

The increased production and use of chemicals, children are exposed to a myriad of chemical risks in homes, schools, playgrounds and communities. Chemical pollutants are released into the environment by unregulated industries or are emitted by motor vehicles or toxic waste sites. Household chemicals such as cleaners, solvents, pharmaceuticals and other chemical products become dangerous if they are kept in inappropriate containers and in places that are accessible to children. While exposures to some environmental hazards have decreased because of new regulations and standards, children continue to be exposed to environmental hazards owing to modern technological development.

1-1 The Health

The constitution of World Health Organization (WHO) defines health as “A state of complete physical, mental and social well being and not merely absence of disease or infirmity”. The Health for All (HFA) was adopted at the Thirtieth World Health Assembly in 1997.

1-2 The Environment

The word environment refers to whatever surrounds the human beings. The environment can be considered as having three fundamental sets of components:

- Bio-Sphere (natural substances, air, water, land, plant, flora, fauna,...etc.)
- Techno- Sphere (matter, man-made, factories, cars , roads, housing, power plant...etc)
- Socio- Sphere (Laws , Legislation, codes ,Ethics, culture...etc)

Social, cultural, and economic conditions interact with the above environmental components to constitute the environment in which we live. The field of environmental health focuses on the relationships between human health and the influence of the environmental components.

1-3 Environmental Hazards

The influence of environmental hazards on our health is very complex and may be modulated by our genetic, psychological, and cultural backgrounds. The environmental threats can be divided into: (1,2)

A-Traditional health hazards: These are associated with lack of development and are related to poverty. They include:

- Lack of access to safe drinking water.
- Inadequate basic sanitation in the household and the community.
- Food contamination with pathogens.
- Poor indoor air quality.
- Occupational injury and hazards in agriculture.
- Natural disasters, including floods, droughts, and earthquakes.
- Disease vectors.

B-Modern health hazards: These are associated with unsustainable development and are related to consumption of natural resources and lack of health - environment safeguards. They include:

- Water pollution from populated areas, industry and intensive agriculture.
- Urban air pollution from motor cars, coal power stations and industry.
- Solid and hazardous waste accumulation.
- Chemical and radiation hazards following introduction of industrial technologies.
- Emerging and re-emerging infectious disease hazards.
- Deforestation, land degradation and other major ecological changes.
- Climate change, stratospheric ozone depletion and transboundary pollution.

Modern environmental health hazards are particularly more global in their influence on human health. In contrast to traditional hazards which are often quickly expressed as disease. For many modern hazards a long period of time may pass before the health effects manifest themselves. Such environmental changes may occur over several decades.

1-4 Classification of Environmental Health Hazards (EHH):

The major environmental health hazards are associated with the three components of the environment; these are ^(1,2):

A- Physical hazards which include the hazards relating to health effects of surrounding energy, extremes of temperature, noise, and physical work environment.

B- Chemical hazards which include the hazards relating to exposure to substances in the environment whether natural or man-made.

C- Biological hazards, which include the hazards relating to the living things or their products in the environment. Other environment health hazards include; Occupational hazards (Electro-magnetic, ionizing, noise ...etc.); Socio- economical hazards, and Accidents and disaster.

1-5- Why are children more vulnerable to EHH? ⁽¹⁾

Children are not little adults, and because of their dynamic state of growth and their specific behavioral patterns, they are more vulnerable to certain environmental hazards than adults. This can be explained by:

A - A greater risk of exposure:

- a- Children have additional pathways of exposure; are not applicable to adults; e.g. intrauterine, through breast milk, via substances toys.
- b- The behavioral characteristics of the infant or child affect its exposure. e.g. hand-to-mouth behavior; infants are most of the time close to the ground than adults.
- c- Their fast metabolism leads to consumption more water and food in relation to their size compared to adults, as a result risks posed by pollutants and toxins are greater.

B - A greater risk of harm following exposure:

- a- Increased rate of intestinal absorption. For example, children absorb ingested lead 5 times more than adults.⁽³⁾
- b- Decreased ability of detoxification, mainly through the liver.
- c- Immaturity of organs and tissues, rendering them more vulnerable to toxic exposures. Children's immunity systems are not yet fully developed, making them less able to fight microbes.

C - An increased opportunity and chance of prolonged exposure:

Children exposure starts in the early years of life, and because they have much more of their life ahead of them to live. Subsequently, they have an increased chance to develop environmentally-triggered disease with a long latent period. Children are more often involuntarily exposed to EHH than adults. They are unable to avoid exposures of their own accord. (Child labor) .

1-6 Environmental health hazards (EHH):

I - A global concern

Every year over 5 million children aged (0 – 14) years die from causes directly related to their envi-

ronments. Many existing national laws and international declarations have begun to address these concerns. The UN Convention on the Rights of the Child (CRC), the declaration of the Environmental Leaders of the Eight on Children's Environmental Health, 1997, the WHO/UNECE Declaration of London on Environment and Health of 1999, the North Amer. Commission for Environmental Cooperation Council on Children's Health and the Environment of June 2000. Last year, 35 countries attended WHO's international conference on "Environmental Threats to the Health of Children" in Bangkok on March, 2002. At the meeting, participants pledged to promote the protection of children's environmental health ⁽⁴⁾.

Few months later, the Healthy Environments for Children Alliance (HECA) was inaugurated by the DG at the World Summit on Sustainable Development (WSSD) in Johannesburg, Sept. 2002. The aim of HECA is to build a global alliance to tackle key environmental risks to children's health ⁽⁵⁾. The activities of WHO continue to focus on the value of environmental health for children. Each year on April 7th, the world celebrates "World Health Day". The theme of this year was "healthy environments for children" ⁽⁵⁾.

II - Classification and forms of the modern biological environmental hazards

The biological EHH generally fall into two broad categories:

- a- Those which produce adverse health effects through infection, and
- b- Those which produce adverse health effects in non- infective ways (toxic effects, allergenic effects).

Toxic chemicals find their way into human body as they become present in the ambient air due to industrial pollution from chemical plants, electric power plants, waste incinerators, and dry cleaners, among others. Health threatening gases are released by motor vehicles and planes. These gases can also heavily pollute water, land and agricultural goods.

III - Sources of modern biological environmental hazards

The different biological hazards can reach vulnerable children from many environmental sources. Some sources are common to both children and adults. Others are most influential on children by virtue of the child's particular behavior and activity. The following is a discussion of the commonest sources of modern biological hazards.

III-1 - Air:

Children are very sensitive to the effects of air pollution. Children breathe more rapidly than do adults, and inhale more pollution per pound of body weight than adults. Therefore, their lungs have a greater chance for being exposed to harmful air pollutants. While exercising, children breathe more heavily and air pollution can be inhaled more deeply into the lungs. When children have a cold or are exercising, they often breathe through their mouths, taking in more pollutants than if the air was filtered through their noses. This may contribute to permanent lung damage.

A - Indoor air: ⁽⁶⁾ Indoor air pollution can be a real concern because children and infants spend more than 60% of their time indoors. The sources of poor indoor air quality are:

- Smoking indoors.
- Burning of oil, gas, kerosene, charcoal
- Central heating, cooling, humidifying systems.

- Building material including furnishings, carpets, wood pressed products
- Household cleaning products.

Ironically, increases in indoor air pollution can be attributed to what are generally considered to be improvements in our quality of life. These include energy saving measures such as better insulation and control ventilation rates in houses, mean indoor temp., and humidity. In addition, the “airtight” buildings have increased, as the use of synthetic building materials and un-vented combustion appliances ⁽⁷⁾. All of these factors may cause and produce of respiratory allergy from several allergens and the transmission of agents causing acute respiratory diseases. Following; Two Examples for indoor pollutants:

Radon: is a colorless, odorless, radioactive gas formed by the breakdown of radium, a naturally occurring element in the earth. Radon can be found in soil, water, building materials, and natural gas. When a building settles, small cracks may form in the foundation. These cracks allow gases in the earth, including radon, to seep into a building. The greatest concentrations of radon are usually found in the basement or ground floor.

Radon breaks down into radioactive particles that can get trapped in lungs when breathing. These particles release small bursts of energy that can damage lung tissue. This can lead to lung cancer. Radon is the second leading cause of death from lung cancer in the United States. Only cigarette smoking causes more cases of death from lung cancer. Smokers are at a greater risk for lung cancer due to exposure to radon than are nonsmokers. The amount of radon accepted by US-EPA is less than 4 *picocuries* per liter of air.

Asbestos: is a fire-resistant material that, in the past, was sprayed on ceilings, pipes, and other surfaces in buildings. Over time, asbestos becomes crumbly and flakes into a fine dust that hangs in the air. Inhalation of microscopic airborne asbestos fibers is the major route of exposure. Asbestos is no longer used in new construction because it was found to cause serious lung problems and cancer. These problems can develop as late as 20 to 40 years after a person has been exposed to it.⁽⁸⁾

B - Outdoor air: ⁽⁹⁾

When inhaled, air pollutants affect the lung and respiratory tract they are also taken up by the blood and transported throughout the body. The most important biological outdoor air pollutants are the grass pollen particles; beside others (smog, soot, dust, etc..) causing respiratory allergies and the air born organisms causing acute respiratory diseases, either by widespread epidemic transmission from diseased contacts (severe acute respiratory distress syndrome SARS is an example) or through biological weapons.

Health effects associated with both indoor and outdoor air pollution include: ^(10,12)

- a - Increased prenatal mortality.
- b - Increased acute respiratory illnesses.
- c - Aggravation of asthma.
- d - Increased frequency of physician visits for chronic cough and ear infections.
- e - Sudden infant death syndrome (SIDS).

A number of environmental contaminants characterized by their resistance to degradation such as lead mercury and organo-chlorinated pesticides, are linked to untoward effects on the nervous, immune, endocrine, and other systems of the newborn. Highly toxic compounds such as dioxins and furans, polyaromatic hydrocarbons and polychlorinated biphenyls can also be found in food, air, and

drinking water and have detrimental effects on development of children's health. Another characteristic of these toxicants is their ability to concentrate in the human body. This is the case notably of the Persistent Organic Pollutants or POP's. They are chemicals remain in environment for long periods, become widely distributed geographically, accumulate in fatty tissue of living organisms are toxic to humans and wildlife.

Indoor Molds: ⁽¹⁰⁾

The growth of molds is pervasive throughout the outdoor environment. Molds readily enter indoor environments by circulating through doorways, windows, heating, ventilation systems, and air conditioning systems. Spores in the air also deposit on clothing, shoes, bags, and pets. Molds proliferate in the environment that contains excessive moisture. Many modern building materials are suitable nutrient sources for fungal growth, including paper and paper products, cardboard, wood, and wood products, paints, wallpaper, carpet, and fabric. Some indoor molds have the potential to produce extremely potent toxins called mycotoxins.

The toxic effects from mold exposure are associated with exposure to toxins on the surface of the mold spores, not with the growth of the mold in the body. The most common indoor molds are *stachybotrys chartarum*, *penicillium sp.*, and *aspergillus sp.*. In addition to their relation to asthma, the toxic effects of indoor molds include upper respiratory tract irritation, acute pulmonary hemorrhage in infants, and SIDS.

III-2 - Household waste: ⁽¹¹⁾

Liquid and solid wastes can come into direct or indirect contact with human beings at several stages in the waste cycle. The health risks of uncollected solid waste are obviously' most severe for those actually living in unserved areas. Notable, pre-school children in developing countries are at risk of injury, intoxication or infection since they are likely to be exposed to uncollected waste in streets or at unofficial dump sites. Ground water used for drinking purposes can become chemically or microbiologically polluted if liquid wastes are disposed of in or near water sources.

In MENA Region, the single largest contributor to child poisoning is kerosene. It produces chemical pneumonitis, secondary infection and eventually, respiratory failure. The most dangerous household products are bleaches, strong detergents and oven cleaners containing sodium hydroxide,, if ingested, produce corrosion of the digestive tract. Repeated surgery and years of rehabilitation are required for a child who inadvertently ingests a drain cleaner or crystallized caustic soda found in the kitchen. Other household products ingested but fortunately less toxic are window cleaners, stain removers, shampoos and cosmetic products.

III-3 - Water: ^(9, 11, 12)

Treatment problems or extreme weather events may allow contaminants to enter water supplies. In most situations, contaminants are found at levels that do not pose immediate threats to public health. Microbial contaminants (such as bacteria and viruses) are of special concern because they may cause immediate, or acute, reactions, such as vomiting or diarrhea. Long-term exposure to some contaminants (such as pesticides, minerals, and solvents) at levels above standards may cause gastrointestinal problems, skin irritations, cancer, reproductive and developmental problems, and other chronic health effects. Water as a source of modern biological hazards can be considered from several aspects.

A - Pollution of drinking water: More than one billion people do not have ready access to an adequate and safe water supply, and a variety of physical, chemical and biological agents render many water sources less than wholesome and healthy.

B - Pollution of water Bodies: Untreated sewage, industrial effluents and agricultural waste are frequently discharged into in land waterways, lake and coastal zones, endangering the health of those who use these water bodies for recreational purposes such as swimming, and windsurfing. Many micro-organisms and chemical substances can bio-accumulate in fish and shellfish which, if consumed, may be hazardous to human health. Recreational exposure to polluted waters can cause diarrhea, respiratory infections, skin irritation and other diseases, depending on the specific pollutants involved.

C - Aquatic ecological changes favoring vector increase: The aquatic environment provides an essential habitat for the mosquito vectors and intermediate snail hosts of parasites that cause human diseases. Accelerated development of water resources has led to habitat modification and ecological conditions that favor certain disease vectors. Of all insects, the mosquito represents the greatest environmental human health threat, and malaria is the most common and important vector- transmitted disease affected by the environment and affecting children's health.

III-4 - Food: ⁽¹³⁾

The increasing interdependency and complexity of our food supply mean that even the best control systems are becoming strained, however. Accordingly, food may pose a biological EHH in many different ways:

A - Food contaminated with pathogens and toxic chemicals:

Food can be a major route of exposure for many pathogens, pesticides and toxic chemicals. These contaminants may be introduced into food during cultivation, harvesting, processing, storage, transportation and final preparation. The epidemiology of food borne infections is changing, while the traditional pathogens remain a threat in poor areas, new pathogens have emerged and spread worldwide.

B - Food inadequately prepared or stored:

- a - Raw or incompletely cooked meat, poultry, fish, shellfish.
- b - Canned food (Botulism, staphylococcus, campylobacter).
- c - Inadequately stored food. Pantry pests (Moths) grow on dried food which if consumed may cause gastrointestinal manifestations.

C - Genetically modified food (GMF)

Genetic modification involves the isolation of single genes of a known function from one organism and transferring a copy of that gene to a new plant host to introduce a desirable character. The incentive for pursuing this area of biotechnology comes in four main categories: better health, better products, better environment, and better business. However, because genetic engineering allows the transfer of a gene from any source, such manipulations create safety and ethical concerns for the consumers of GMF. The potential health hazards of GMF are: ⁽¹⁴⁾

- a - Alteration of the nutritive value of the modified food.
- b - Modification of the allergenicity of certain food.
- c - Transfer of antibiotic resistant genes to the consumer; (copied from a pig).

Research did not confirm or exclude such potential health hazards. Moreover the long term consequences of GMF cannot yet be completely predicted, such as development of cancer or birth defects.

III-5 - Soil:

Exposure to hazards in soil can occur when children are forced in agricultural labor, when children play in schoolyards, or when dust from dry fields is blown into polluted areas. Additionally, deposition of biological, chemical or radioactive hazards on or in soil can lead to indirect exposures following use of contaminated groundwater for drinking-water, or consumption of food grown on contaminated soil. Pesticides in air are often invisible and odorless, but like secondhand cigarette smoke, inhaling even small amounts overtime can lead to serious health problem especially for children.

III-6 - Clinical Waste:

In many developing countries, disposal of clinical waste from hospitals and polyclinics is random and unsupervised. Disposal may be into public streets in residential areas. This poses a serious health hazard, not only on street children, but also on children playing around their schools or homes. The most serious diseases that can result from clinical waste are virus hepatitis (B or C), HIV infection, infections with hospital resistant bacterial strains.

III-7 - Child labor: ⁽¹⁵⁾

Child labor is the employment of children under 18 years of age. Illegal child labor is widespread and increasing in frequency worldwide. The driving forces responsible of child labor in the modern world are the increased child poverty, immigration, and deficient governmental supervision. Child labor carries significant health risks, which are magnified when employment is illegal or exploitative. Exposure to biological agents, and organic dusts occur in selected occupational environments in rural areas, farm labor is a major cause of morbidity and mortality among children.

In Egypt, child labor is estimated at 1.3 million representing 12% of children on the age group (6-14) years, and 7.6% of the total labor force. More than 40% of working children are aged less than 12 years and 46% of the total is females. Most children work in agriculture (78% of the total) and 50% are totally illiterate ⁽¹⁶⁾. In study conducted at Alex. – Egypt; it was found that 25% of the working children were obliged to work for economic reasons, and due to the dropping out of school. ⁽¹⁷⁾

III-8 - Medicinal preparations as environmental hazards:

Medicinal preparations from biological sources can be considered as EHH when children are undeliberately exposed to them owing to the unsupervised over use by caretakers or health workers. A large proportion of antibiotics are prepared from bacteria or fungi. Penicillin and other natural β -lactam antibiotics are a common example of antibiotics that are overused in many countries. The result is an increased risk of untoward effects. ⁽¹⁸⁾ Likely; children are a target of a large list of vaccines; can be a health hazard when their administration becomes more a parental initiative than a professional decision.

IV - Epidemiological Aspects and Public Health Impact

One should look at the environmental health problems from the view point of burden of death, burden of disease, and of disability expressed as the *disability-adjusted life years* (DALYs). The child proportions of DALYs are 48% for all diseases and around 90% for acute respiratory infections and diarrheal diseases.

Of the global burden of disease, a substantial proportion (up to one third) is caused by environmental risk factors, and 40% of this falls on children under five (who constitute 10% of the world's population). Over 5 millions children per year aged (0-14 yrs) old die from illnesses and others conditions caused by the environments causes. The two major killers of children under 5 years of age are categorized as biological environmental hazards. Acute respiratory infections, the largest killer of young children cause around 2 millions deaths each year. Diarrheal diseases are the second most common, and cause 1.3 million deaths / year. ⁽¹⁹⁾

IV-1 - Acute respiratory infections (ARI) & severe acute respiratory syndrome (SARS):

ARI include bacterial & viral infections of the respiratory tract. Around 2 millions children under 5 yrs die / year from ARI, the largest cause of childhood mortality ⁽¹⁹⁾. The SARS is now an emerging world wide health threat. This syndrome is an atypical pneumonia for which a cause has not been yet determined. Symptoms are high fever and respiratory, syndrome may be associated with headache, muscular stiffness, confusion, rash, and diarrhea. ⁽²⁰⁾

IV-2 - Acute diarrheal diseases: ^(11,19)

It has been estimated that up to 12% of all deaths in children under 4 years of age can be directly accounted for by repeated episodes of diarrheal diseases resulting in around 1,3 millions child death per year. Children affected by serious diarrheal diseases in countries of Mediterranean & Eastern North African (MENA) regions are likely to spend up to 20% of their first 2 years of life suffering from serious diarrhea, with a median number of 4,9 episodes per child per year. Emerging organisms as well as resistant bacteria causing diarrheal diseases constitute a global public health problem in their control. Food poisoning with a short incubation period is associated with preformed toxins of staphylococci. Invasive bacteria and enterotoxin-producing bacteria have longer incubation periods.

IV-3 - Vector-borne diseases: ⁽²¹⁾

During the past 20 years, at least 30 new diseases have emerged. Environmental changes and human activity interfering with the bio-environment have contributed in one way or another to the appearance of most if not all of these diseases. The most prevalent vector-borne diseases that are a serious threat to children's health are Malaria, with over a million deaths per year among children under 5 years of age; Filariasis, second in magnitude to malaria; schistosomiasis, with 2 hundred million people infected around the world; Leishmaniasis, with estimated 2 million cases every year 95% of them under 5 years old; and Dengue fever which kills over 10,000 children each year on the average.

IV-4 - Child Cancer and Chemicals

The increase in childhood brain tumors and cancers has been showing a statistical increase over the past 60 years. Researches agree this is not just attributable to improved diagnosis. Each year more than 16,000 children and adults in the U.S. are diagnosed with a brain tumor. The brain cancer figures below, from the American Cancer Society, show a disturbing trend in the number of cases being found per 100,000 populations:

Year	1940	1950	1960	1970	1980
No of Cases	1.95	2.90	3.70	4.10	4.51

These figures showing a steady increase are true for all industrialized countries, and therefore, strongly implicate chemicals used in modern society. The next question we need to ask is which

chemicals have been linked to the brain cancers? Identified risk factors for brain cancers now include workers exposed to chemicals used in vinyl and rubber production, as well as an increased risk for workers employed at oil refineries or chemical manufacturing plants.

Exposure to chemicals called nitrosamines, such as in cured meats and baby pacifiers, have also been implicated. The National Cancer Institute Pest Control Operators found they had twice the normal rate of brain cancer. Several studies showing household pesticide chlordane exposure increases risks for childhood brain cancer.

A study by University of Southern California (1987) found children exposed to home and lawn pesticide use had a 6.5 times increased risk of developing leukemia. Researches have stated that chlordane is a high risk chemical for brain cancer because it is a fat soluble compound and therefore has the potential to accumulate in the brain. (Journal CANCER)

One reason scientists are still extremely concerned about chlordane is the fact that although its use was stopped in the U.S. in 1988, chlordane is such an extremely persistent pesticide that it is still being detected in the air of homes today. In fact, tests of over 1000 homes performed by the U.S. Air Force and other agencies have found that approximately 75% of all homes built before 1988 show air contamination of the pesticide chlordane and that 6-7% are suspected of being over the maximum safe levels set by the National Academy of Sciences.

Next we need to look at the research explaining how and why pesticides can be increasing the risk of child cancers. The explanations now show that pesticides are able to cause at least two biological changes in the body that enable cancer to grow.

- First, pesticides have shown the ability to damage DNA and genetic structure.
- Second, pesticides are now being found to seriously weaken the human immune system.

Childhood cancer has become an important pediatric problem in several parts of the developing countries. Children younger than 15 years of age diagnosed to have cancers and admitted to Alexandria University Children's Hospital throughout 1991, showed that the types of childhood cancers encountered during the study were Leukemia (39.4%), CNS tumors (26.8%), Lymphoma (14.6%) of all cases. Children cancers were more in males than females (male/female ratio = 1.87/1). Most cases occurred between age one and ten years. The study revealed the following results, as the exposure to pesticides in the environment and to high voltage current increased the risk of childhood cancer. (22)

IV-5 - Surrounds Petrochemical Plant

An unusually high number of bone, bladder and brain cancers were found to be occurring among children living in a residential area near 3 petrochemical plants between 1981 and 1990. The children ranged in age from 0-19 years. Upon reviewing 28 death certificates of these three types of cancers, 27 of the children lived within 2-3 kms from the chemical plants. According to the pollution reports compiled by the Environmental Protection Agency of the Republic of China, nine serious air pollution events occurred in these chemical plant districts which released the chemicals vinyl chloride and acrylonitrile. Other chemical sources from the plants included polycyclic aromatic hydro-

carbons and well-water contamination with the chemical phenol which was found for over government safety guidelines. ⁽²³⁾

IV-6 - Children exposed to passive smoking:

A study was conducted in child health care centers in Sharkia Governorate-Egypt to elucidate the relationship between passive smoking and prevalence of respiratory illness among infants less than 5 years age children. The main results showed that a statistically significant increase in incidence of upper respiratory tract infections, lower respiratory tract infections (bronchitis / pneumonia and wheezy chest) among exposed children to household tobacco, when compared to those non exposed ($p < 0.01$), also the study revealed significant increase in prevalence of respiratory illness among exposed children for passive smoking in younger age group (up to 2 years), and among those exposed for higher quantity of tobacco smoke at home through either increase in number of smoked cigarettes or its equivalents per day or increase in number of smoking family members at their houses. ⁽²⁴⁾

The incidence of acute respiratory infections among the under 5 years age children decreased significantly with the increase of age of children and attributed this results to the immunity acquired due to reported acute respiratory infections. ⁽²⁵⁾

Acute respiratory infections in Egypt are now responsible for 30% of all infant deaths. About 80,000 cases of pneumonia were reported from 21 governorates in 1993. ARI (Acute Respiratory Infection) are the result of interaction between factors in the host, infective agent and the environment. A study was carried out in 3 main hospital of Alexandria – Egypt for a period of 12 months (1993). The risk factors showed significant association with occurrence of ARI presence of smoker in the house (O.R.= 4.4), location cooking area (O.R.= 3.8) and use of Kerosene stoves (O.R.= 8.9) ⁽²⁶⁾.

The inhalation of environmental tobacco smoke (ETS) is known as passive smoking. More than 4000 compounds have been identified in laboratory-based studies as components of mainstream smoke and at least 42 of these were classed as carcinogenic to laboratory animals, many of them known or suspected human carcinogens⁽²⁷⁾. Regardless of cause, low birth weight is associated with higher risks of mortality and morbidity in infancy and early childhood. But the risk of prenatal mortality for babies of smoking mothers has been reported to be 25-56% higher than babies of non smoking mothers for all birth-weight categories. ⁽²⁸⁾

Sudden infant death syndrome (SIDS) is defined as unexplained mortality occurring in the post-neonatal period (1-12 months). The association between maternal smoking and SIDS is firmly established: typically, there is approx a two-to-three fold increase in risk for prenatal smoking with a slightly smaller effect for postnatal smoking only. ⁽²⁹⁾

IV-7 - Lead Exposure, Health Status and scholastic Achievement:

Lead exposure among children is a serious health problem affecting virtually every system in their bodies, with implication of poor school performance. A cross sectional study was carried out on 250 primary school pupils aged from 8 to 10 years in region in Alexandria. The concentration, visual and hearing acuity and laboratory investigation of blood lead level of the pupils was carried out. Their final scholastic achievement at the end of the year was recorded. The results indicated that the mean blood level among the studied pupils was $17.36 \pm 10.67 \mu\text{g/dl}$. More than one third of the sample

(36.00%) was highly exposed to lead with blood level of 20 µg/dl and more. A significant negative correlation was found between blood lead level and the 50th percentile of weight for height ($r = -0.4488$), hemoglobin concentration ($r = -0.6133$) and IQ scores ($r = -0.8150$) of the pupils. While a significant positive correlation was observed with the functional visual and hearing loss ($r=0.1390$, and 0.2189 respectively). ⁽³⁰⁾

IV-8 - Stratospheric Ozone Depletion:

The stratospheric ozone layer is essential in absorbing UV radiation, in particular UVC and UVB. A 10% decrease in stratospheric ozone is projected to cause an additional 300,000 non-melanoma skin cancers and 4500 melanoma cases per year, worldwide (WHO,1994). ⁽³¹⁾ For each 1% decrease in stratospheric ozone, the average annual percent increases in the incidence of melanoma skin cancer range 3-5%. Children are more vulnerable to the adverse health effects, because of the long time period of exposure, and the length of time available for an adverse health effects to appear.

Children are in proportion more heavily exposed, per unit of body weight, to environmental toxins than adults. This is well recognized in radiation biology, where the risk of radiation-induced cancer is greater for children than for adults: It is 16 times greater for a 3-month old; eight times greater for one-year old; four times greater for a ten-years old.(ICRP, 1991). ⁽³²⁾

V - Control Measures

The prevention and control of the EHH are the responsibility of the health authorities, public health workers, epidemiologists, paramedical personnel, and lastly the pediatricians. The different approaches for control of biological EHH are targeted to the school children, parents, public leaders, health workers, health authorities, and pediatricians. ^(33,34)

Such approaches include health education, behavioral modifications, and improvement of housing, sanitation, prevention of exposure, reporting, and reinforcement of related laws.

VI - Recommendations

VI-1- To parents:

- Parents should improve their awareness about the health implications of the different environmental hazards.
- Parents should implement the necessary restriction on their children related to health protection from environmental hazards.
- Parents should help their children to understand and be involved in the avoidance of the different health hazards surrounding them.

VI-2 - To pediatricians:

- Pediatricians should be trained in issues of pediatric disaster management; and should report cases suspected to be due to a direct environmental hazards to health authorities.
- Pediatricians who serve as school physicians should act to disseminate information and implement restrictions on environmental pollutants in school.
- Pediatricians should be able to recognize sentinel cases of illness after a biological hazard especially with the appearance of unexplained illness clusters.

VI-3 - To public health workers:

- They should work in communities to provide a safe home environment especially free from allergenic sources.
- They should work in low social residence areas to provide healthy sanitary conditions regarding sewage disposal, waste disposal, and safe drinking water.
- They should assist in developing protocols for health care facilities for management of biological weapons disaster.

VI-4 - To governments; and international community:

- The governments must act more vigorously in the area of pollution prevention in terms of both technological requirements and public education.
- Regulatory agencies including ministry of environment affairs should act aggressively to implement the requirements of the Laws (air, water, and food).
- International aid programs, national health policies & community health agencies must address the environmental problems that contribute to childhood illness.
- Government agencies should ensure that adequate supplies of antibiotics, & vaccines are always available to children in case of mass exposure to biological hazards.

VII - REFERENCES

- 1) Chivian E, McCahly M, Hu H, Haines A, Eds. Critical condition: Human health and the environment. Cambridge, MA: MIT Press, 1993.
- 2) Anonymous. Health and environment in sustainable development. Five years after the Earth Summit: Executive summary. World Health Organization, Geneva, 1997.
- 3) Ryu, J. E. et al (1983), Dietary intake of lead and blood lead Concentration in early infancy. Am jr. Dis. Child, Vol. 137, pp.886.
- 4) World Health Organization.; International conference on environmental threats to the health of children. The Bangkok Statement. World Health Organization, Geneva, 2002.
- 5) Healthy Environments for Children Task Force. The Healthy Environments for Children Alliance (HECA). World Health Organization, Geneva, 2003.
- 6) Smith K et al. Indoor air pollution in developing countries and acute respiratory infections in children. Thorax 2000; 55: 518-532.
- 7) Halken S. Environmental causes of asthma in children. Pediatric Allergy Immunology 1994; 5 (suppl 1): 57-60.
- 8) US-EPA (1987), Asbestos Containing materials in schools EPA RPT, No.52, pp. 41826 – 903.
- 9) American Academy of Pediatrics. Ambient air pollution: respiratory hazards to children, American Association of Pediatrics News, 1993.
- 10) Committee on Environmental Health, American Academy of Pediatrics. Toxic effects of indoor Molds. Pediatrics 1998; 101 (4): 712-714.
- 11) World Health Organization. Urbanization and its implications for Child Health. Potential for action. World Health Organization, Geneva, 1988.
- 12) World Health Organization. International drinking water supply and sanitation decade; Mid-decade progress review. Unpublished WHO internal document, A139/1 1, 1985.
- 13) Anonymous ; Infectious Diseases and Immunization Committee. Bugs in our meal: food for thought. Canadian Pediatric and Child Health 2001; 6(4): 214-217.
- 14) Anonymous. Genetically modified foods. Commonly asked questions with answers. For use by health professionals. Ministry of Health, UK, August 1997.
- 15) Committee on Environmental Health, American Academy of Pediatrics. The hazards of child labor. Pediatrics 1995, 95(2); 311-313.
- 16) Hoda A B (1998), Child labor, A Review; CAPMAS labor force sample survey; Suez Canal University, Egypt.
- 17) Hidayet NM et al (1995) , Health and Child Labor Problems of Alex. Poor Urban Community Bult HIPH, Alex. University, 25(3):567-74.
- 18) Parfitt K. Martindale. The complete drug reference. 2nd Ed. Pharmaceutical press, World Color Book Services, Taunton, Massachusetts, USA, 1999.
- 19) World Health Organization. World Health Day 2003: Healthy environments for children. WHO Back grounder No3, April 2003, Geneva, 2003.
- 20) World Health Organization. 2002 Severe Acute Respiratory Syndrome Spreads World wide, WHO;. Press release. WHO/23, 15 March 2003, Geneva, 2003.
- 21) World Health Organization. Shape of future of life. Healthy Environment for children. WHO, Regional Office for the Eastern Mediterranean, WHO, EMRO, Cairo, 2003
- 22) Ashry Gad (1992), Epidemiological study of childhood cancer in Alex. Thesis for ph D, HIPH, Alex. University.
- 23) Wayne Sinclair; (1994), Brain Cancer Cluster Jr. Of Toxicology and Environmental Health, 43:117-129.

- 24) El Mosalmany A. et al, "Effect of passive smoking on respiratory illness among infants and under 5 yrs age children", Zagazig Univ.; Egypt; Med. Jr. Vol. VIII, 2002, No.1.
- 25) Khafagi M.A et al, Acute respiratory infections among children under 5 years age, Egyptian Jr. of community medicine, Vol. 15, 1997, No. 1.
- 26) Hakim, A. K., 1995, A Study of Some Risk Factors of Lower Respiratory Tract Infection in the First Two Years. Thesis of MS Deg, HIPH Alex. University.
- 27) NRC, 1986, Environmental tobacco smoke measuring exposures and assessing health effects, Washington DC, National Academy Press.
- 28) Gidding S. S et al, 1994. Active and Passive tobacco-exposure: A serious pediatric health problem Circulation, Vol. 90, PP. 2581-90.
- 29) Anderson, H.R. and Cook D.G., 1997, Health effects of passive smoking and sudden infant death syndrome: Review of epidemiology evidence, Thorax, Vol.53, PP.1003-9.
- 30) Nahed M. Kamel, et al (2003), Lead Exposure, Health Status and scholastic Achievement of school pupils, Jr. Egyptian Pub.Hlth.A., Vol. LXXVIII; N. 1, 2.
- 31) WHO 1994, Ultraviolet Radiation Env. Health Criteria, WHO Geneva, 1994, No. 160.
- 32) ICRP, International Commission on Radiological Protection Publications, Pergamon press, Oxford, 1991.
- 33) Carlson JE. Children's environment health: Research, Practice, Prevention, and policy. Environment Health Perspectives 1998; 106 (suppl 3): 322-334.
- 34) Schneider D, Freeman N. Children's Environmental Health: Reducing risk in a dangerous world. Washington, DC: American Public Health Association, 2000.

Death walks around while children play: Childhood, environment, health

Children meet on the banks of endless worlds...

Death walks around while children play

Children meet on the banks of endless worlds...

(Rabindranath Tagore)

Stefano Beccastrini

Introduction

Ottawa Chart (OMS 1986) defines environment protection as one of the most important strategies to promote health. Environmental decay represents, indeed, one of the major extra-sanitary motives of human health. This concept is generally true, but perfectly fits those people – children for instance – who are at risk and sensitive to environmental pollution and its effects on health.

For this reason in 2002 UNGASS (ONU special department for childhood) issued a document titled *Creating a World fit for Children*. A world fit for children is a world for anybody. A world unfit for children is a world for no one. Therefore, we may say that children health is a quite reliable indicator of the global quality of our society.

As regards this matter the European OMS department and the European Environmental Agency (EEA) have recently published the book “Children health and environment: a review of knowledge”. It is a fundamental book since focuses on the connections among the multiple aspects of environmental decay and children health and puts in evidence what we know about this major problem. Our knowledge is not so wide. It is full of uncertainty, need to be thoroughly considered and deeply examined. Nonetheless, its peculiarity frightens us and force us to a preventive action whose main characteristics may only be integration, co-operation among disciplines and fields.

In Tuscany we were so impressed by this book to feel obliged not only in translating it in Italian, under OMS and EEA authorisation, but also, relatively to that integrated co-operation project we have developed in our Region among health promoters and environmental protection operators, in creating – beginning from the book itself and its subject - a wider project of research-action on the theme of children health and its connection with environmental pollution.

Contents

The value of this book induced ARPAT (Tuscany Regional Agency for Environment Protection) in co-operation with the Italian department of the International Society of Doctors for Environment (ISDE) to translate it in Italian and publish its content, since anybody may avail of it.

The book, with its cultural value, is divided in four parts:

- I the first one (drawn up by Giorgio Tamburlini, an Italian paediatrician and an OMS adviser) has a general tone and deals with two subjects: children being particularly affected by environmental risk and the determination of the risks in specific areas and environmental patterns;
- II the second chapter (drafted by several European specialists) is about the effects on health due to multiple factors related with the environment. It deals with asthma and other allergies caused by

air pollution, neuro-evolutive disturbs related to chemical contamination, cancer of environmental origin, congenital malformations, gastrointestinal diseases determined by water, illnesses caused by food, traumas and accidents (connected with labour, home and roads);

III the third one (drawn up by several European authors too) is devoted to the environmental exposure connected with various effects on health and deals with passive smoking, pesticides, ultraviolet rays, electromagnetic fields;

IV and then, the fourth section (drafted by several specialists and, mainly, by the Italian Giorgio Tamburlini) deals with principles, methods and policies referred to actions based on environmental justice, social participation, interaction among sanitary institutions, environmental organisations, schools, town, road and traffic planning, economy and labour. Their aims should be the protection of our children health from the risks generated by the environment.

Aims

As we said before a world unable to safeguard the health of its younger sons and daughters is historically due to fail.

Protecting children health - mainly creating a healthy and bearable environment for them and their families – not only is in itself an absolutely primary value, but represents a significant indicator of the quality of life for the whole human beings.

Where children suffer and die (because of illnesses caused by environmental decay, wars and violence as well as by lack of protection – that is educational too), there the whole World suffers and dies because of cultural poverty, social inadequacy and political incapacity.

ARPAT and ISDE, in co-operating to the book translation and its publishing, engaged themselves in the creation of a “research programme” on children health and its connections with the environment, whose aim is promoting an “integrated health project” on a regional base. This project, involving other institutional bodies as ARS (the Regional Health Agency in Tuscany), CSPO (the Regional Scientific Institute for Cancer Prevention) and Mayer (the children hospital in Florence), should :

- a. Unify the methods to collect information about this subject;
- b. Monitor the situation by means of suitable uniform indicators;
- c. Investigate on environmental epidemiology in specific and defined geographical areas;
- d. Promote education in schools and among adult people...

...And so on.

The International Conference on children health and its connections with environment that will take place in Budapest next June 2004 will be the meeting place: we will be there to illustrate the Tuscan project of integration between environment and health in favour of children.

The integrated actions

After having taken part to the translation and publishing of the book drawn up by OMS and EEA, we have realised how the environmental protection for children health represents a typical ground for integration among operators belonging to different institutions, agencies and associations. Since it involves ecological, epidemiological, paediatric, social and political competences.

There is no absolute expert in “children protection” since there is no absolute expert in “life protec-

tion". It is an universal responsibility that involves society and institutions. It is a competence common to all scholars, both to doctors and politicians, environmental protection operators and educators...

For this reason, in Tuscany, children health and its connections with environment and its decay rose our enthusiasm: not only because of its intrinsic value but for its characteristic of being a "ground for integration" among organisations, scientific disciplines, power makers and political programmes, that because of their differences are very often more or less unable (or willing) to discuss, interact, co-operate.

Following up to:

- a. Ottawa Chart (OMS, 1986) that, being devoted to "Health Promotion", ratified the concept of "socio-ecological paradigm" of health itself, focusing on extra-sanitary motives, which include environment at first level;
- b. UE opinions (see for example the strategic Document on Environment-Health integration issued on June 2003);
- c. In Italy, Act no.7 quinquies of Law 299/99 that rules the reorganisation of National Health Service;
- d. And in Tuscany, our last Regional sanitary Programme 2002-2004 that stresses on the importance of co-operation among operators of environment protection and health promoters; we, in Tuscany indeed, are aware that only sharing (i.e. integrating) our competencies, knowledge, intersectorial and interdisciplinary abilities we should be able to give answers to the problems of quality of life (that is to say an healthy and bearable progress) for our citizens and, obviously, starting from those young, future citizens who are our children.

Summary

Giorgio Tamburlini, the often mentioned OMS advisors and author of several chapters of the book whose translation in Italian and publishing has represented the starting –point of the project we tried here to illustrate, has written: *"Children are the main subject for a bearable progress: the analysis of their actual conditions and of the most likely scenarios of their future represent a valid help to try to give an answer to the questions about bearable progress..."*.

In Tuscany, we intend to take these quotations seriously and, consequently, behave coherently.

ENDOCRINE DISRUPTING CHEMICALS IN FOOD AND INDOOR ENVIRONMENT: AN EMERGING RISK FOR CHILDREN

Francesca Maranghi, Alberto
Mantovani

Istituto Superiore di Sanità
Rome - Italy



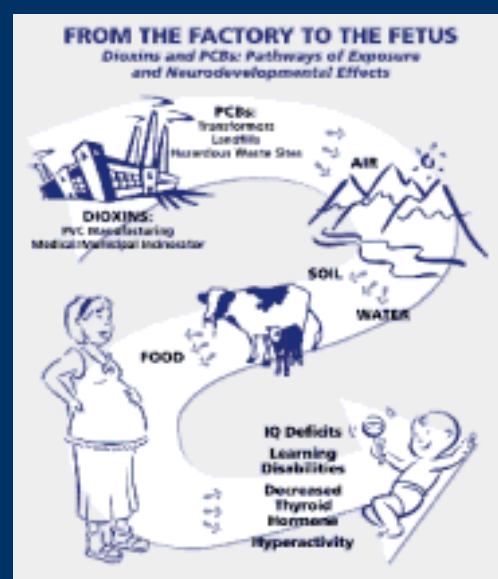
- Growing attention to **children** at national and international level
- In term of **health risks** deriving from environmental – food exposure to xenobiotics

What EDCs are?

- EDCs are a *heterogeneous* group of substances which can interfere with the function(s) of the endocrine system through diverse mechanisms (receptor-mediated, enzyme inhibition, etc.).

Persistent Organic Pollutants (POPs)

- PCBs: homeostasis of steroids and thyroid
- Dioxins, PCBs "dioxin-like": agonists of Ah receptor
- DDT and derivatives: agonists ER and/or antagonists AR



Pesticides - biocides

- Organochlorines (e.g. Lindane): homeostasis sex steroids
- Triazoles, Imidazoles (fungicides): inhibition of steroid synthesis
- Vinclozolin, Procymidone, Linuron (agrochemicals): antiandrogens
- Triazines (herbicides): HHG axis
- Ethylene bisdithiocarbammates: thyreostatics

Industrial compounds and cosmetics

- BPA (plastic manufactures): estrogen agonist
- Phthalates (plasticizers, deodorants, toys, cosmetics): antiandrogens
- PBDE (flame retardants): thyreostatics
- Organotins (preservatives): aromatase inhibition
- Parabens (cosmetics): estrogen agonists



Other compounds...

- Phytoestrogens (genistein): estrogen agonists
- Mycotoxins (food contaminants), e.g. zearalenone: strong estrogen agonist
- Anabolics for farm animals: banned in EU
- Heavy metals (Pb, Cd)

Major human disorders expected from EDCs

- Effects on children health: puberty onset, cognitive development, growth
- Long term effects from early exposure on immune/endocrine/reproductive systems through different mechanisms

Children are not small adults

VULNERABILITY

- They eat, drink, breathe more than adults
- Specific food
- Different diet
- Habits and Behaviour (contact with soil, hand-to-mouth, toddlers...)

Children are not small adults (II)

SUSCEPTIBILITY

- Development of target systems
- Pharmacokinetics
- Physiology and metabolism

Different biological phases

Different effects

Ways of exposure

- Food
- Indoor environment (air – dust)
- Which substances?
- Problems

Food exposure

- POPs food with high fat content (**milk and dairy products**, big fishes, pork products)
- Pesticides/biocides treatment of food, gardening and/or domestic use, animal care, contaminated foods
- Other compounds present in foods as additives or contaminants (e.g., phthalates, PBDE)

Breastfeeding

- ✚ Xenobiotics (POPs, PBDE, etc.) can bioaccumulate in human milk
- ✚ Prenatal exposure may be more effective than postnatal exposure (lower organ development)
- ✚ Protective effect of breastfeeding on cognitive development
- ✚ Specific instances of high contaminated areas

Indoor environment

- ✚ Air (well characterized)
Chemical, physical, microbiological contaminants
- ✚ House dust
complex heterogeneous mixtures of biological components, particulate matter derived from outdoor and residues from indoor activities

exposure to house dust

- Oral, dermal, inhalation
- Children habits (toddlers, hand-to-mouth) - increased intake of contaminants than adults

Components of house dust relevant for long-term effects

- POPs
- Agrochemicals
- PBDE
- Biocides
- Industrial products (phthalates, BPA, etc.)
- Heavy metals (lead, cadmium)

Strategies of prevention/control

- Identify contaminants and hazards
- Develop epidemiological models for long-term effects of early exposures
- Limit/reduce exposure

Research needs

- Reference values and biomarkers
- Life styles, cultural and social factors affecting exposure and vulnerability
- Focus on
 - low doses
 - mixtures

Holistic approach to prevention

Web site: <http://www.endodisru.iss.it/>
<http://www.iss.it/sitp/dist/>

È Francesca Maranghi
Istituto Superiore di
Sanità Rome Italy
Tel. +39 06 49902529
E-mail maranghi@iss.it

È Alberto Mantovani
Istituto Superiore di
Sanità Rome Italy
Tel. +39 06 49902565
E-mail alberto@iss.it



ENVIRONMENTAL RISKS AND THE HEALTH OF CHILDREN

Irene Figà-Talamanca*

In collaboration with:

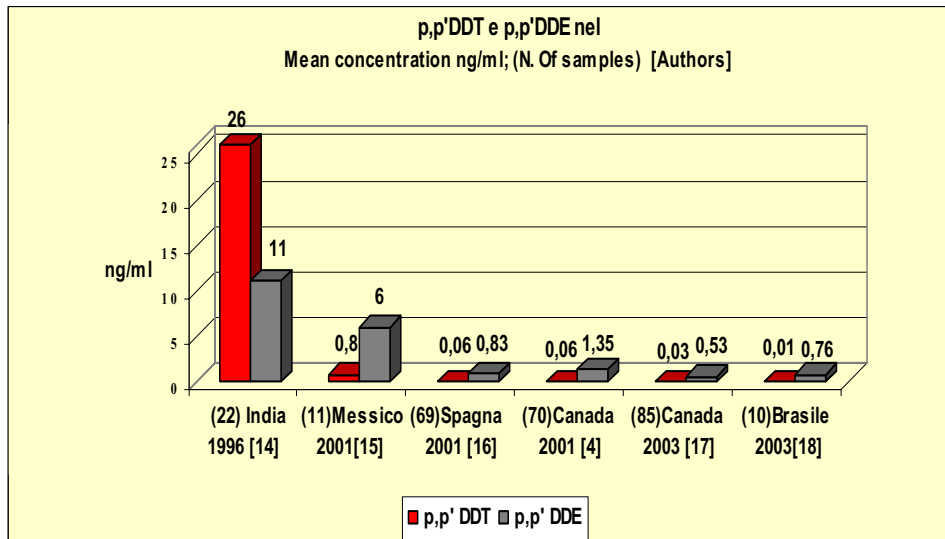
Calamandrei G.-Davanzo F.-Faraoni L.-Forastiere F.-Giordano F.-Giustini M.-
Magnani C.-Pitidis A.-Scattoni ML.-Settimi L.-Taggi F.-Traina E.-Urbani E.

**Dipartimento di Biologia Animale e dell'Uomo – Università degli Studi di Roma “La Sapienza”*

Exposure of children to Environmental Pollution

- Ù Initial Observations: Teratogenic drugs (1960 - 70)
- Ù Followed by studies on Lead (1970 - 80)
- Ù “Normal Pollutants”, Air Pollution, Pesticides,
Tobacco (1980 - on)

Fig.1 Some persistent Pesticides measured in the blood or in the umbelical cord in selected countries



Effect of environmental exposures on the health of children

1. Congenital Defects
2. Respiratory Diseases and Allergies
3. Childhood Cancer
4. Effects on the Nervous System

In Italy each year about
7500 children
are born with some
Congenital Defect

**Known or suspected
environmental cause
of Congenital Defects**

- ↳ Ionizing Radiation
- ↳ Non Ionizing Radiation
- ↳ Waste Disposal Site
- ↳ Pesticides and other Agricultural Chemicals
- ↳ Air Pollution including Passive Smoking

Table 1. Environmental Risks associated with congenital defects

ENVIRONMENTAL RISK	CONGENITAL DEFECTS FOUND BY SOME STUDIES
Ionising Radiation (Doses over 50 RAD during gestational week 8 to 25) Non Ionising Radiation	Damage to the CNS Increased cancer risk Increased risk for fetal death Suspected teratogenic and cancerogenic effect
Noise	Possible negative effect on the hearing apparatus
Residing near waste disposal sites	Increased risk for neural tube and cardiac defects
Pesticides	Increased risk for fetal death and some urinogenital defects
Air pollution	Increased risk for low birth weight, foetal death Increased risk for hare-lip, cleft-palate and skeletal anomalies Cardiac and CNS defects
Occupational exposures of parents	Increased risk for foetal death from exposures to solvents, pesticides, metals, anaesthetic gases, antineoplastic drugs Increased risk for congenital defects (ex. neural tube defects related to lead, cleft-palate related to exposure to pesticides-and solvents)

Outdoor and indoor Air Pollutants associated with Respiratory Disease in children

- ↳ SO₂
- ↳ NO_x
- ↳ CO
- ↳ Lead
- ↳ Volatile organic compounds
- ↳ Aromatic Polycyclic Hydrocarbons
- ↳ Suspended Particles

50%
of Italian children
are
Passive Smokers

Respiratory Health Effects

- V** Minor symptoms (cough, irritation)
- V** Reduced Respiratory Capacity
- V** Bronchial Asthma
- V** Increased risks of Respiratory Infections

Bronchial Astma:
a European collaborative study
found that
7% to 10%
of children suffer from asthma

The most common childhood
cancers:

- ↳ Leukaemia
- ↳ Cancer of the Central Nervous System
(neuroblastoma)
- ↳ Lymphomas
- ↳ Bone Cancer

The prevalence of some childhood cancers is increasing:

V Acute Lymphatic Leukaemia

V Cancers of the Central Nervous System

V Testicular cancer

Table 3. Variations in incidence of childhood leukaemia (all) in studies published since 1990 (percent increase).

			Leukaemia	ALL	AnLL
Draper et al, 1994	UK	1953-91	+0.5 to +1.0* in ages<5,	0.0 to+1.2* con variable by age	tra -2.6 e +0.3 con variazione per età
Blair e Birch, 1994	Manchester	1954-88	-	+0.7*	-0.4
Dockerty et al, 1996	New Zealand	1953-90	+0.8	+2.2	-3.8
Gurney et al, 1996	USA (SEER)	1974-81	+0.9*	+1.6*	+0.6
Bunin et al, 1996	USA (Delaware)	1970-89	+0.2	+0.2	+0.8
Parkin et al, 1996	Europe	1980-91	+0.6	-	-
Mc Nally	UK	1980-98	-	+ 3%*, limiteda toalle ALLpre-B type in chidren between 1 and -4years	+2%
Feltbower	UK	1980-97	-	1.4% onlyALL in ag 1-4 (2.4% in pre-B ALL) e	+3.4%*
Magnani et al.	Italy (Piemonte)	1980-98	+1,3 %	+ 2,6% * in age1-4 (pre-B-ALL + 4.4%*) nel 1980-98	+ 1,6

- not available

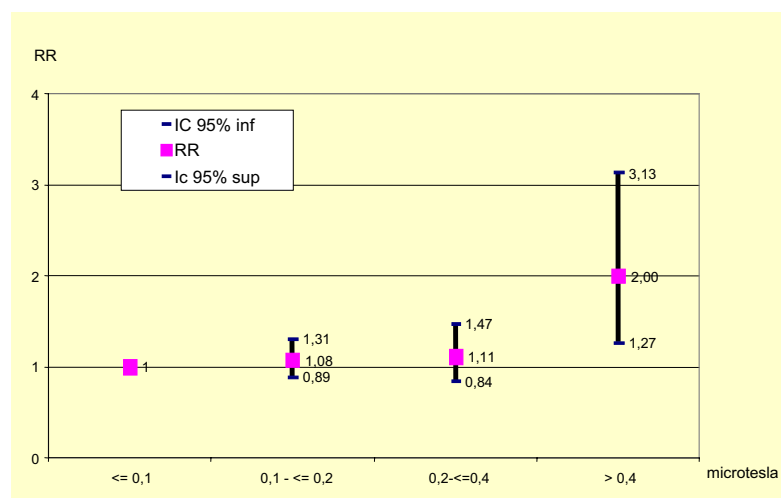
* p < 0.05

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Known or suspected Environmental Agents contributing to childhood cancer

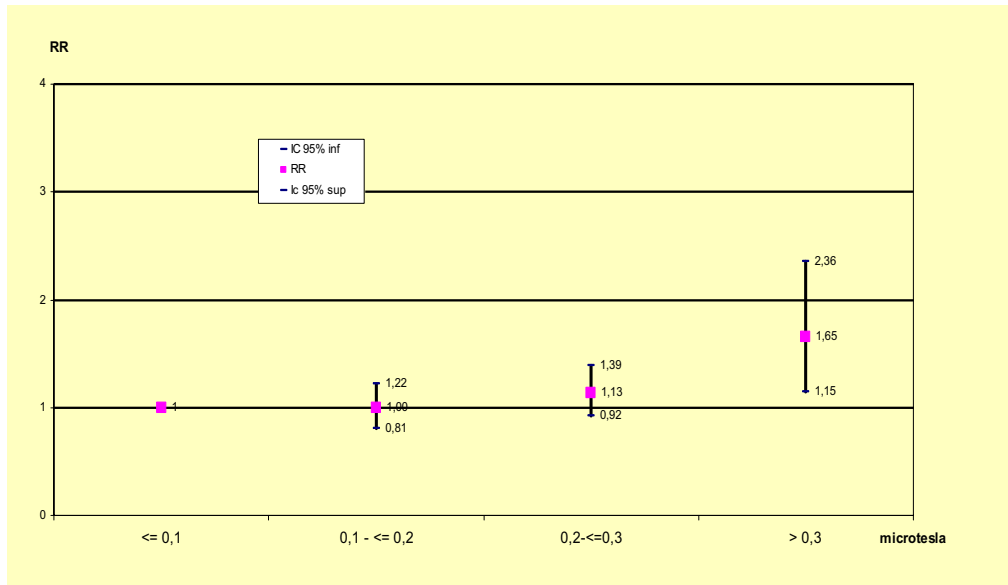
- V Infective Agents (B+C Hepatitis virus, Epstein-Bar virus)
- V Exposure to Benzene
- V Urban Air Pollution
- V Ionizing Radiation
- V Electromagnetic Field Wave (?)

Fig. 2 Risk of Childhood Leukaemia and Exposure to Electromagnetic Field Waves According to the Metanalysis of Ahlbom et al. 2000



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Fig 3. Risk of childhood leukaemia and EFWs according to the metanalysis of Greenland et al. 2000



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Environmental Risks affecting children's Nervous System

↳ Lead

↳ Polichlorurated Bi-phenyls (PCBs)

↳ Pesticides

Accidental exposures of children to Environmental Risks

1. Accidental Intoxications

2. Household Accidents

3. Traffic accidents

Table 4. Frequent causes of accidental intoxication in children

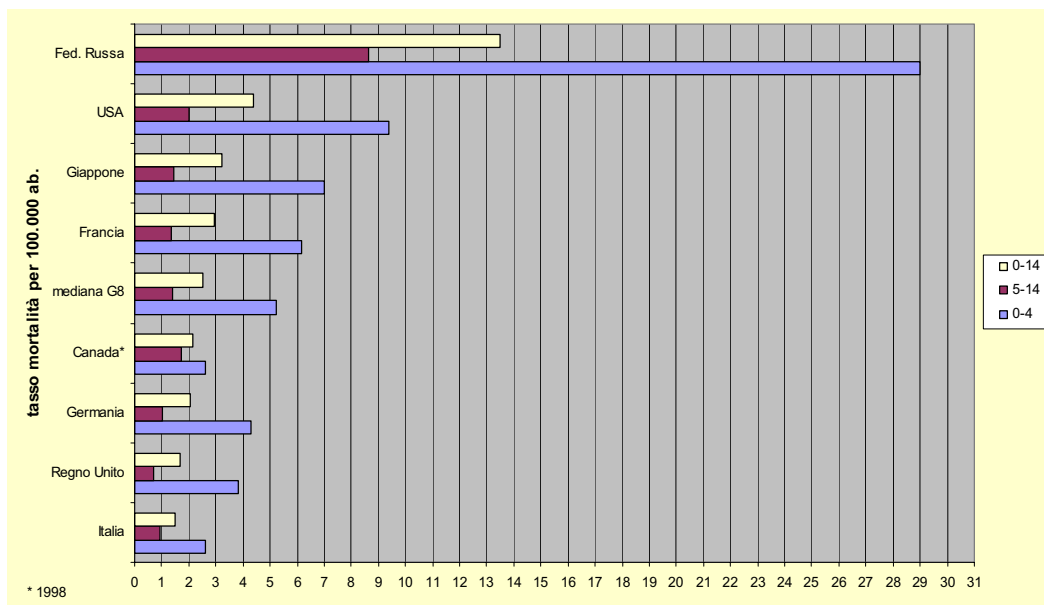
Country (period)	Type and number of population involved (age)	Causative Agents					
		Drugs	Household cleaning products	Cosmetics	Pesticides	Hydrocarb	Tobacco
		(%)	(%)	(%)	(%)	(%)	(%)
United States ¹³ (2001)	64 (APC) Anti-poisoning Centers 1.169.478 (<6)	39,8	10,5	13,2	4,0	1,9	ns
Italy ¹⁸ (1995-1999)	APCs Milano 49.532 (0-14)	32,1	29,3 ^x	3,6	6,8	ns	ns
Caraibi ¹⁹ (1989-1999)	Hospital Admissions 255 (<13)	26,0	ns	ns	ns	24,0 ^{xx}	ns
New Zealand ⁶ (1993-1997)	APCS 11.278 (ns)	36,0	36,0 ^x	8,0	5,0	ns	ns
Australia ⁸ (1987-1995)	Hospital Admissions 5.324 (<5)	60,0	ns	ns	ns	ns	ns

Prepared by Settimi L. Davanzo F. and Faraoni L.2003

**In the G8 countries, about
7800 children
die each year from
accidents in the home .**

**Pratically no data are available
from LDCs**

Fig. 4 Mortality from Household Accidents in children in selected countries 1999



Source: ISS.(Prepared by Taggi, Pitidis and Giustini,2003)

Traffic accidents: multiple and non concordant sources of data.

Ex. In Italy 1999

Total deaths reported by the health system:

7829

Total deaths reported by the road accident reports:

6633

Percent of deaths due to Road Accidents: (Italy 1999)

↳ All ages ➡ 1.4 %

↳ 0 – 14 ➡ 6.0 %

↳ 10 – 14 ➡ 10 %

From 1973 to 2003 a total of **19000** Italian children died in Road Accidents

Hospital Admissions of children

0 – 14 for Road Accidents:

80000

Table 5. Types of trauma caused by Road Accidents among children

LESIONS	AGE			
	0	1-4 years	5-14 years	0-14 years
Cranial fracture	7,4	3,5	4,4	4,4
Other fractures	7,9	17,3	32,6	30,1
Distortions	2,3	0,8	4,3	3,8
Intracranial trauma	36,6	29,6	25,1	26,0
Thoracic and abdominal trauma	1,9	2,8	2,7	2,7
Wounds	1,9	4,4	3,5	3,6
Superficial trauma	4,2	5,5	2,5	2,9
Scratches etc.	22,2	22,8	15,6	16,6
Other	15,7	13,4	9,4	10,1

Source: ISS elaborations of data from Ministero della Salute

Prepared by Taggi, Giustini and Pitidis 2003

**A study in Athens showed that
“66%
of all serious automobile
lesions in children could be
avoided by appropriate
Restraining Devices”**

Source:Petridou et al. 1998

Conclusions

1°

At present, the scientific knowledge on how environmental factors (physical and chemical) effect the health of children during childhood and in their future adult life is still only inadequate.

2°

Known or strongly suspected risk factors (ex. passive smoking, air pollution, pesticides, food contaminants, EFWs), are viewed by legislators and by the public without due attention to the particular susceptibility of children.

3°

The lack of reliable and comparable data on the environment -related diseases and disabilities affecting children is the first obstacle to evaluating the dimension of the problems and in planning prevention interventions.

E7

WORKSHOP VII

4°

The generation, compilation and dissemination of such data by an organization specifically concerned with children's health and safety and the environment is a future priority in international public health.

Intervention with children affected by the Molise earthquake of October 2002: first data from the “community reactivation program”

Giampaolo Nicolais, University “La Sapienza”, Rome, Italy; “Tetto Azzurro”, Rome

Ernesto Caffo, President of Telefono Azzurro; Professor of Neuropsychiatry, University of Modena and Reggio Emilia, Italy

Barbara Forresi, University of Modena and Reggio Emilia, Italy

The Community Reactivation Program after the earthquake in Molise

BACKGROUND

- October 31st, 2002
- Province of Campobasso (S. Giuliano di Puglia-Colletorto-Bonefro)
- 29 people died
 - school collapsed
 - 26 school children in S. Giuliano di Puglia (1st elementary school class under the collapsed school building)
- Telefono Azzurro provided support in the immediate aftermath

The Community Reactivation Program after the earthquake in Molise

THE INTERVENTION - 1

*Telefono Azzurro and The D. Cohen & I. Harris Center for Trauma and
Disaster Intervention (Tel Aviv)*

Main goals of the intervention

- reactivation of the "traumatised community"
- enhancing learning and meta-adaptive attitudes within the social system
- promoting adaptive re-definition of roles and institutions in response to changes in vital parameters

The Community Reactivation Program after the earthquake in Molise

THE INTERVENTION – 2

First phase

- post-school activities (December 2002 – ongoing)
- school intervention / "the Class Activation Program"
(March – June 2003)

Second phase

- group psychotherapy with PTSD expected school children after CAP (to be done after data analysis)
- urban planning (ongoing)

The Class Activation Program

Rationale

- data on interventions in the area of mental health after disasters support intervention effectiveness
 - Chemtob et al., 2002; Galante, Foa, 1986; Goenjian et al., 1997; Saltzman et al., 2003; Wolmer, 2001
- postdisaster support at school reduces PTSD rates
 - Udwin et al., 2000
- empowerment of teachers with professionals providing supervision
 - Laor, Wolmer, 2002

The Class Activation Program

Goals

- psychological relief of children
- contrasting "avoidance as the core of the posttraumatic response" (Pfefferbaum et al., 1999)
- prevent/reduce expected high psychopathology and PTSD rates in children after the earthquake (Pynoos et al., 1988; Pynoos et al., 1993; Vernberg et al., 1996; Wolmer et al., 2001)
- address normal reactions to stress

The Class Activation Program

Methodology

- Cognitive-behavioral framework
- Teacher-mediated intervention (*"from teacher to educator"*)
- Protocol-based intervention
- Eight 2-hour meetings focused on:
 - restructuring traumatic experiences
 - dealing with intrusive thoughts
 - controlling body sensations
 - confronting posttraumatic thoughts, dreams, etc.
 - coping with loss, guilt, death, anger
 - planning for the future

The assessment of the Class Activation Program

Research-Intervention design

T1 (March, April 2003)

- Training
- Introductory meeting (supervisors, parents, teachers)
- First assessment of children, teachers and parents on
 - PTSD symptoms
 - Traumatic dissociation and grief and stress response
 - Children developmental risk factors
 - Children school curricula/behavior (prior to earthq.)

The assessment of the Class Activation Program

Research-Intervention design

CAP class activities (April and May, 2003)

- 8-week program
- Weekly 2-hour meetings

T2 (June 2003)

- Final feedback meeting (supervisors and teachers)
- Final assessment of children, teachers and parents on
 - PTSD symptoms
 - Traumatic dissociation, grief and stress response
 - Children school performance

Context of intervention

S. Giuliano 1160 inhabitants; 460 families, all displaced in 3 temporary shelters after the earthquake;
29 dead (all 1st grade pupils died due to the school collapse);
50 other students were hurt and/or caught under the rubble

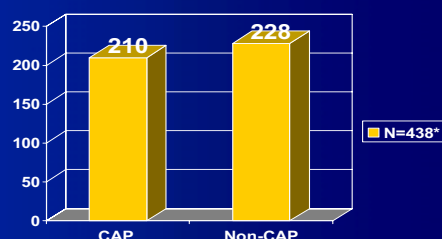
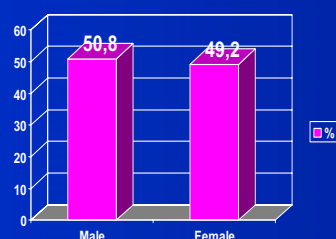
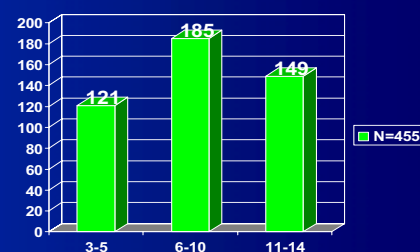
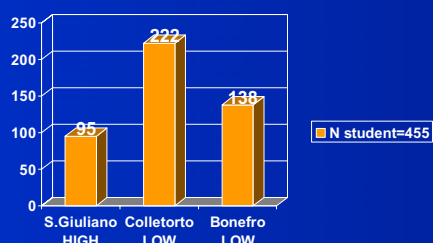
Colletorto 2480 inhabitants, 1100 families (130 relocated in a temporary shelter after the earthquake)

Bonefro 1880 inhabitants, 800 families (250 relocated in a temporary shelter after the earthquake)

S.Giuliano
HIGH EXPOSURE

Colletorto and Bonefro
LOW EXPOSURE

Subjects – S.Giuliano, Colletorto, Bonefro



* One Colletorto preschool class did not join the research intervention (N=17)

Instruments

Risk Factors Checklist (Cohen-Harris Center, 1998)

PCASS - Preschool Children's Response to Stress Inventory (Mayes & Cohen, 1990)

Child PTSD Reaction Index (Pynoos et al., 1991)

Children School Performance Teachers' Report (Cohen-Harris Center, 1998)

DTS - Davidson Trauma Scale (Davidson et al., 1999)

TDGS – Traumatic Dissociation and Grief Scale (Laor et al., 2002)

	Risk factors checklist	PCASS	Child PTSD	Teachers' assess.	Davidson DTS	TDGS
3-5	X*	X		X		
6-14			X	X		X
Parents					X	X
Teachers					X	X

* Only T1 administered

Baseline data –preschoolers

High vs Low exposure

PCASS	PCASS dimensions							
	Separ.	Mood changes	Fears	Anxiety	Physiol. changes	Regress.	Coping	Tension level
S.Giuliano		N=13; X=1.79		N=13; X=1,72				N=15; X1,70
Vs		(Mann-Whitney 66.5) p=.001		(Mann-Whitney 61.5) p=.001				(Mann-Whitney 88) p=.001
Colletorto		N=25; x=1,18		N=25; X=1,16				N=25; X=1,14

Baseline data - elementary school

High vs low exposure

Child PTSD	S. Giuliano	Colletorto
PTSD "Severe" + "Very Severe"	46.2%	19%

TDGS	TDGS dimensions			
	Irritability	Perceptual distortions	Guilt and anhedonia	Body-self distortions
S. Giuliano	N=22; X= 1,70	N=21; X=1,55	N=21; X=1,46	
Vs	(Mann-Whitney 452) p=.005	(Mann-Whitney 347.5) p=.000	(Mann-Whitney 444) p=.007	
Colletorto	N=68; X=1,31	N=68; X=1,08	N=68; X=1,22	

Teachers' Assessment

Presc. + Elementary	CAP	Non-CAP
General Performance Index (Mann-Whitney 1322) P=.000	N=122 X=3.23	N=48 X=2.69
	GPI before CAP	GPI after CAP
Preschool (N=54) No s.d.	X=3.05	X=3.03
	GPI before CAP	GPI after CAP
Elementary N=51 Wilcoxon(Z=-4,213) p=.000	X=3.04	X=3.42

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WORKSHOP VII

Teachers' feedback on CAP

BEFORE CAP	AFTER CAP
Absenteism	More children at school during CAP days
Lack of attention	Increased attention
Inappropriate behaviour in the classroom	Appropriate and targeted behaviour during CAP sessions
Lack of cooperative learning	Cooperative learning during CAP sessions
Relational inhibition	Adequate relational patterns w/ schoolmates, teachers, parents
Lack of emotional expression	Emotionally relevant expressions
Lack of narratives on the event	Meaningful narratives on the event
Lack of vision for the future	Rich expression of planning for the future in the last CAP session
PTSD-like responses to environmental stimuli (i.e. loud noise)	Development of a sense of mastery on those stimuli
Absence of a sense of protection and safety	The class as a place of protection and safety



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WWW.ISDE.ORG



via della Fioraia 17 52100 Arezzo

tel. 0575-22256 E-mail: isde@ats.it

Presidente dott. Roberto Romizi



Ambiente e salute



- Le malattie legate all'ambiente e ad un errato stile di vita sono responsabili del 75% di tutte le cause di morte
- 43% di queste patologie colpisce i bambini sotto i 5 anni



LIVELLI DI INTERVENTO DEL MEDICO PER L'AMBIENTE



il medico come informatore/educatore
 il medico come esempio di comportamento
 i medici come ricercatori
 il medico come partecipante e/o promotore di interventi o
 sessioni dedicate a fattori di rischio ambiente-correlati
 all'interno di Congressi organizzati da Società
 Scientifiche o di iniziative culturali
 il medico come promotore di iniziative volte a stimolare i
politici e le istituzioni



Modello Integrato per la Salute, l'Ambiente e la Sostenibilità - MISAS



Integrazione interistituzionale e intersettoriale dei livelli di intervento territoriali





Le attività

1990

- Progetto Città Sane dell'OMS
- La Scuola per una Città Sana e Sostenibile
- Coinvolgimento dei Medici di Medicina Generale
- Inquinamento Atmosferico e Salute
- Cooperazione Internazionale
- Campagna per il Diritto del Bambino a non essere Inquinato
- Mortalità evitabile nelle Città

2003



Associazione Medici per l'Ambiente - ISDE Italia

- Si è costituita con l'obiettivo prioritario di integrare le politiche di promozione della salute con quelle della sostenibilità ambientale.
- L'Associazione "Medici per l'Ambiente" è di fatto operativa su tutti i livelli di intervento prevedibili in un Modello Integrato Sistemico:
- è costituita prevalentemente da medici di medicina generale ma anche da pediatri, epidemiologi, specialisti in tutte le branche, altri operatori nei settori della salute e dell'ambiente e chiunque ne condivida scopi e strategie;
- è diffusa in tutto il territorio nazionale con sezioni costituite a livello comunale, provinciale, e regionale;
- ha promosso nel 1990 la costituzione dell'Associazione Internazionale dei Medici per l'Ambiente (ISDE);
- ha ufficialmente partecipato al Congresso ONU di Rio de Janeiro del 1992 su "Ambiente e Sviluppo";
- è formalmente riconosciuta dall'Organizzazione Mondiale della Sanità e dal GEF (organismo promosso dall'ONU e finanziato dalla Banca Mondiale);
- ha attivato una serie di iniziative formative, informative e di ricerca epidemiologica.
-

Se gli uomini sono responsabili per l'ambiente, i medici lo sono due volte



**Associazione Medici per l'Ambiente
ISDE Italia**



**Affiliata all'ISDE – International Society of Doctors for the
Environment - www.isde.org**

***Tutti gli uomini sono responsabili
dell'Ambiente.***

I Medici lo sono due volte.

**Via della Fioraia, 17/19 - 52100 Arezzo - Tel. 0575-22256 Fax. 0575-28676
E-mail: isde@ats.it - www.isde.it**

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WORKSHOP VII

Shape the future of life – Health environments for children

Theme of World Health Day, WHO, 2003

E7

WORKSHOP VII

According to the World Health Organisation, the major causes of mortality, sickness and disability can be reduced by preventing six types of risk behaviour: smoking, behaviour leading to accidents and violence, consumption of alcoholic beverages and other drugs, unbalanced diet, sedentary life style and sexual behaviour leading to early pregnancy or sexually transmitted diseases.



Knowing that health habits and behaviours are acquired early in life, and that it is easier to acquire them than to change them, it becomes clear that it is necessary to tackle health issues at an early age.



School seems to be the ideal place to do this because 95% of children attend school and spend there a great part of the day, and for many years in their lives. Besides, from a social point of view, school is traditionally a source of values and knowledge. Also, behaviours that put health at risk – violence, for instance - are against school rules too.



Based on this, we have conceived a project in health education targeted at children between 4 and 10 years old. It is called “Busca-Polos”¹. The aim is to help children finding out, within themselves and in the world around them, the necessary energy to relate to others and to themselves in a positive manner.

We believe that it is possible to achieve this aim by developing skills that can result in health protection behaviour, i.e. attitudes that protect the individual’s health as well as the health of others.

Some of the aspects that make this project an innovative one are:

- It is based on a positive concept of health: not as the lack of illness, but rather as well being with one’s self and with others
- It is built on a Health-Education partnership, involving multidisciplinary teams
- It targets very young children and follows them up until they are 10 years old
- It counts on the participation of parents / families
- It has a didactic feature for teachers and education professionals
- It originates materials
- It allows research
- It is open, that is, it is built with the participants

¹ A tool that determines the type of electric charge (positive/negative)



The Impact of Child Labor on Health

A Field Investigation in Egypt

Philip L. Graitcer
Amber B. Surrency
Leonard B. Lerer



In Developing Countries

- 120 million children work full time
- 30-60% of children are in labor force
- About 6 million children are injured
- About 32,000 children are killed

Definitions

- Child labor is employment of children under 18 years of age
- Do not have to be paid: “domestic work”, apprenticeships, or slavery

Child Labor in Egypt (Official 1998 Data)

- Children are 10-20% of labor force (2-6 million children)
- In rural areas, young children (6-14) are working in agricultural jobs
- In urban areas, children are older (14-18) and working in small industry
- Only 20% of working children are literate

Child Labor in Egypt (Population Council Data - 1997)

- One-third of children working (paid and unpaid)
- Adolescents working: 50% of all boys, 1 in 6 girls
- Boys working: 29% at age 10, 60% at age 19
- Girls working: 13% at age 10, 19% at age 19

Study Purpose

*Does working affect a child's
health?*

Study Design

- Quantitative survey
 - Cross-sectional cohort study of working and school children living in 3 Cairo neighborhoods
 - Health, economic and social characteristics
 - Physical examination
- Qualitative survey
 - Medical and anthropological study of 4 working children and their families

Egyptian Working Children



Methods - Quantitative Survey

- Children visited at workplace or school
 - Employer/school permission
- Survey - perceived health status, educational, social, economic status
- Physical examination

Methods - Qualitative Study

- Four working children and their families
- Visited and interviewed twice a week during 5 weeks
- Conducted by Egyptian anthropologists

Study Cohort

	Working Children	School Children
Boys	49 (45%)	60 (55%)
Girls	29 (40%)	43 (60%)

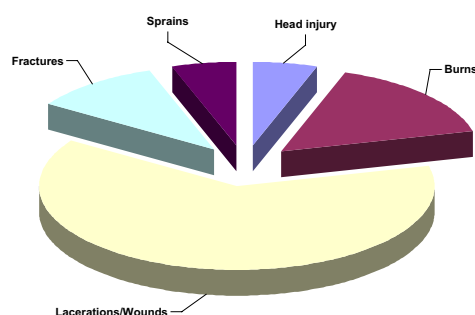
Reasons for Not Attending School

Reasons	Number	Percent
Needed income	23	37.7%
No interest in school	21	34.4%
Failed school	8	13.1%
Did not like school	2	3.3%
Other/Unknown	7	12.4%

Health Characteristics

- Fever, cough, diarrhea - no significant differences between group
- Missed work/school because of illness or injury
 - 43.5% working children
 - 56.2% school children
- No significant health differences

Working Child Injuries in Past Year



19 Injuries

Work Characteristics

- Worked 6-16 hours/day (11.1 hours average)
- Boys worked 72 hours/week (range 36-112)
- Girls worked 60 hours/week (range 42-84)
- Children earned \$1 - 17 / week
- Children gave most of earnings to families

Environmental Exposures

- More than half of children exposed to dust, wastes, noise, sharp objects
- Only 4 of 63 children wore protective clothing or equipment
- Many children wore a work uniform - coveralls for boys, blouse for girls

Medical Characteristics

- No significant differences in signs or symptoms, except for skin and nails
 - 9% (7) of working children had abnormal or discolored skin
 - 2% (2) school children had abnormal or discolored skin
 - Significance of finding unknown - manual labor?

Discussion

- Poverty's Impact
- Educational Implications

Discussion

- Poverty's Impact
- Educational Implications
- Economic Implications
- Health Implications

Conclusions

- No significant differences in the immediate health of working and school children
 - Working environment is no riskier than a play or school environment
 - Work children do - in the short term - is not inherently unhealthy
 - Child who work may be initially healthier than their peers

In closing...

No short-term health risks of child labor, but long-term and development issues ultimately make child labor deleterious for the child, his family and his country

- Health exposures
- Deprived of childhood and social skills
- Few opportunities for learning
- Society and economy can not change with illiterate and semiskilled workers ill prepared to compete in today's global and technological economy

Child Labor - A Timeless Problem



United States
1909

Egypt
2000



Urban Environment and Arab Child

Hoda Abdel Rahman

Background:

Many researches proved that the environment surrounding the child affects him psychologically, socially and healthily, but researches concerning Urban Setting and its influence on the child still needs lots of studies specially in our Arab world. This might be due to the absence of the urban designer in the Arab organizations concerned with children.

Many changes took place during the last three decades in Arab cities, as a result of population growth and the increase of civilization level, this reflected negatively on the child and his needs in the cities.

Since playing being a major child activity, and through playing the child develops and discover the surrounding environment [Voices, Colors, Shapes and Volumes, ...etc.] and through this urban environment the child can acquaint with the behaviors and values of his society and hence we can ask:

WHERE THE CHILD CAN PLAY IN EGYPTIAN CITY ?

Objectives:

1. To raise awareness of the importance of child open spaces in Arab cities for preventing children's exposure to all risks.
2. To make use of this increased awareness to change Government policies towards children and respect their needs in urban setting and promoting children's rights in open spaces specially to children in slums and poor districts.

Methods:

1. Theoretical studies to know the negative influences of urban environment, (descriptive methods).
2. Field study of two districts in Cairo, (analyzing methods).

Results:

- The absence of open spaces, play areas and parks.
- In spite of the presences of unused areas due to the changes of urban functions, the political decision was to use these areas in urban functions not serving child needs.

Conclusion:

First: Suggested on the political and legal level demand.

Second: Suggested conceptual design for open spaces in Arab cities.