

The pediatrician and environmental medicine

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To care for environmental factors is an essential task for the pediatrician. In different regions of the world and even within Europe, there exist quite different highlights and necessities for environmental activities, which are elaborated in this review on pediatric environmental medicine. Networking and closer collaboration between German and Lithuanian pediatricians are proposed as an easily realisable concept.

Key words: environmental medicine, children and environment, pediatrician and environment

INTRODUCTION

There are various reasons why pediatricians should engage in environmental medicine: children have special vulnerabilities, due to peculiarities of metabolism, behaviour, nurture, and because their organisms, physiologically and functionally growing and developing, are more susceptible to harmful interferences than the more stable ones of adults.

Children have to cope for many decades to come with diverse environmental harmful influences and their consequences, unlike older people with their limited life span ahead.

Preventive medicine is one of the essential tasks, especially for pediatricians.

ENVIRONMENTAL MEDICINE: DEFINITIONS

Environmental medicine is concerned with three rather distinct fields:

(1) **environmental medicine** is a clinical discipline caring for individuals, offering diagnostic and therapeutic procedures. Environmental medicine cares for patients who have fallen sick because of environmental conditions as well as for individuals that fear environmental hazards as a reason for their symptoms, but where there is no evidence that the environment is the causing factor for the symptoms. Serious cases of environmentally related intoxication in children are rare in Central Europe. This could be because cases are not diagnosed due to a severe lack of knowledge of paediatricians. Another major reason is that within the last decades many

environmental hazards have become rarer in Europe due to legislation and increased attention from many parts, to the benefit of the children's health. One has to remain, however, on the *qui vive*, since there are many things between heaven and earth that we do not see or recognize or appreciate correctly. There are large scientific gaps regarding distinct or suspected or yet entirely unnamed environmental factors. Examples that have only recently surfaced are: acrylamide, bisphenol, carbon monoxide, DEHP (phthalates), fine particles, and fungous toxins, to spell just a few from the beginning of the toxicological alphabet;

(2) **environmental health** means primary *prevention* regarding exposure to well identified environmental toxicants or conditions. Prevention is often seen as a task of public health services, of government, legislation, and administration. This can concern fields as different as chronic lead intoxication, fine particles and smog, or noise prevention. This is a wide area where yet much has to be done, also in Central Europe;

(3) finally, ecopolitical concerns, environmental **health policy**, are the crucial field where environmental medicine has and will retain an everlasting task. This challenge is a very specifically pediatric aspect. Differently from the tasks of, say, physicians treating orthopedic or ophthalmologic patients, our nowadays's paediatric clientele and their descendants will want to live in a sustained world for more centuries to come.

“TRADITIONAL” CONCEPT OF ENVIRONMENTAL MEDICINE

Traditionally (the “tradition” dates back to the eighties of the last century when Seveso and Chernobyl and acid rain were among the key events, with atomic bomb testing as a forerunner), environmental medicine has centered its attention on anthropogenic chemical and physical substances

and conditions, as dioxines, lead, mercury and fluorides, polychlorinated biphenyls (PCB), high voltage power lines and background radiation. Not all of these are of real practical importance, and there have been numerous “toxins of the months” which were pushed to the surface by sometimes very uncritical or even sensational medial attention (Table 1) These statements are valid for the first world. If you look at the less developed countries of the larger European region, including borderline Asian countries, the spectrum is different, and again quite other priorities have to be set in a world-wide perspective (Table 2).

Table 1. Some environmental issues – in part of practical importance, partly rather negligible, but presently in discussion

Higher priority	In discussion, but of lower priority
Acrylamid	Amalgam
Fine particles	Asbestos
Ozone	Electromagnetic fields
Phthalates	Food, genetically altered
PCB	Food, pesticide content
Radon	Radiation from atomic plants

Table 2. Some environmental factors with relevance to human health in different regions

Central Europe	Larger Europe	Global
Lead	Indoor and outdoor air	Water and sanitation
Fine particles (pm 10)	Accidents	Vector borne diseases
Ozone	Water and hygiene	Indoor and outdoor air
Mercury	Health risks from chemical and physical factors and those listed for Central Europe	Pesticides and PCB
Radon		Injuries and those listed for Europe
UV radiation		

ENVIRONMENT AND INDIVIDUAL DISPOSITION

Health and disease have always been conditioned essentially by the **environment** – and by the **individual predisposition**. Table 3 shows some important factors related to the environment and others that are forming the individual disposition. Diseases are always the result of the interaction of both sides. Table 4 gives a list of diseases with the rising environmental and declining endogenous causation. In phenylketenuria, genes are very predominant, whereas nutrition plays a minor role, and in asthma and cardial infarction both sides of the tableau interact with an approximately equal weight, whereas a skull fracture is nearly exclusively the result of environmental harm; and yet, there are people who always have bad luck and accidents and fractures, and others who are less prone to such traumatic injury.

Table 3. Some conditions to be attributed either to endogenous or to exogenous causation: individual disposition and environmental factors

Individual disposition	Environmental factors
Genes	Climate
Psyche	Social environment
Sex	Allergens
Race	Infectious agents
Immune status	UV radiation

Table 4. Diseases with increasing importance of environmental factors as compared to individual predisposition

Diseases
Phenylketonuria
Cystic fibrosis
Diabetes mellitus
Asthma
Cancer
Appendicitis
Liver cirrhosis
Pneumonia
Lead poisoning
Skull fracture

PRESENTLY IMPORTANT ENVIRONMENTAL FACTORS WITH RELEVANCE FOR ACTUAL CHILDREN’S AND ADOLESCENTS’ HEALTH

Not many of the aforementioned “classical” anthropogenic environmental factors are really and importantly pathogenic for today’s children’s health. Environmental medicine has started to observe and discuss another set of factors (Table 5). **Sociologic, psychologic, economic conditions** at present affect seriously children’s health, and if one is to spend money in order to ameliorate health, these fields should be laboured with high priority. Such prioritisation meets with acid critiz-

Table 5. Economic, social, psychologic, environmental factors with present day’s impact on children’s and adolescents’ health

Poverty	Poor housing
	Lack of playgrounds
	Traffic accidents
Migration	Noise
	Language barrier
	Lack of compliance
	Lack of education
Nutrition	Poverty
Physical inactivity	Overweight, obesity
Disuse of media	Autistic past time occupation
	Violence
Family structures	Patchwork families
	No peers in the family
Legal and illegal drug abuse	Tobacco smoke
	Alcohol
	Cannabis, etc.

ism from baseline environmental activists who, depending on their individual standpoint, irrationally tend to ask for overall repair.

Knowledge, expertise and good data are necessary for correct risk assessment and risk management of nowadays pollutants and of those resulting from the implementation of new technologies, to be expected in the future. It is essential that a thorough risk communication is mandatory to avoid inefficient expenditures. Thus, one may keep in mind the statement of the former EPA administrator W. K. Reilly: "Huge sums of money are being spent on hypothetical risks experienced by few individuals while ecological matters affecting millions of people are not adequately addressed".

ACTIVITIES, INITIATIVES, STATEMENTS, REVIEWS

The Convention on the Rights of the Child (1989) has been signed and ratified by practically all nations. It stresses "the right of the child to the enjoyment of the highest attainable standard of health" (Article 24) and asks "to combat disease and malnutrition ... taking into account ... the dangers and risks of environmental pollution".

Since then, there have been numerous local and international initiatives, on very different levels, to focus and promote children's environmental health. Many of these manifests, documents, declarations are repeating very similar statements and calls for action: Children are more vulnerable than adults, it is society's task to protect them from hazards and to ensure to the possible utmost their well being, etc.

Nearly ten years ago, the G8-group issued the "1997 Declaration of the Environment Leaders of the Eight on Children's Environmental Health" in Miami, Florida. Points for implementation actions on a worldwide scale were: risk assessment and standard setting; lead; safe drinking water; endocrine disruptors; air quality (G8-Group, 1997) (1).

Within the frame of the Ministerial Conferences on Environment and Health (Frankfurt, 1989; Helsinki, 1994; London, 1999; Budapest, 2004), attention has been centered on children's issues, and in Budapest the "Children's Environment and Health Action Plan" for Europe (CEHAPE) (World Health Organisation, 2004) was issued, defining four "Regional Priority Goals": Water and sanitation; accidents and injuries; outdoor and indoor air pollution; and hazardous chemicals and physical and biological agents, with commitments of "developing and starting to implement National Children's Environment and Health Action Plans (NEHAPs) by 2007 at the latest" (2). Previously, for the London Conference, the European Environment Agency (EEA) had prepared a background briefing "Children in their environment: vulnerable, valuable, and at risk" (EEA, 1999) (3).

The next Ministerial Conference will take place in Parma / Italy in March 10–12, 2010 and will have as one of the central issues again the Children's Environment and Health Action Plan (CEHAPE).

The World Health Organisation (WHO), Regional Office for Europe, jointly with the EEA, in its Environmental Issue Report No. 29 centres on "Children's Health and Environment: A Review of Evidence" (WHO and EEA, 2002) (4).

The WHO recently has edited an extensive review: "Principles for Evaluating Health Risks in Children Associated with Exposure to Chemicals", at the time available only as an unedited draft, 301 pages long (IPCS, 2006) (5).

The US Environmental Protection Agency (US EPA) has focused attention on children's environmental problems and hazards in North America: "America's Children and the Environment: Measures, Body Burdens, and Illnesses". Their "Strategic Plan" foresees seven goals: clean air; clean and safe water; safe food; preventing pollution and reducing risks in communities, homes, workplaces, and ecosystems; better waste management, restoration of contaminated waste sites, and emergency response; quality environmental information (US EPA, 2003) (6).

At the same time, the Commission for Environmental Cooperation (CEC) has issued a report: "Children's Health and the Environment in North America. A First Report on Available Indicators and Measures" (CEC, 2006) (7).

The European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC), with its task force and scientific committee comprising mainly industry and producer's scientists, has issued in 2005 the Technical Report No. 96: "Trends in Children's Health and the Role of Chemicals: State of the Science Review" (ECETOC, 2005) (8).

The US EPA has produced the Toxicity and Exposure Assessment for Children's Health (TEACH) website (US EPA, 2006), which contains a limited amount of data on some toxicants (9).

The German Health Authorities (Robert Koch-Institut (RKI) and Umweltbundesamt (UBA)) in the last three years have conducted an important children's and youth's health survey (KiGGS) and an environmental survey (KUS), including some 17,000 and 1,800 participants, respectively. The results of these surveys have been published and are available as a public use file over the web (10).

There exists a 170-page issue of the International Journal of Hygiene and Environmental Health (IJHEH, October 2007) which reports the results of a four-day international workshop organised by the Commission on Environmental Health of the German Academy of Pediatrics and by Kinderumwelt (11).

ALLUM, A GERMAN INITIATIVE, AND FUTURE COOPERATION WITH LITHUANIA

The Deutsche Akademie für Kinder- und Jugendmedizin (DAKJ), the German Pediatric Academy hosts, since nearly 20 years, the Commission on Environmental Questions and, assisting its work, the Documentation and Information Center on Environmental Questions (DISU) and on Allergies (DISA). This institution has, on behalf of the public health

insurance companies in Germany, worked out an Internet website which contains relevant information, both for lay people, patients and parents, or public media, as well as for physicians and scientists looking for information, indications on recent literature etc.: www.allum.de. This website, at the moment, is being translated and presented in the Czech and Hungarian languages, and the Lithuanian version hopefully will be instituted in the near future. As of now, everybody who knows enough the German language may visit the allum website and find there information on noxious environmental factors, environmental diseases and pediatric allergologic topics. Two international workshops on pediatric environmental questions, with participation also from Lithuania, have recently taken place, and another meeting is scheduled for April 22–25, 2010.

LONG-TERM SUSTAINABILITY

The possibly most important aspect of pediatric environmental medicine, however, are our concerns about what we do to our world in mortgaging nature and the environment. Our descendants will have to repay one day. Today's adult generation with its consumer's mentality do put at stake the **future of our children and grandchildren**. Tropical and boreal deforestation, loss of biodiversity, climate change, scarce resources of safe drinking water, chemical and nuclear waste deposits, and chemical contamination may prove to be a one-way movement leading to a dead end. We will have to adjust our behaviour, our producers' output and consumers' wastes under the aspect of aptitude for the grandchildren's generation: will it harm, or will it suit the world of our grandchildren and of their descendants beyond? This is the essence of an old Karelian tale: Floods were rising, and the old raven father, being able to rescue only one of his children, carried his first son across toward the shore. "I will care for you in your old age", said the first one. The father dropped him and took the second one. "I will study and learn so that you will be proud of me", said the second one. But the father brought to the safe shore the third child who promised: "I will have in mind, just as you do now, the future of my grandchildren".

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PEDIATRAS IR APLINKOS MEDICINA

Santrauka

Viena iš pediatrijos užduočių yra rūpintis aplinkos veiksniais. Šioje aplinkos medicinos apžvalgoje detalizuojami aplinkos poveikio aspektai, kurie įvairiuose pasaulio regionuose, taip pat ir Europoje, yra gana skirtingi. Glaudesnis Lietuvos bei Vokietijos pediatrijos bendradarbiavimas siūlomas kaip lengvai įgyvendinama idėja.

Raktažodžiai: aplinkos medicina, vaikai ir aplinka, pediatras ir aplinka