in schools may not also impact health and well-being but also compromises learning and dignity. Chemical exposures of relevance in educational facilities include lead and nitrate. Poor WASH also favours undernutrition with a resulting higher susceptibility for different infectious diseases associated with poor foetal development and other pregnancy complications.

Specific features of children’s exposure pathways may also contribute to disproportionate exposure to environmental hazards. Starting from involuntary exposures during foetal development or in the period of breastfeeding) relevant for some chemical, mainly persistent organic compounds), through specific child behaviors (for example, hand-to-mouth behaviour) and, finally, staying in different ‘exposure zones’ as compared to those of adults (near the ground, relevant for example for the exposure to some chemicals, like pesticides, and to traffic exhausts).

Children cannot control their exposures, especially in the most vulnerable periods of their life, such as during foetal development and in early childhood. They cannot make informed choices; younger children cannot read warning information; children and adolescents are not able to evaluate threat adequately as a result of immaturity of cognition and urge “to explore a risk”, as well as cannot respond independently to avoid danger. Moreover, children are not able to advocate for themselves and are politically powerless. All these circumstances put even greater responsibility on governments/policy-makers and societies to make sustained efforts to effectively protect children from environmental harm and to create conditions, under which the rights of children can be exercised to their full extend.

**What WHO is doing to address the challenge of environmental harm on children’s rights**

WHO has undertaken many efforts to address the impact of environmental harm on children’s health, contributing also to the children’s rights agenda. The main lines of WHO work include promoting international collaboration in relation to children’s environmental health; promoting the collection of harmonized data to assess the magnitude of the problem; normative work, such as guidelines, and developing improved methodologies to assess the risks of environmental hazards in children; preparing training guides and information materials for physicians and health care professionals; providing guidance on the rapid assessment of the status of children’s environmental health and exposure to chemicals; raising awareness and build capacity in response to global, regional and country needs; and, advocating for the protection of children’s health through creating healthy environments. For example, WHO has developed children’s environmental health training package,[[8]](#footnote-8) which includes modules on children’s vulnerabilities, principles of paediatric environmental history, and on the main environmental risk factors and diseases; and, a subpackage on reproductive health and environment.

Through its work, WHO aims to reduce the impact of exposures to chemicals and pathogens in children and contribute to creating healthier environments in the places where children live, play, learn and work and to enable health, environment, education and other sectors to better identify and assess exposure pathways for toxic chemicals and pathogens in children as basis for developing effective intervention strategies.

Further to global WHO initiatives, regional activities are undertaken to address region-specific needs. In the WHO European Region, the main frameworks for working on environmental factors affecting children’s health, with a strong equity emphasis and relevant to children’s rights include Health 2020 strategy, and the European environment and health process. In its frame, the Fourth Ministerial Conference on Environment and Health in Budapest focused on children, recognizing the public health relevance of the links between children’s health and the environment, and referred directly to relevant processes, including those leading to the Convention on the Rights of the Child, the Millennium Development Goals and the Plan of Implementation of the World Summit on Sustainable Development. The Conference resulted in the adoption of the Children’s Environment and Health Action Plan for Europe (CEHAPE).[[9]](#footnote-9) The efforts focused on the protection of children’s health continued during the Fifth Ministerial Conference on Environment and Health held in 2010 in Parma.[[10]](#footnote-10) The four Regional Priority Goals (RPGs) addressed main environmental challenges to public health, focusing on children: on water and sanitation, creation of safe environments supportive to physical activity, prevention of diseases related to air pollution, and protection of children’s health from chemical, as well as biological and physical agents.

The new Health 2020[[11]](#footnote-11) policy framework aims to support actions to: ‘significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality’. While not focusing on children, Health 2020, thorough an inclusive, ‘whole of government and whole of society’ approach provides a very good framework for actions to protect children, alongside the four priority areas, including: investing in health through a life-course approach; tackling major disease burdens of noncommunicable and communicable diseases; strengthening people-centred health systems and public health capacity, including preparedness and response capacity for dealing with emergencies; and, creating supportive environments and resilient communities.

In 2015, at the Ministerial Conference on the Life-course Approach in the Context of Health 2020, which resulted in the adoption of the Minsk Declaration[[12]](#footnote-12), the Member States of the European Region agreed that ‘… the life-course approach across the whole of government would improve health and well-being, promote social justice, and contribute to sustainable development and inclusive growth and wealth in all our countries.’ Among the most cost-effective policy choices available to governments, ‘investment in early childhood development, and protection against toxic stress and dangerous environmental exposure at critical points of development’ were highlighted.

In the WHO European Region, the work on environmental factors affecting children’s health is implemented mainly by the WHO Regional Office for Europe’s WHO European Centre for Environment and Health (WHO/ECEH), a center of scientific excellence, in cooperation with other parts of the Regional Office, dealing with human rights, gender, social determinants of health, as well as maternal and child health, noncommunicable diseases, etc., and in coordination with WHO headquarters.

In the area of WASH, the work is guided by the programmes of work for 2014-2016 and for 2017-2019 under the Protocol on Water and Health,[[13]](#footnote-13) the primary policy instrument in the WHO European Region in the water, sanitation and health domain. In these programmes, improving WASH conditions in schools has been identified as a regional priority. With the objective to inform policy-making in this domain, WHO/ECEH undertakes a systematic evidence review on WASH conditions in schools with a view on the European Region and, based on these findings, promotes national target setting on WASH in schools under the provisions of the Protocol. With the support of a WASH expert group, which provides a joint platform for health and educational departments, WHO/ECEH develops recommendations and technical advice for improvement interventions, as well as practical tools for surveillance agencies and school management. WHO/ECEH also leads on the revision of global WHO and the United Nations Children's Emergency Fund standards/guidelines for WASH in schools, specifically taking into consideration the impetus of the 2030 Agenda.

In the area of chemical safety, the work is guided by the Strategic Approach to International Chemicals Management (SAICM) and its health sector strategy, relevant multilateral environmental agreements, in particular the Minamata Convention, as well as related World Health Assembly resolutions. It involves sharing of scientific knowledge, support of the development of policies and strategies, exposure and risk assessment, as well as advocacy and promoting actions at national level.

WHO efforts to protect human health from the negative impacts of chemicals, in particular in vulnerable population groups and in vulnerable life stages, such as during the prenatal development, early childhood and adolescence, as well as growing attention to the relevance of early life exposures for health in all life stages, and the recognition of the relevance of early life prevention of health and developmental impacts of environmental exposures are of direct relevance to the children’s rights agenda.

The WHO publications and expert meetings contribute to sharing of the scientific knowledge. The recent examples include an expert meeting on *Identification of risks of endocrine-disrupting chemicals (EDCs): overview of existing practices,[[14]](#footnote-14)* held at the WHO/ECEH in Bonn in 2014, resulting in several recommendations on methodologies for health risk assessment, on assessing exposure to EDCs, health surveillance, and the design of epidemiological studies, as well as the publication.[[15]](#footnote-15)

Recognizing the critical role of protecting vulnerable population groups and life stages from the negative impacts of chemicals, a technical consultation with the Member States, experts and stakeholders was organized by WHO/ECEH in 2016, to discuss chemical policy and programmes to protect human health and environment in a sustainability perspective. The meeting was part of the preparations to the upcoming Sixth Ministerial Conference on Environment and Health and aimed at identification of actions leading to progress in protecting human health from the negative impacts of chemicals, to be considered in the Ministerial Conference outcome document.

The role of early life exposures and events in the risk of chronic, noncommunicable diseases and the concept of the developmental origins of health and disease, in the context of preventative measures was also discussed with the Member States and experts at the meeting organized by WHO/ECEH in 2015.[[16]](#footnote-16) Although not yet fully applied in the planning and implementation of preventive interventions, the evidence is growing that the adverse early life experiences, such as maternal stress or composition of mother’s diet can affect the foetus development, establishing a development trajectory that influences the response of an individual to later exposures.

Despite many challenges in investigating the developmental origins of NCDs and collecting evidence of the effectiveness of early interventions, WHO promotes a life-course approach for the prevention and control of NCDs. As formulated in the Global Action Plan for the Prevention and Control of Noncommunicable Diseases (2013–2020)[[17]](#footnote-17): “Policies, plans and services … need to take account of health and social needs at all stages of the life course, starting with maternal health, including preconception, antenatal and postnatal care, maternal nutrition and reducing environmental exposures to risk factors, and continuing through proper infant feeding practices, including promotion of breastfeeding and health promotion for children, adolescents and youth followed by promotion of a healthy working life, healthy ageing and care for people with noncommunicable diseases in later life”*.*

The links between children’s rights and protection of children from the negative impacts of chemicals were discussed in the context of the implementation of the Minamata Convention on Mercury during the meeting with Member States and experts, organized by the WHO/ECEH in 2015.[[18]](#footnote-18) It was highlighted that the Convention on the Rights of the Child and the Minamata Convention on Mercury have common implications for states in terms of their duty to protect the rights of children, that is, to strive for the highest attainable standards of health and to protect the inherent right to life. Since almost every state is a Party to the Convention on the Rights of the Child and thus has obligations to protect children, and the only way to protect the rights of the child is to prevent harm, states should focus more on protecting children from early life-stages exposure to toxic chemicals to prevent harm in the present and future generations.

Furthermore, the role of different stakeholders, including businesses was discussed. Businesses, alongside their economic interests, have a responsibility to avoid toxic chemical pollution, to exercise due diligence regarding the impacts of their activities, to respect human rights and to provide access to effective remedies. In 2011, the Human Rights Council endorsed the Guiding Principles on business and human rights. Since some 60% of chemicals produced and used are toxic, the situation in the context of chemicals and human health can be quite challenging. However, it was underlined during the meeting that communities increasingly recognize that environmental issues, health protection and human rights are linked and cooperation is needed, and companies and retailers use their market power to move towards the use of safe chemicals.

The above mentioned meetings are also examples of the WHO efforts to support policies and strategies, such as: the Minamata Convention, including consideration of the links between the protection of children’s rights and chemical safety; national frameworks for actions to address endocrine disrupting chemicals; and, chemical policies and programmes to protect human health, in particular vulnerable population groups and life stages, in line with the Minsk Declaration.

Furthermore, regional priorities for the health sector on the SAICM 2020 goals were identified at a meeting organized by WHO/ECEH in 2015.[[19]](#footnote-19) These included: policy development and strengthening of legislation, monitoring, risk assessment and evidence collection, capacity building, and research. Furthermore, a proposal of a national framework for the health sector involvement in chemicals management was agreed. The meeting outcomes provided input to the global priorities and were included in SAICM strategic documents.

Many aspects discussed during the meetings are of direct relevance for actions to be taken at national level. Further to the discussed above, as part of advocacy and awareness raising, the WHO/ECEH supports Member States of the WHO European Region at the international lead poisoning prevention week of action.[[20]](#footnote-20)

The WHO/ECEH is actively involved in the work on exposure and risk assessment; this can be exemplified by an on-going United Nations Environment Programme/WHO project (funded by the Global Environmental Facility), led by the WHO/ECEH in coordination with WHO headquarters, to develop a global plan for mercury monitoring, using human biomonitoring. The focus is on assessing prenatal exposure to mercury, as there is clear evidence of a link between prenatal exposure and poor cognitive development and behavioural disorders in children. Low-level methylmercury exposure has been shown to impair the growth of foetuses and very young children and to facilitate the development of NCDs. The mercury HBM methodology is being developed as part of the implementation of the Parma Declaration on Environment and Health.

Another example of an assessment work was a survey on the environment and health status in European schools and on the relevant national policy actions, completed before the mid-term review of the European Environment and Health Process, with data provided by 34 out of 53 Member States on sanitation and hygiene, physical activity and injuries in children, indoor air quality in schools and kindergartens, and involvement of youth in the process.[[21]](#footnote-21) The results, launched at the mid-term review meeting of the European Environment and Health Process held in Haifa in 2015, indicated that most Member States have comprehensive policies aiming at providing healthy environment for pupils, but implementing and enforcing some of these policies is a common challenge. Further efforts are needed to improve school sanitation, provide adequate ventilation, prevent dampness and mould growth, reduce emission of indoor air pollutants, improve enforcement of existing smoking bans, facilitate the use of active transportation modes in some countries.

Exposure to environmental risks and their impacts on children’s health are not equally distributed, affecting disproportionally less developed countries, and disadvantaged sections of the society. Moreover, it is strongly related to a range of socio-demographic determinants. The assessment conducted in support to the development of the Health 2020 acknowledges the persistent health inequities between and within countries of the WO European Region, and calls for action on ‘the social determinants of health, across the life-course and in wider social and economic spheres to achieve greater health equity and protect future generations’.[[22]](#footnote-22) In the wake of the Fifth Ministerial Conference on Environment and Health, the WHO Regional Office for Europe carried out an assessment of environmental health inequality in the European Region, reviewing inequalities related to housing, injuries, and the environment.[[23]](#footnote-23) Socioeconomic and demographic inequalities in exposure have been reported in all Member States, though they varying from country to country; often they represent inequities, which are avoidable and unjust. Similar findings emerge from a focused study conducted in two municipalities in Kosovo (in accordance with Security Council resolution 1244 (1999)) (see text box).

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| Text box: **Inequalities in environmental exposure in two municipalities: indications for intersectoral action in Kosovo (in accordance with Security Council resolution 1244 (1999))**[[24]](#footnote-24)An impact of demographic, socioeconomic, ethnic and spatial determinants on environmental exposure and self-reported health was assessed in two municipalities (Fushë Kosovë/Kosovo Polje and Obiliq/Obilić), based on the analysis of the Community Vulnerability Assessment Survey database provided by the United Nations Kosovo Team. Marked inequalities in environmental exposure were associated mainly with socioeconomic determinants (especially low income and poor education) and ethnicity (Roma, Ashkali and Egyptian groups being most disadvantaged), as well as with demographic and spatial determinants. Self-reported health was most strongly affected by socioeconomic and demographic determinants, and related to some environmental variables, but not to ethnicity. The findings illustrate the magnitude and distribution of environmental inequality within the local population and thereby help to identify potential target groups and priority areas for intersectoral action. Based on the survey results, specific conclusions can be drawn on local interventions with a social and environmental focus. |

A new impetus to the work on environmental impacts on children’s health is set by the 2030 Agenda for Sustainable Development.

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