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. A number of slides refer to the specific issues related to e-waste in developing countries, as it represents a major determinant of the burden of disease in children. Present only those slides that apply most directly to the local situation in the region.
This module is an introduction to the paediatric environmental history (PEH), a part of the standard medical history with additions relevant to potential environmental exposures that can and should be adapted to specific localities. The module reviews the need for the paediatric environmental history, shows examples, and discusses how to develop and take the history.

Image:
• © WHO / Anna Kari
Learning objectives

- Recognize and understand the importance of taking the Paediatric Environmental History (PEH)
- Review the basic concepts of children’s environmental health that should be considered in an environmentally-oriented questionnaire
- Consider when, where and how the Paediatric Environmental History should be taken – collecting basic data or more detailed information
- Assess the potential barriers to taking the Paediatric Environmental History, and how to overcome these barriers
- Develop the capacity and expertise to develop, record and use the Paediatric Environmental History

At the end of this talk, learners will be able to:
1. Recognize the importance of a Paediatric Environmental History, or PEH
2. Understand the basic concepts that are central to the PEH questionnaire
3. Understand when, where and how the PEH should be taken
4. Assess and understand the barriers to taking a PEH, and how to overcome them
5. Develop the expertise to collect and use the PEH to help patients in need
Outline

• Introduction and background
• What is the Paediatric Environmental History (PEH)?
• Key areas to address in the PEH & Examples
• Developing and using the PEH
• Who takes the PEH? When and how?
• Barriers to taking the PEH
• Case studies

Outline of the module: main points to address.

Image:
• © WHO / Tom Pietrasik
As an introduction to the subject it is important to review the reasons why children's health and the environment should be considered in more depth.

- Over the past decade, the evidence about the association between the environment and children’s diseases has increased. A number of chemical, physical and biological risk factors represent a menace to children’s health and development – these should be appropriately identified and recorded.

- There is a new recognition of children’s special susceptibility to environmental threats. The fetus, the child and the adolescent may be exposed to environmental threats during crucial periods of growth and development, called "windows of susceptibility". These exposures may not only cause disease in childhood, but also have an impact on health during adulthood.

- A number of different environmental threats are present – and coexist! – in the places where children spend most of their time, where they live, grow, play, learn, and even work, in some circumstances.

- The effects of environmental exposures occurring early in life may be clinically evident or may appear later in life – during childhood or even in adulthood. Effects suffered early in life may have consequences in the adult, for example asthma, chronic bronchitis and cancer are linked to exposures to air pollutants early in life.

- Health care providers and public health professionals play a key role, as they are in the “front line”, in dealing with children and adolescents; they are in contact with the parents, teachers and communities. Health professionals are in a key position to identify children at risk, advise parents on how to reduce the risk, and recommend actions to policy-makers. Health care providers should be able to recognize and assess the environmental health threats present in the places where children and adolescents live, learn, play and work. They should also know that the threats are greater in low-income populations and marginalized communities, in degraded environments and when children and adolescents are living under extreme stress (e.g. during civil unrest, or in refugee camps).

Image:
- © WHO / SEARO / Hayley Goldbach
Children are highly vulnerable to environmental exposures. For a detailed description of children’s vulnerabilities, please see WHO CEH Training Module “Children are not little adults”

We now recognize that children, including the embryo, fetus, infant and all life stages until the completion of adolescence, are often at a different and increased risk from environmental hazards from that of adults, for reasons that can be divided into four major categories.

1. Children often have different, and sometimes unique, exposures to environmental hazards from those of adults.
2. Due to their dynamic developmental physiology children are often subjected to higher exposures to pollutants found in air, water and food. These exposures may be handled quite differently by an immature set of systems to the way they are dealt with in adults. Furthermore, the developmental component of a child’s physiology is changing: maturing, differentiating and growing in phases known as "developmental windows". These "critical windows of vulnerability" have no parallel in adult physiology and create unique risks for children exposed to hazards that can alter normal function and structure.
3. Children have a longer life expectancy. Therefore they have longer to manifest a disease with a long latency period, and longer to live with toxic damage.
4. Finally, children are politically powerless; they are defenceless. With no political standing of their own, they must rely on adults to protect them from toxic environmental agents. Each of these points is illustrated in more detail in the following slides.

Image:
- © WHO / Jim Holmes
The environment is a complex source of exposures,
There are many hazards that can impact both the immediate and long term health of children every day, beginning from pregnancy
It is important to be aware of these exposures, and how they can impact the health, growth and development of our children

Figure:
The world is rapidly changing - urbanization and population growth, climate change, industrialization, increased production and use of chemicals and hazardous waste. This also means increased potential for dangerous environmental exposure for children where they play, live, learn, and work.

New “emerging” risks are always on the horizon, such as natural disasters and illness associated with climate change, dramatic increases in air pollution as a result of increases in traffic and industry, and endocrine disrupting chemicals which are now entering our environment and may impact children’s hormone balance.

This map shows the main environmental risks observed in different parts of the world. These should be known to enable a paediatric history-taking that will aim at identifying the concrete environmental problems faced by children.

Figure:
Understanding inequity and environmental exposures

- Environmental risks are typically greatest among the poorest populations
- Water and sanitation are lacking, garbage may accumulate, industry may be nearby, and air quality may be poor
- Children in LMIC countries, and socioeconomically disadvantaged communities in wealthy counties are most at risk
- Social and environmental conditions associated with poverty are linked with communicable and noncommunicable disease, especially in children

Reference:
While action is being taken to reduce childhood mortality, rates are still higher where the per capita gross national income is lower. (Compare to next slide)

Reference:

Map:
• © World Bank. License: CC BY-4.0.
Childhood mortality rates, seen on the previous slide, are highest in countries with lowest gross national income per capita.

**Note:**
This map expresses income in PPP international dollars. PPP, or purchasing power parity, accounts for price differences between countries to best reflect people’s living standards uniformly.

**Map:**
- © World Bank 2018. License: CC BY-4.0.
"Front-line" health care providers – those dealing with children's health issues on a regular basis – have specific roles and responsibilities in recording environmental and health data. They should be able to:

- Recognize clinical, subclinical and potential effects of environmental risk factors on children's health. This requires the capacity to identify potential exposure to chemical, physical and biological agents and to determine their effects on children's health and development.
- Understand the mechanisms of action – learn how environmental risk factors cause or trigger different diseases (e.g. respiratory, gastrointestinal or neurological) or how they may be linked to developmental problems or potential reproductive, endocrine and neurobehavioural effects.
- Take a thorough exposure history – ask the right questions and record the information in an appropriate place (the clinical record!).
- Contribute to research and knowledge generation – the data on environment and health that have been collected, collated and analysed provide valuable information to fill knowledge gaps and contribute to research.

Health care providers dealing with children should be able to understand the mechanisms of environmental disease and be familiar with the biomedical techniques available for the study and monitoring of environmental exposures.

All this knowledge will enable more effective primary care of the child and his or her family, improve the quality of medical surveillance, and contribute to the prevention of environment-related diseases.

The health care providers (HCP) – from the paediatrician to the nurse, from the primary health care worker to the family doctor, and other relevant HCPs – are in a privileged position and play a key role in detecting the environmental threats to children's health because they are in direct contact with the child, his or her family and community.

Image:
- © WHO / Tom Pietrasik
The PEH is a set of basic and concise questions, part of the standard medical history, a tool and a mechanism for interaction that covers:

- general issues that are similar throughout the world (e.g. access to safe drinking-water and sanitation; waste disposal and quality of the air);
- specific issues, that depend on the local situation (e.g. pesticide use in agricultural areas and local traditional medicines and practices); and
- age- and gender-related issues (different questions are used when addressing the behaviour, diet or activities of toddlers or adolescents, or of boys or girls).

The questions should be adapted to suit the local situation, needs and capacities of:

- **Industrialized countries** where there is concern about heavy traffic, injuries, noise, food additives and diet; where physicians and nurses see the children and may ask the questions; and there are good mechanisms for recording case data (using electronic clinical records).
- **Developing regions** where there are concerns about other risk factors such as unsafe water, lack of sanitation, misuse of pesticides and unsafe buildings. Physicians and nurses may not be available and primary health care workers should take the PEH – which may have to be recorded very succinctly on paper or in a notebook.

**Image:**

- © WHO / Anna Kari
The paediatric environmental history (PEH) is a set of questions – part of the standard medical history – that focuses on the different environments of the child. It is both a tool (set of questions) and an opportunity for interaction.

A tool for:
- identifying and assessing children’s exposure to environmental threats in the different places where they spend time: home, school, playground or even the workplace or small cottage industry;
- responding with the right therapeutic and preventive measures – as only a good knowledge of potential sources of exposure will guide an appropriate medical diagnosis and treatment; and
- increasing the knowledge base – as the data collected in a harmonized manner, with controlled terminology and definitions will generate a valuable database of knowledge and facilitate research.

An opportunity for interaction:
- with the child and his/her family, and with others.

The PEH may motivate:
- enquiries – discussions with colleagues about similar cases or observations;
- contacting professionals who may have information on the situation observed; and
- informing the responsible authorities about situations observed.

Note: State that the confidentiality of clinical data must always be respected.

The PEH is not a NEW idea – all those involved in medical care, throughout the world, have learned to ask questions about the environment. However, in view of the new knowledge and increased concerns about environmental risk factors, the environmental questions are now more detailed and are aimed at collecting and recording information in a more specific manner.

Image:
- © WHO / Heba Farid
The green page is presented as an example of a concise PEH—where just a core set of basic details is recorded.

The data collection form is green, to make it clearly visible within the clinical records (which are still kept in paper form in most primary health care centres).

The green page has about 50 fields for recording information about the child, his or her built and ambient environments, the characteristics of the community and other data. It also allows a basic assessment to be made of the state of the child’s environment (the “ABC” of environmental risks).

Please see the below reference for guidelines on how to use the green page and versions in other languages.

Reference:
Reference:
PEH – an example

III. “ABC” OF ENVIRONMENTAL CONDITIONS

<table>
<thead>
<tr>
<th>BUILT ENVIRONMENT</th>
<th>Home</th>
<th>School or Nursery</th>
<th>Recreation Area</th>
<th>Workplace</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Excellent – B. Average – C. Precarious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOGRAPHICAL AREA</td>
<td>A. Low risk – B. Medium risk – C. High risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOOD (quality &amp; supply)</td>
<td>A. Adequate – B. Uncertain – C. Contaminated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIR</td>
<td>A. Clean – B. Average – C. Contaminated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATER</td>
<td>A. Potable – B. Average – C. Contaminated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOIL/FLOOR</td>
<td>A. Adequate – B. Average – C. Inadequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEWAGE DISPOSAL</td>
<td>A. Adequate – B. Uncertain – C. Inadequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WASTE DISPOSAL</td>
<td>A. Adequate – B. Average – C. Inadequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOISE</td>
<td>A. Low – B. Moderate – C. High</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEMICAL EXPOSURE</td>
<td>A. Low risk – B. Moderate risk – C. High risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAFFIC</td>
<td>A. Low – B. Moderate – C. Intense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WHAT IS THE PEH?

PAEDIATRIC ENVIRONMENTAL HISTORY

Reference:

PEH – an example

IV. PUBLIC SERVICES AVAILABLE: | HOUSING | SCHOOL | COMMUNITY
---|---|---|---
ELECTRICITY
COMMUNICATION (PHONE, RADIO, OTHER)
WASTE COLLECTION
FINAL WASTE DISPOSAL
PUBLIC TRANSPORTATION
PUBLIC LIGHTING
HEALTH CARE CENTRE
EXCRETA TREATMENT PLANT
SEWAGE SYSTEM
WATER SUPPLY

Reference:
Reference:
Another example: the *Case Studies in Environmental Medicine* series of the Agency for Toxic Substances and Disease Registry (ATSDR) devoted to paediatric environmental health, which presents interesting case-studies (on mercury and lead) and provides a summary of questions for an environmental history. This ATDSR document focuses not so much on the history to be taken at the clinician's office, but rather on the details of an exposure history.

Examples such as this can help you inform your own PEH

- American Academy of Pediatrics: [https://www.aap.org/](https://www.aap.org/)
- Children's Health and the Environment: [https://www.who.int/ceh](https://www.who.int/ceh)

Reference:

The photo illustrates a typical situation in rural and suburban areas, where children play in the street, and are exposed to chemical contaminants, to vectors of disease.

**Image:**
- © WHO / Joao Soares Gusmao
Key areas to address in the PEH

1. What are the potential environmental hazards?
   - **Physical**
     - Radiation, noise, extreme heat/cold, unsafe buildings, traffic...
   - **Chemical**
     - Pesticides, solvents, lead, mercury ...
   - **Biological**
     - Disease vectors, mould, envenoming ...

Image:
- © WHO / Pallava Bagla
Children are exposed:
• In places where they spend time: at home and in the surrounding areas; at school; in playgrounds and recreation areas; in the street; in fields; at the workplace; in rural and urban settings; in hazardous situations and waste sites;
• Through media that originate or carry the contaminating agents (water, air, food, soil or objects);
• As a consequence of their activities: eating, drinking, playing, exploring, testing, learning and working; and
• Due to characteristic behaviours including crawling, “hand-to-mouth”, hobbies and recreational drug use.

Image:
• © WHO / SEARO / Hayley Goldbach
The effects will depend on the dose and the timing. Therefore, it is important to consider the special "windows" of susceptibility. The vulnerability of the embryo, fetus and newborn is quite different from that of an older child or adolescent (see module "Children are not little adults"), as they develop very fast and their organs and systems are maturing rapidly.

The effects of environmental threats may or may not be clinically evident. The adverse effects of a chemical or physical agent may have an impact on organs and systems (e.g. anaemia due to lead poisoning or hepatic damage due to aflatoxins), cause functional problems (e.g. bronchospasm due to allergenic substances, or malaise and headaches due to inhalation of solvents) or alter development (e.g. learning disabilities due to lead, or low birth weight in children whose mothers were exposed to tobacco).

**Image:**
- © WHO / Petterik Wiggers
Example of the detailed questions on housing that may be asked while taking the PEH. Many more questions may need to be asked and the answers recorded. These represent a few examples. Questions will depend on geographic region, culture and local environmental concerns.

Examples of questions to ask about the home

- How old is the home? What is the building made of (e.g. wood, brick, mud, cardboard,...)?
- Is there water damage or mould on the walls? Is it well-ventilated? Are there odours?
- Has there been any recent painting or refurbishing?
- Do family members smoke at home? What do they smoke? How much?
- Are pesticides used indoors? What kind? How? Are there insect or rodents in the home?
- Are there pets (dogs, cats, birds) or other animals?
- How often is the home cleaned? Which chemicals are used for cleaning?
- Where/how is the cooking done? How is the home heated? Stoves? Exhaust?
- Is there traffic or industry near the home?

* Ask similar but modified questions about the school, day care and any other environment the child spends a significant amount of time in.
Example of the detailed questions on activities that may be asked by those in charge of collecting environmental information at the health care centre, while taking the PEH.

**Image:**
- © WHO / Tom Pietrasik (left) and Anna Kari (right)
Examples of questions about the child's behaviours

**Personal hygiene and habits**
- How often does the child bathe?
- Are clothes washed regularly?
- Type of diapers are used?
- Does the child have lice? How is it treated?
- Does the child play on the floor? Carpet? Soil?
- How and how often are the child's bedroom and play area cleaned?
- Which chemicals are used to clean the home?
- Does the child have pica?

**Cultural history**
- Use of alternative medicines or cosmetics
- Cultural practices
- Religious practices
- Traditions involving the use of chemicals

**Transport**
- What transport does the child use?
  - individual or collective;
  - bicycle;
  - motorcycle;
  - horse; or other?
  - Characteristics of bus?
  - Bus stop?

Example of the detailed questions on behaviours and habits that may be asked while taking the PEH.

**Image:**
- © WHO / Jim Holmes
Another example of the relevant information that may have to be collected is provided here.

These are the environmental risk factors under consideration by the WHO project on long-term studies, that is being undertaken in collaboration with the National Children's Study in the USA and studies in about 15 other countries.

The Working Group, with participants from more than 15 countries, compiled this initial list with the core set of environmental risk factors that should be considered when collecting data on children's environments and health.

- **Chemicals**: lead, mercury, PCBs, pesticides, POPs, manganese, chromium, vanadium.
- **Physical factors**: noise, radiation, air, water, soil pollution, food contamination, mycotoxins and unintentional injury.
- **Biological factors**: vector-borne diseases.
- **Psychosocial factors**: poverty, child abuse/neglect, violence, parental mental illness and substance abuse.
- **Built environment factors**: housing, overcrowding.
- **Sanitation factors**: lack of potable water.
- **Adequate nutrition factors**: food safety, food security, food additives.
- **Media impact factors**: television, Internet.
- **Physical activities factors**: time and location, playground, toys.
- **Social network and participation factors**.
- **War and conflict factors**.
- **Socioeconomic changes**: individual household and community.
- **Life crises factors**: natural disasters; maternal death; access to health/
These are the environmentally-related health outcomes under consideration by the WHO project on long-term studies that is being undertaken in close collaboration with the National Children's Study in the USA and about 15 other countries.

The Working Group, with participants from over 15 countries, compiled this initial list with the core set of environmentally-related outcomes that should be considered when collecting data on children's environments and health.

- Pregnancy outcomes: perinatal mortality and morbidity, birth weight (BW), birth height (BH), birth defects.
- Developmental disorders.
- Growth: malnutrition, stunting, obesity.
- Cognitive functions: behaviour disorders, delinquency, high-risk behaviour, unintentional injuries, intentional injuries.
- Sexual development and reproductive behaviour: (teenage pregnancy), maternal death up to 1 year after birth.

Image:
- © WHO / Antonio Suarez Weise
The questions should be prepared locally, taking into consideration the three key areas (questions) already mentioned. It is desirable to prepare the PEH through dialogue among health care providers, in consultation with experts in epidemiology, environment, psychology and informatics, involving the community and informing decision-makers and others.

The questions should address the main environmental threats present in the places where children spend most of their time; the toxicants, physical and biological; risk factors and pathologies most commonly encountered; as well as the unhealthy behaviours and conditions observed. Environmental exposure results from more than one chemical or factor: there is usually exposure to many agents and conditions.

It is also important to consider the genetic susceptibility of the child (e.g. family history of allergies or cancer).

Psychosocial and economic factors are crucial: exposures tend to be more frequent and/or severe in the more degraded (poor) environments and where there is ignorance about potential risks or lack of means to implement solutions.

In some special cases, the PEH may be an important tool for addressing public health problems, such as a cluster of paediatric disease, uncommon cases or symptoms, epidemics of unknown origin, or changes in epidemiological trends in a given area.

The advantage of using a "harmonized" data collection protocol or format is that it facilitates the analysis and interpretation of data collected, enabling epidemiological and other studies (within the country, or even internationally).
The harmonization of these questionnaires in the health sector offers a number of advantages.

It allows comparability of the data collected and the potential to aggregate data offers the potential for their use in cooperative research studies and scientific publications.

The potential for generating reports could be enhanced (e.g., by producing annual reports on the status of children’s environmental health, and the use of indicators of children’s environmental health).

The use of a common language may facilitate communications, the sharing of experiences and more awareness about local environmental problems and may "accelerate" actions.

The harmonization of the PEH requires a common terminology and case definitions: a clear understanding of the terms used (and possibly the need for a glossary).

If feasible, electronic data entry offers the possibility of creating a database that could provide valuable information for interventions and for the follow-up of environmental health problems in the area covered.

Image:
- © WHO / Karen Robinson
The decision about who takes charge of the PEH will depend on the characteristics of the health system, the availability of health personnel and other resources.

Health care professionals dealing with infants, children and adolescents can take the PEH. They may be paediatricians, family doctors, primary health care workers, nurses in the “front line”, residents, others

• Social worker, environmental officer, or specially trained professionals

In some instances, part of the environmental history-taking may be done by a social worker or environmental officer who can visit the home, school, playground or other places where children spend their time. Environmentally trained staff in health care facilities could offer tremendous advantages, as they would be in a position to identify and assess the potential threats in the child’s environment, inform the health care providers and authorities, and educate parents, teachers and communities.
Who takes the PEH?

Possibly a new profession within the health care system?

The environment and health officer who visits the home and school, records observations, talks with parents, discusses with teachers, informs health care providers, and keeps the “green” file in the case records.

In some special cases, the PEH may be an important tool for addressing public health problems, such as a clusters of pediatric disease, uncommon cases or symptoms, epidemics of unknown origin or changes in epidemiological trends in a given area.

Image:
- © WHO / Antonio Suarez Weise
A PEH may be taken when children, whether symptomatic or asymptomatic, are seen at a medical facility or during a home visit.

It may be done in several stages.

It is crucial to take a PEH when children with acute or chronic disease come to emergency departments, outpatient clinics, primary health care centres or private medical offices.

It is also a highly significant preventive tool when used during routine health surveillance visits.

A "complete" PEH includes visits to the places where the child spends most of his or her time (e.g. home, school, playground and neighbourhood).

The green page will be presented as an example of the concise PEH – where a core set of basic details is recorded.
There are many situations that may lead to a discussion about environmental exposures in a child’s environment and the need to conduct a more thorough environmental history.

- A health care professional may suspect based on the child’s symptoms, behaviour or knowledge of the local area that an exposure as occurred
- A parent may bring up a concern with their health care provider and ask for more information about an exposure or possible exposures that may be linked with their child’s illness
- Routine examination of a child and regular discussion with the parents may reveal a new symptom or exposure not previously noticed

It is important that health care providers are aware of environmental exposures (particularly local concerns) and how they can impact children’s health.
The main obstacles to the use of the PEH include:

- Lack of awareness of the health professionals and decision-makers about the importance of the effects that environmental factors have on the health, development and well-being of children;
- Lack of training and information on environmental health issues (e.g. no formal training, no access to sources of data);
- Limited time available for the paediatric consultation—children may have to be diagnosed and treated in a very short time;
- Overstretched health facilities and lack of personnel;
- Lack of reimbursement for the time required for taking an environmental history; and
- Lack of motivation and/or frustration—linked to the limited ability or capacity to intervene clinically in environmentally-related diseases (e.g. ozone and asthma).

Image:
- © WHO / SEARO / Sanjit Das
These barriers may be overcome by incorporating environmental health into the curricula of medical and nursing schools, increasing the awareness of health authorities, disseminating information on environmental issues and strengthening health facilities.

In addition, health workers could carry out home and school visits while training. Many developing countries require newly graduated medical students to work for some years in a rural setting before practicing in urban areas. These graduates could be excellent agents for promoting the use of environmental home/school audits in rural areas. Environmental health questions could be added to health intake forms, periodic visit forms, same-day visit progress notes and other forms used by clinicians.
Case study: School Environment

**Teachers: Unhealthy conditions in classroom “may be worse than we thought”**

- Teachers in Franklin, Ohio raised concerns after they and students increasingly noticed common symptoms when at the school including:
  - Breathing problems
  - Dizziness
  - Nausea
  - Headaches
  - Nose bleeds
  - Extreme lethargy
  - Sore throat
  - In some classrooms, teachers had difficulty keeping students awake
  - Symptoms improved on the weekend, when away from the school

Reference:
Teachers at the school voiced their health concerns and suspicions of environmental exposures, leading to investigation and environmental testing.

10 rooms were tested for mould, with eight rooms returning moderate and high scores.

Carbon dioxide was tested in five classrooms. One classroom had a sensor malfunction and thus had no reading. Scores in the four rooms successfully tested were all above the American Society of Heating, Refrigerating and Air Conditioning Engineers recommended level of 1000 parts per million (ppm) for schools. One classroom reached 2768 ppm, nearly three times the recommended level.

Of 149 samples taken for asbestos, 69 were found to contain the carcinogen. One area was in immediate need of repair, with a hazard rank of six out of seven on the U.S. Environmental Protection Agency scale. A rank of six indicates potential significant damage.

Reference:

Image:
• © WHO / Tom Pietrasik
Case study: School Environment

Franklin High School – Environmental Exposures

Scientific evidence: Exposures linked with potential health effects

- **Indoor mould and dampness** are known to be associated with breathing problems including shortness of breath, cough, wheeze, and upper respiratory tract symptoms as well as increased risk of asthma development and exacerbation, respiratory infections, bronchitis, allergic rhinitis, and eczema.

- **Carbon dioxide** exposure is associated with dizziness, headaches, drowsiness, difficulty concentrating, eye irritation, nausea, upper respiratory symptoms (e.g. sore/dry throat, runny nose, cough), and lower respiratory symptoms (e.g. wheeze, cough).

- Exposure to **asbestos** over long periods of time is associated with increased risk of serious illness, including lung cancer and mesothelioma. It is unknown if any of the children will be impacted by this exposure.

Many of the health effects observed in the children have also been noted in research studies.

References:


Identification of symptoms without a known cause, or as in this case, with a suspected cause, deserves further investigation. Feeling unwell in a particular environment is a sign that there is something in that environment (an exposure) that is causing a health outcome. As you will soon see, the Paediatric Environmental History is a valuable tool to help identify exposures in different environments that may be adversely impacting the health of our children.
Case study: Family

- Parents of 4 young children living in a rural Latin American town express concern over the health of their children
  - The eldest (age 10), a boy, has developed serious respiratory problems, including chronic cough and wheeze
  - The two girls (ages 8 and 6) are beginning to show signs of respiratory illness (persistent cough)
  - The youngest (a boy, age 3) is still not speaking and rarely interacts with his family members

You decide to conduct a full PEH . . .

Speaker – Consider adding a case relevant to your local area/concerns.

Image:
- © WHO / Tom Pietrasik
PEH findings
Upon interviewing the family you find:

- They live in severe poverty – the home is very old and in poor condition.
- Several additional family members live with them and the home is overcrowded and dusty.
- There is chipped and flaking paint on the walls of the home (which you suspect may have lead in it) and the youngest child puts things in his mouth.
- The father has applied insecticides in the home to treat cockroaches.
- The daughters helps the mother with the cooking, which is done over an open fire that burns biomass fuels (animal dung, wood, and agricultural products found nearby).
- The family’s water source is a nearby river, and it is cloudy.
- To help support the family, the eldest son works at a nearby farm with his father, where they apply pesticides to the crops.

Reference:
Advice and action based on PEH

Provide education for the family on the impact of possible environmental exposures and their impact on child health:

- Cooking over and open source using biomass fuels is an important source of indoor air pollution and can contribute to respiratory illness.
- Pesticides can effect the nervous and respiratory systems of children.
- The dust and crowded conditions of the home may be exacerbating the respiratory effects the children are experiencing.
- Old paint can contain lead and it is a neurotoxin that may negatively impact the youngest child’s development if he is ingesting it.
- Contaminated water in developing parts of the world may contain a variety of biological and chemical contaminants (including arsenic).

Education is a powerful resource and may help protect the family in the future.

Reference:
Advice and action based on PEH

Recommend care and treatment
- The children should be seen by a physician or other health care provider (if possible) to manage their health issues.
- Medical intervention or tests may be needed.
- Follow-up care is essential.

Recommend changes in the home and community where possible
- Encourage the family to clean the home and reduce dust.
- Advise them to stop using pesticides inside the home.
- Advise the eldest son to find employment that does require interaction with pesticides or other harmful chemicals if possible.
- Help them seek alternatives to biomass fuels in the home, or a clean cookstove.
- Help them find a way to test the paint in their home/repaint/reduce or stop mouthing behaviour.
- Inquire about alternative water sources. Consider asking the community to test the water (public health issue).

Recommendations may be restricted by available local resources. It is important to consider the options available and those the family is most able to take advantage of and implement into their daily lives.

- Medical tests include, for example: asthma testing, respiratory medications and blood lead levels.

Reference:
The paediatric environmental history is a useful tool that allows health care providers to take descriptions of environmental conditions, behaviours and risk factors relevant to a child's health. This information allows health professionals to educate families on and promote prevention of environmentally related diseases in children. It can also help providers identify, assess and follow up environmentally exposed children and respond with effective measures.

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Reviewers:

Initial edits by Lesley Brennan (Canada)

Final review, technical and copy-editing: Gloria Chen (WHO Consultant)

WHO CEH training project coordinator: Marie-Noëlle Bruné Drisse (WHO)

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First draft prepared by Jenny Pronczuk MD (WHO)

With the advice of the Working Group Members on the Training Package for the Health Sector:
Cristina Alonso (Uruguay); Yona Amitai (Israel); Stephan Boese-O’Reilly (Germany); Stefania Borgo (ISDE, Italy); Irena Buka (Canada); Ernesto Burgio (ISDE, Italy); Lilian Corra (Argentina); Ruth Ezel (WHO); Ligia Fruchtengarten (Brazil); Amalia Laborde (Uruguay); Leda Nemer (WHO/EURO); Jenny Pronczuk (WHO); Roberto Romizzi (ISDE, Italy); Christian Schweizer (WHO/EURO); Katherine M. Shea (USA).

Reviewers: Sophie Balk MD (USA), Ruth Ezel MD (USA)

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WHO CEH Training Project Coordination: Jenny Pronczuk (WHO)

Medical Consultant: Katherine M. Shea (USA)

Technical Assistance: Marie-Noel Bruné (WHO)
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