

Healthy Environments for Children

Initiating an Alliance for Action



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SUMMARY

Children are exposed to serious health risks from environmental hazards. Over 40% of the global burden of disease attributed to environmental risk factors fall on children below 5 years of age, who account for only about 10% of the world's population. Environmental risk factors often act in concert, and their effects are exacerbated by adverse social and economic conditions, particularly poverty. Children are particularly vulnerable, and action needs to be taken to allow them to grow up and develop in good health, and to contribute to economic and social development. The aims for action are set by the Millennium Development Goals, whose targets are reduced child mortality and environmentally sustainable development.

The Healthy Environments for Children initiative is designed to protect children from the physical hazards in their environment, within the context of social, economic and behavioural determinants. This initiative should build upon the active and committed involvement of various stakeholders, such as decision-makers, community leaders, teachers, health professionals, nongovernmental organizations (NGOs), the private sector, and the families. The outcome is expected to be the creation of a concerted, popular, participatory and inclusive movement, supported by a global alliance of key institutions and organizations at the

international level, and by alliances at the national and local level.

This initiative is seen as an umbrella, encompassing all efforts that support action based on scientific evidence. This should ensure that investments are made to address real priorities through the most cost-effective measures. Key elements for implementation include taking stock of ongoing efforts; creating a popular movement by mobilizing all potential players that can make a difference; consolidating and disseminating scientific knowledge on risk factors and cost-effective interventions; initiating and promoting research to complement existing knowledge and support efficient action, and efforts to make healthy environments for children a major component of policy-making; promoting the healthy settings approach; and fostering intersectoral, integrated collaboration.

Priorities will be set at the local, national or regional level by the initiative, and a number of priority risk factors have been identified as major global issues, requiring concerted international action. These are: household water security, hygiene and sanitation, air pollution, disease vectors, chemical hazards, and injuries and accidents. Approaches to scale up actions are proposed for each risk factor.

The present document has been prepared by the WHO Secretariat in support of discussions to be held during the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa, in August/September 2002. Information is presented to stimulate the creation of an alliance for action, as broad-based as possible, for the initiation of a worldwide movement on Healthy Environments for Children during the months immediately following the WSSD.

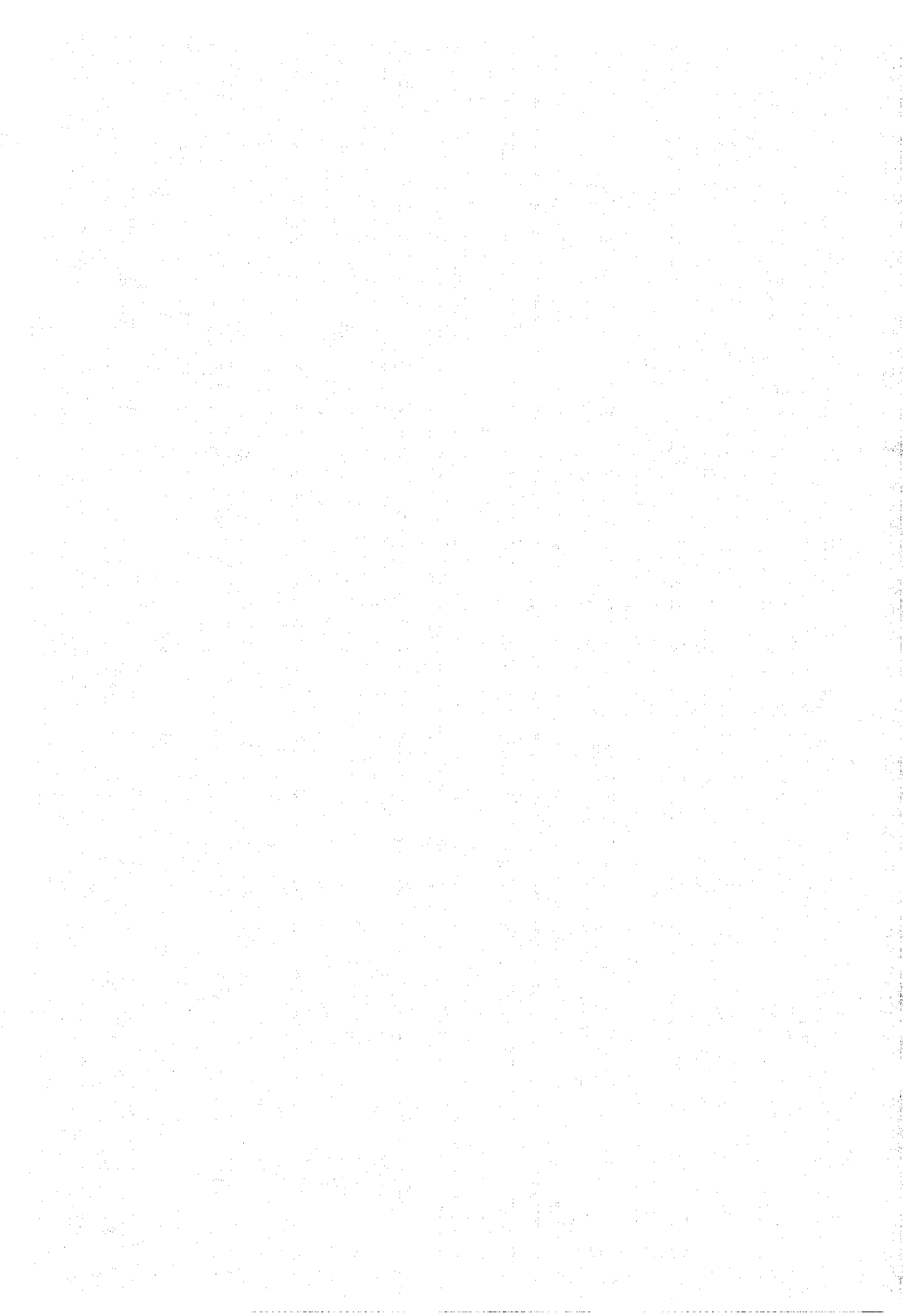
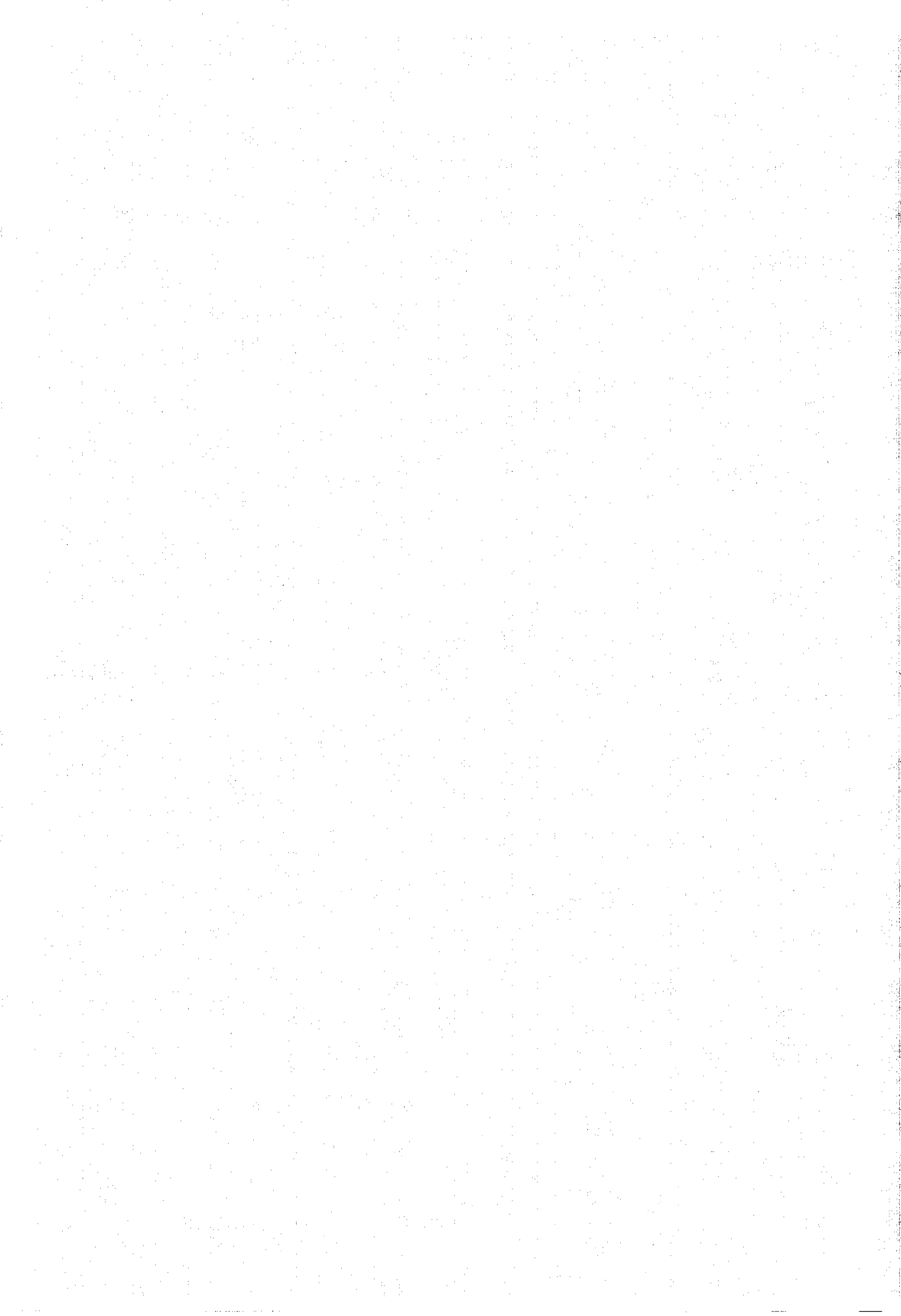


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1. THE NEED FOR ACTION

Children today live in an environment that is vastly different from that of a few generations ago. New challenges include increasing industrialization and globalization, rapid urban population growth, non-sustainable consumption of natural resources, and increases in the trade and use of chemicals. While economic development and improved hygiene and health care have led to a significant decrease of childhood morbidity and mortality in many parts of the world, new "modern" risks to children's health must now be added to the "basic" environmental risks such as unsafe drinking-water, lack of adequate sanitation, and indoor air pollution, which are closely linked with and aggravated by persistent poverty and social inequity. Exposure to environmental risk factors during childhood may not only impact on a child's health, but ill-health outcomes may persist through into adult life or may appear during adulthood. Unsafe and unhealthy environments are thus violating children's rights to health, and represent a serious threat to the potential for sustainable development.

While the environmental burden of ill health affects all children, it is greatest among the poor, whether in the poor regions of the world, in poor countries, in poor communities or in poor households within cities. Inequities in child health constitute systematic and relevant differences between population groups that are both avoidable and unfair. These inequities not only relate to a socioeconomic gradient (e.g. income, education), but often exist in relation to gender, family structure (e.g. orphans, single-parent households), geographic differences (e.g. rural versus urban), ethnicity and other factors.

Poor children:

- are more likely to die in the first month of life, in the first year of life, or before they reach the age of five;
- are sick more often and more seriously;
- are less well-nourished and are more likely to lag behind in growth and psychosocial development;
- are more likely to have difficulties at school and on the job

... than better-off children.

Social, economic and behavioural factors largely impact on the health outcomes due to unhealthy environments. Malnutrition associated with poverty often results in an increased susceptibility to infections and to the effect of chemical pollutants, and so do unhealthy behaviours, such as inadequate personal hygiene, and the lack of a care-giving social environment. This requires a comprehensive approach addressing not only the physical environment, but also the psychosocial and economic determinants that impact on health outcomes.

Healthy Environments for Children – The foundation of sustainable development

Sustainable development has three main components: economic development, social justice, and environmental protection. Healthy environments for children are at the same time a condition depending on all of these elements.

Poverty is the single biggest threat to children's health and affects children often through environmental factors such as sanitation and clean air. Economic development and social justice are prerequisites to overcome poverty.

The bare survival of millions of children is at stake and needs to be addressed now. In addition, many environmental exposures of children cannot be corrected during their adult life. Healthy environments are a condition to safeguard children's intellectual, social and economic potential, and the future of our societies.

While the environmental burden of disease is by far highest among poor children, the environment also impacts on those children living in medium and high income societies.

Goal and objectives

Children are more susceptible than adults to the effects of environmental health hazards, and therefore require special protection. The aim of the current initiative is to launch a movement to ensure appropriate action to promote healthy environments for children. This movement will be supported by an alliance and involve partners from various sectors, and at various levels of responsibility. The overall goal of the movement is to prevent disease and disability in children associated with biological, chemical and physical environmental hazards, with due recognition of the importance of behavioural, social and economic factors. This goal is in line with the Millennium Development Goals i.e. to reduce child mortality (Goal 4), and to ensure environmental sustainability (Goal 7). Thus, the movement should be instrumental in achieving the target to "reduce by two-thirds between 1990 and 2015 the under-five mortality rate".

The main objectives of the movement will be:

- to provide the knowledge base to enable informed policy action;
- to raise the awareness of decision-makers and ensure their political commitment to take action;

- to help countries and communities create and maintain healthier environments, enabling children to grow and develop to their full potential as citizens in their own right and contribute to sustainable development; and
- to promote safe and healthy homes and communities for children, as well as healthy behaviours.

For action to be successful, credible and concrete targets will have to be set at the local level, taking into consideration the priority environmental threats to be addressed, the appropriate settings in which children are exposed to given risk factors, and the needs of the different age groups involved. Action will centre on environments where children, boys and girls of all age groups from conception to adolescence, spend their time in their homes and surroundings, schools and recreation areas, and community places in both urban and rural areas, especially (but not exclusively) in the developing countries.

One major aim of the movement will be: "the home as a safe place" for every family, irrespective of the level of their income. There is a need for basic protection of each child given a space with access to clean drinking-water and food, adequate sanitation, a space free from risk of injury, such as unprotected fires, or unprotected machinery and tools, a space protected from as much indoor pollution as possible, and with as much daylight as possible. The child needs a stimulating environment, including toys, colours and enough space for play, tailored to the different needs of infants, children and adolescents.

It should be recalled that malnutrition is responsible for by far the largest global burden of disease through its effects on the immune system. The achievement of food security is a key prerequisite to achieve health and environment objectives. Therefore, the movement could not achieve its goals and

targets without concurrent progress being made in combating malnutrition of children at all age levels.

Growing international concern calls for action

The *Convention on the Rights of the Child* (1989) lays down the fundamental right of every child to "the enjoyment of the highest attainable standard of health". Several recent international declarations and policy statements demonstrate a growing commitment to a healthier and safer environment for children. Three of these are of particular relevance:

- Declaration of the Environment Leaders of the Eight (G8) on Children's Environmental Health (1997), as confirmed by the Banff Ministerial Statement on the World Summit on Sustainable Development (2002).
- The United Nations General Assembly Special Session on Children (UNGASS) (2002).
- The Bangkok Statement - A Pledge to Promote the Protection of Children's Environmental Health (2002): see Annex.

Several other recent recommendations address specific issues related to healthy environments for children, such as the ILO Convention 182 on the Worst Forms of Child Labour (1999).

2. ENVIRONMENTAL RISK FACTORS FOR CHILD HEALTH

Throughout the world, children face significant threats to health from a wide range of environmental hazards. Preliminary estimates suggest that up to one third of the global burden of disease can be attributed to environmental risk factors. Over 40% of this burden fall on children under 5 years of age who make up only about 10% of the world's population. Inadequate drinking-water and sanitation, indoor air pollution, injuries and other risk factors are the root cause for more than 4.7 million deaths suffered annually by children under five from illnesses aggravated by unhealthy environments.

The health and environment linkages affecting children are numerous and complex. In most cases, exposure to a particular

environmental risk is associated with many different health outcomes, and a range of environmental exposures may influence a particular disease condition. This is based on the contribution of environmental risk factors to global child mortality and morbidity, thereby highlighting the biggest environmental threats to children's health, and illustrates the potential for disease prevention through the association of specific risk factors with distinct settings. In addition, there are non-environmental risk factors which tend to aggravate the health impacts emanating from the child's environment. Nutrition is one such key factor, either in the form of malnutrition or the lack of micronutrients or in the form of obesity due to sedentary lifestyle or unhealthy eating habits.

Health-and-hygiene-environment linkages for children

Setting	Community												
	School										Home		
	Housing conditions	Indoor air	Food safety and supply	Water, sanitation and	Outdoor air	Lead	Pesticides and other chemicals	UV radiation	Disease vectors	Occupational Environments	Transportation	Recreational activities	Emergency situations
Risks factor													
Disease outcomes													
Diarrhoeal diseases													
Acute respiratory Infections													
Tuberculosis													
Perinatal effects													
Nutritional diseases													
Malaria & other vector diseases													
Child cluster diseases													
Chronic respiratory diseases													
Cancer													
Injuries & accidents													
Drowning													
Poisonings													
Cognitive effects													

While a global analysis of the burden of disease in children associated with environmental risk factors helps identify priorities for global action, additional risk factors may result in a high disease burden at the regional or local level. Developing a cause-effect matrix for a particular geographical region based on a differentiated analysis of the burden of disease will help identify priorities for regional initiatives or programmes to create healthy environments for children.

An unequal disease burden: the risk transition

A differentiated analysis of the global burden of disease (GBD) reveals that most environmental threats to children's health are

associated with persistent poverty and social inequity. The two major problems are: communicable diseases due to lack of safe water and sanitation, and acute respiratory infections due to high levels of indoor air pollution in combination with unhealthy housing. The virtual disappearance of these two leading causes of child mortality, with the transition towards an industrialized society, demonstrates the dominant influence of socioeconomic factors on the nature and magnitude of children's health problems.

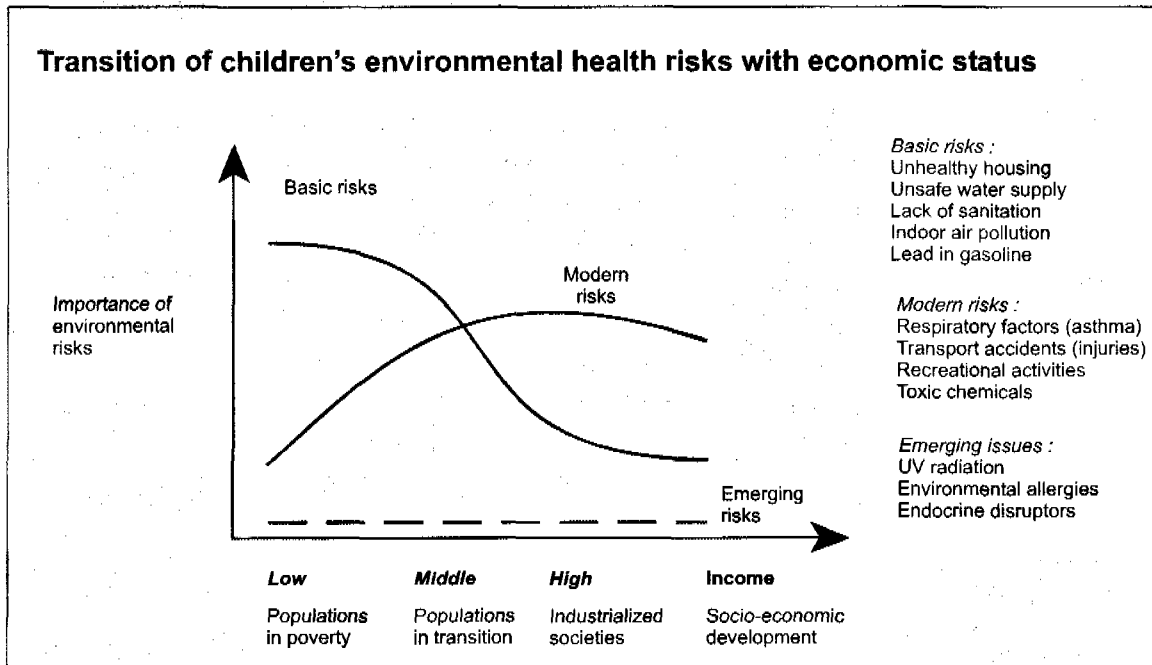
However, communicable diseases do not occur exclusively in developing countries and toxic chemicals are not exclusively associated with industrialized countries. There are pockets of poverty in rich countries where certain population groups experience deprivations with their associated health

problems, which are similar to those in developing countries. Also, toxic chemicals are increasingly being used in developing countries, often with fewer controls and regulations than in industrialized countries.

There is a clear shift in the pattern of leading environmental health problems in children. This differential is not only measurable between rich and poor countries but also between population groups within a given country and within any urban agglomeration, ranging from periurban slums with sub-standard housing to affluent modern suburbs. Typical "modern" risks include chronic respiratory illnesses, asthma, immunological disorders, neurological, neurodevelopmental and behavioural effects, as well as childhood cancers. In addition, there are emerging risks such as environmental allergens, UV

radiation, endocrine disruptors, autoimmune effects, and other diseases not directly related to the quality of the child's environment. Any potential health-and-environment linkages require further research and a search for other causative factors or combinations of factors.

Environmental risks to children tend to be greater among rural populations compared with urban populations, and an unequal disease burden on the rural poor may be further aggravated by lack of access to health care. However, the health status of children living in urban poverty is equally preoccupying. Consequently, population-based risk assessment is the prerequisite of a cost-effective strategy, with tailored interventions to reduce the environmental disease burden in children.



Focus on action

The above overview of health and environment linkages demonstrates that the design and implementation of programmes to promote healthy environments for children must, in addition to addressing global risks, tackle problems at the regional and local level. Only the selection of key risk factors locally can guarantee that one sees the prevailing health risks in combination, and can detect their synergistic or aggravating effects detected.

For example, the Strategy for Children's Environmental Health in Latin America and the Caribbean has identified the following as priorities for action: (i) water resources, water quality and basic sanitation, (ii) indoor and outdoor air quality, (iii) heavy metals, (iv) pesticides, and (v) climate variability and change.

The Third European Ministerial Conference on Environment and Health, held in London in 1999, recognized (i) injuries, (ii) smoking and environmental tobacco smoke, and (iii) asthma and other related respiratory diseases as the main environmental threats to children's health in Europe. In addition, the apparent increase in childhood cancers and neurodevelopmental disorders, and the risk of water and food-related diseases are also subjects of major concern.

Specific issues may be of relevance to geographically defined areas of the world. For example, Australia has the highest rate of skin cancer in the world, which is attributable to people's exposure to high levels of UV radiation. Frequent sun exposure and sunburn in childhood set the stage for high rates of skin cancer later in life, and may cause or accelerate cataract development and limit the effectiveness of the immune system. Similarly, arsenic contamination of drinking-water drawn from groundwater is a priority issue in some countries of South-east Asia.

Identifying priorities and building a programme should take into account and seek synergies with existing activities such as single-issue campaigns for water or food security; risk-focused programmes to eradicate the worst forms of child labour, to prevent injuries and accidents, or to create a tobacco-free environment; and disease-specific programmes such as Roll Back Malaria. Activities to create healthy environments for children should complement these efforts rather than re-create existing programmes.

As a first step, and to make the best use of scarce resources, global action should focus on improving the health and wellbeing of those children who are most at risk, as described in detail in the following section.

3. PRIORITY ENVIRONMENTAL HEALTH ISSUES

Throughout the developing world, traditional environmental health hazards remain the primary source of ill-health today e.g. biologically contaminated water, poor sanitation, indoor smoke, rampant disease vectors such as mosquitoes, an inadequate food supply, and unsafe waste disposal which are all usually associated with poverty and social exclusion. In addition, the very same populations are often also exposed to toxic chemicals with little or no protection. Children's health problems resulting from these hazards rank among the highest environmental burden of disease worldwide.

Significant progress in reducing the environmental burden of disease on a global scale can only be achieved through focusing on the key risk factors. Comprehensive comparative risk assessment suggests concentration on a cluster of six environmental issues, as follows:

- Household water security
- Hygiene and sanitation
- Air pollution
- Disease vectors
- Chemical hazards
- Injuries and accidents.

The combined effects of these environmental risks are, in one way or another, "diseases of poverty" and constitute the bulk of child mortality and morbidity on a global scale. The proposed action programme for healthy environments for children is designed to focus on interventions to prevent or reduce child exposure to these risk factors, and to support health services at all levels in managing related disease outcomes. Thus it should make a crucial, if not decisive, contribution towards achieving the Millennium Development Goal

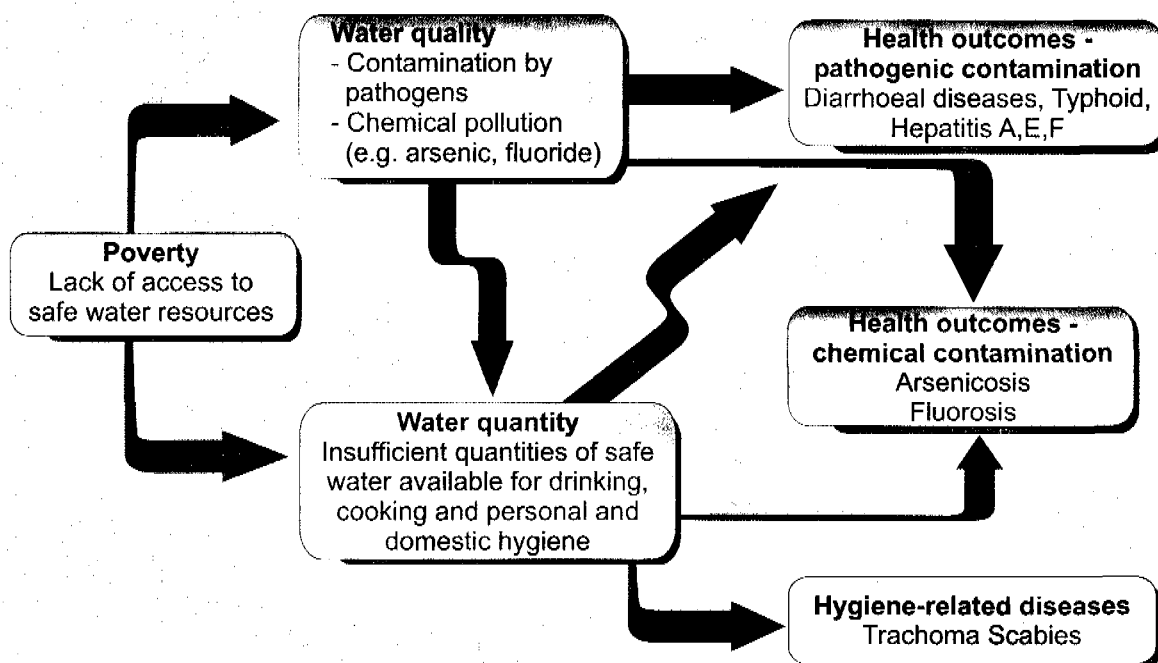
of reducing by two thirds the under-five mortality rate.

3.1 Household water security

A child's wellbeing is highly dependent on both the quality and the availability of water, and on how well this precious resource is managed. Around the world, both biological disease agents and chemical pollutants are compromising drinking-water quality. Contaminated water causes a range of diseases which are often life-threatening. Of the water-borne diseases affecting children, the most deadly are diarrhoeal infections. Diarrhoea is estimated to cause 1.3 million child deaths per year, constituting about 15% of total child deaths under five in developing countries. The most dramatic event in recent history has been the cholera epidemic in South America, which started in Peru in 1991 and then swept across the continent.

The public health importance of diarrhoea among children lies partly in the high mortality rates as well as in the interactions between malnutrition, recurrent diarrhoea and impaired child development. Contrary to breastfed infants, bottle-fed infants are highly exposed to the effects of unsafe drinking-water. It cannot be overemphasized that the transmission routes for infectious agents are complex and thus contribute to the complexity of prevention. Interventions in water supply, sanitation and hygiene are estimated to reduce diarrhoeal incidence, on average, by a quarter (25%) and child mortality by 65%. However, selected interventions have been shown to be much more efficient in certain settings.

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Some dangerous chemicals also occur naturally in groundwater, notably fluoride and arsenic. The consumption of fluoride-rich drinking-water results in serious health effects, ranging from dental fluorosis to crippling skeletal fluorosis, both effects being irreversible. Children whose teeth and bones are still developing are most susceptible to high fluoride concentrations. This is further aggravated by poor nutritional status. Symptoms start to develop during childhood, and preventing exposure represents the only effective intervention. At least 25 countries across the globe are affected. In Bangladesh and India (West Bengal), high concentrations of arsenic have been found in tubewells and arsenicosis has become widespread. Arsenic can cause severe and irreversible health effects, even at chronic and low levels of exposure, with onset in early childhood and symptoms emerging gradually. There are at least twelve other countries suffering from naturally high arsenic levels in water.

The availability of at least minimal amounts of water for drinking and other personal

purposes is considered as important as its quality. Already, one third of the world's population lives in countries facing moderate to high water stress, if not water scarcity, and water tables are falling in every continent. If present trends continue unchecked, it is estimated that two out of three people on earth will live in water-stressed conditions by the year 2025. Globally, 1.1 billion people are today without access to a clean and adequate water supply. And too little water for basic needs makes it virtually impossible to maintain the necessary minimum of personal hygiene and sanitary conditions in the home.

Traditionally, improvements in water supply and sanitation have been promoted as essential public health measures to improve the population's health status. If universal piped and regulated water supplies were to be achieved, about 7.6 billion episodes of diarrhoea could be prevented annually, a 70% reduction. These are critical interventions for the health of populations and of children in particular.

Scaling-up of actions

Further strengthening of the evidence base, with better geographical coverage and specificity for children in different age groups is required in the area of water accessibility and safety, and this should underpin policy-making and advocacy for cost-effective interventions.

Improved water supply and sanitation has long been targeted as a priority for health and development. It was central to the International Drinking Water Supply and Sanitation Decade, and more recently is reflected in the Millennium Development Goals set by world leaders at the UN Millennium Summit in September 2000. The target is to "halve, by 2015, the proportion of people without sustainable access to safe drinking water" through the promotion of affordable and environmentally sound technologies.

Action has also to be accelerated to fulfil the commitment made at the UN Millennium Summit to halt the unsustainable exploitation of water resources by developing water management strategies at the regional, national and local levels, which will secure both equitable access and adequate water supplies.

Capacity-building efforts should be geared towards strengthening the enforcement of existing environmental regulations on water quality and resource protection. This requires also close monitoring of drinking-water quality at the local service level through practical and cost-effective methods.

3.2 Hygiene and sanitation

Lack of adequate sanitary facilities and poor hygienic practices are common throughout the developing countries; the lowest levels of

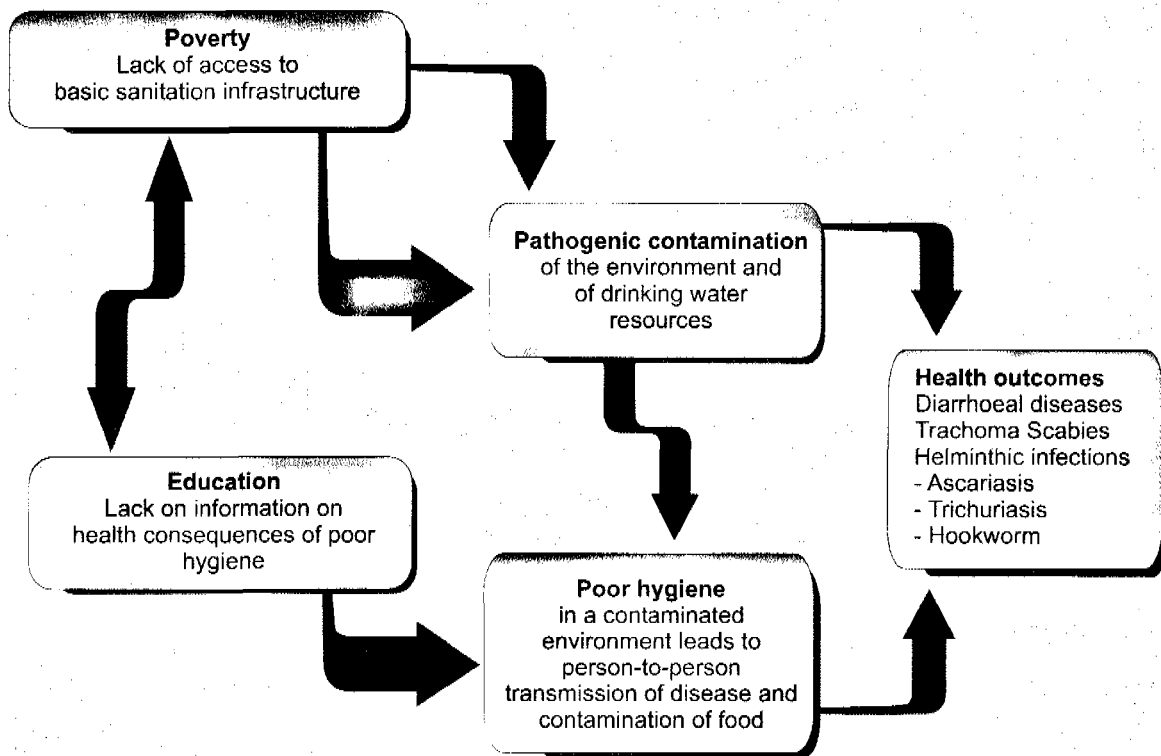
service coverage are to be found in Asia and Africa where more than half of the rural populations are excluded from any measurable progress in this area. Globally, 2.4 billion people, most of them in developing countries, do not have access to improved sanitation facilities. Data collected over ten years show that little progress has been made in reducing this number.

Unhygienic conditions and practices at the household level create a dangerous environment with immediate health risks to children. Also, lack of sanitation facilities in schools helps transmit diseases. Waste dumps sited on the outskirts of almost all major cities provide hazardous environmental conditions to those living nearby, and even more so to those living as scavengers on such wastes. Sanitation interventions, technical and managerial, are badly needed in all areas in houses, schools, and within the community at large. These must be accompanied by the necessary behavioural changes in the child and adult populations, which pose a formidable hygiene education challenge to the health sector.

Trachoma is one of the infectious diseases which are linked to environmental conditions, and is thus amenable to effective environmental interventions. Worldwide there are around 6 million people irreversibly blinded by trachoma and about 500 million people are at risk of the disease. Improved sanitation and hygiene behaviour contribute significantly to the control of trachoma. Through the provision of adequate quantities of water alone, about one quarter of the burden of this disease could be prevented or reduced.

Intestinal worms severely affect about 10% of the population of the developing world. Children, due to their direct exposure to soil and other helminth-carrying material are especially at risk, and they are generally more worm-infested than adults. Intestinal parasitic

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infections in children can lead to malnutrition, anaemia and retarded growth, depending upon the severity of the infection, in addition to their adverse effects on the immune system. Exposure to helminths and hookworms can be effectively controlled through improved sanitation, hygiene and water supply.

Scaling-up of actions

Further work on the evidence base, specifically targeting children, is required across the spectrum of sanitation, hygiene and behavioural interventions to reduce infectious diseases with an environmental etiology. This entails child-specific research efforts on the impact of alternative sanitation methods on child disease outcome, supported by pilot-scale and expanded implementation of high-yield health interventions, using feedback from experience to guide future activities.

The setting of most significance in the child's environment is the home and this should be given prime attention. This implies improved

household sanitation facilities through affordable interventions, including the development of a sense of responsible ownership and use following the common rules of hygiene. All potential pathways of disease transmission have to be addressed, including drinking-water, safe handling of food, excreta disposal, and personal hygiene.

Improved hygiene practices, including both hand and face washing, and safe handling and disposal of children's faeces should be promoted through educational campaigns in the community and in kindergartens and schools.

Several UN and other organizations in 2000 launched FRESH (Focusing Resources for Effective School Health) to achieve more child-friendly schools. This includes a simple set of core interventions, health-related school policies, provision of safe water and sanitation in all schools, skills-based health and hygiene education, and school-based health and nutrition services.

3.3 Air pollution

Air pollution is a major environment-related health threat to children and a risk factor for both acute and chronic respiratory disease. Outdoor air pollution, primarily a consequence of traffic and industrial processes, remains a serious problem in cities throughout the world, particularly in the megacities of developing countries. It is estimated that a quarter of the world population is exposed to unhealthy concentrations of air pollutants. In recent years, indoor air pollution has received more and more attention: a pollutant released indoors is a thousand times more likely to reach the lungs than a pollutant released outdoors. Indoor air pollution is strikingly different in industrialized and developing countries, and also varies between urban and rural settings. While the main concern in developing countries is the exposure to combustion products from biomass fuel and coal, poor indoor environments in the industrialized world are characterized by reduced ventilation, the presence of biological agents such as moulds, and a myriad of chemicals in furnishing and construction materials.

Acute respiratory infections

More than half of the 2.1 million annual deaths in children under five caused by acute lower respiratory infections may be associated with indoor air pollution, lack of adequate heating, or other precarious living conditions. Indoor air pollution from the combustion of biomass and coal is a serious and widespread problem in developing countries. Some 3 billion people worldwide rely on biomass fuels and coal for cooking and heating needs. Of these, approximately 800 million depend on agricultural residues and animal dung as sources of fuel because of severe fuel wood shortage. Traditional low-efficiency cooking stoves produce heavy smoke with fine

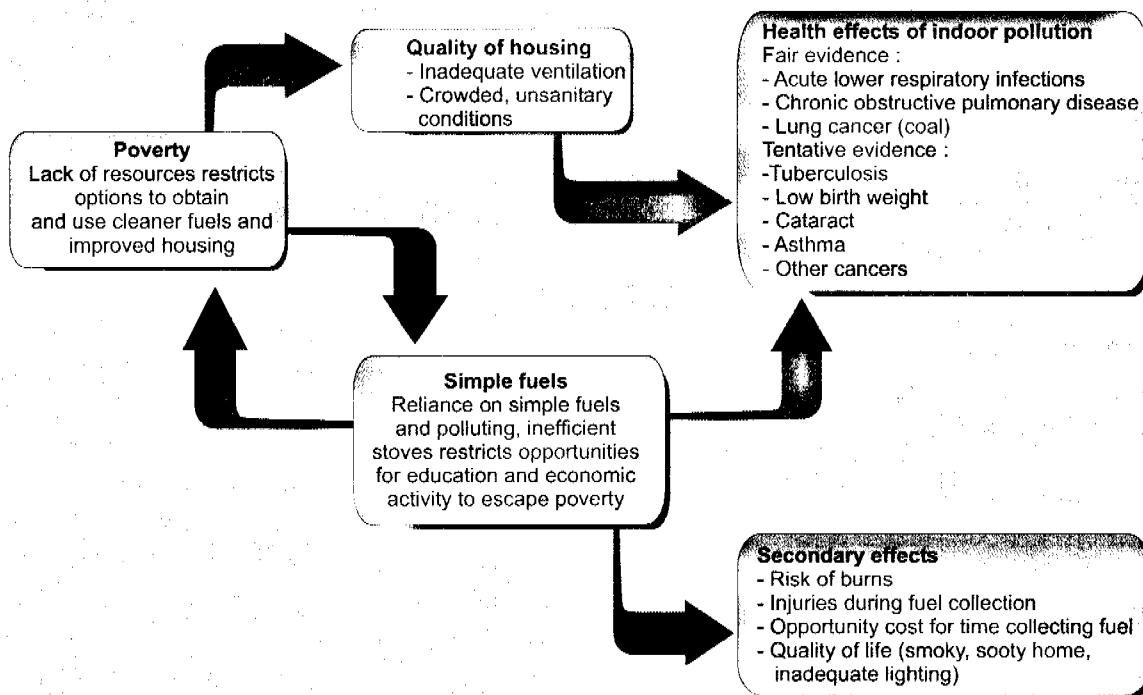
particles, carbon monoxide, and carcinogenic compounds.

Infants are most at risk due to the immaturity of their respiratory organ systems and their high exposure when carried on their mother's back or placed near the cooking stove. The assessment of the burden of disease attributable to indoor air pollution, which is currently under way, will further strengthen the evidence that indoor air pollution presents a substantial risk to children's health and demands concerted global action.

While second-hand tobacco smoke and certain outdoor air pollutants are known risk factors for acute respiratory infections, indoor air pollution from biomass fuel smoke is by far the biggest single contributor to the global burden of disease. In principle, several different types of interventions are capable of producing a reduction in exposure to indoor air pollution. These include (i) interventions relating to the source of pollution, e.g. changing to cleaner fuels or improved stoves, (ii) interventions in the living environment, e.g. better ventilation, and (iii) changes in user behaviour, e.g. keeping children away from the smoke or eliminating tobacco smoking in the home. Beyond their effectiveness in reducing the level of indoor air pollution, these interventions should also meet several other criteria such as local participation, in particular of women, to ensure a culturally appropriate and sustainable approach.

Initial work on assessing the economic costs and benefits of interventions in household energy is encouraging. For example, the cost-effectiveness of an improved stove appears to compare favourably with other important health interventions. However, as interventions to reduce indoor air pollution have a wide range of implications for health and quality of life, an appropriate assessment of their cost-effectiveness may require novel approaches.

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Scaling-up of actions

There is an urgent need to consolidate experience of interventions to date, and to undertake a comparative evaluation of experiences in different settings. Based on such a review, concepts for effective interventions and supporting policies should be developed and made available internationally and locally for capacity-building. This will require multi-sector collaboration at the international, national and local level to combine the expertise in areas as diverse as health, energy, environment and financing.

Strong advocacy will be needed to raise awareness about the magnitude of the problem among stakeholders, and to generate support for basic and applied research into the effects of indoor air pollution on child health, and, in particular, to develop and implement interventions and supportive policies.

Asthma and chronic respiratory disease

Asthma, allergies and chronic respiratory disease are among the leading causes of chronic disease in children. In recent decades, asthma incidence rates saw a threefold increase in some industrialized countries, and approximately 25 000 annual childhood deaths are due to asthma. The International Study of Asthma and Allergies in Childhood (ISAAC) demonstrated enormous differences in the prevalence of asthma symptoms, ranging from less than 10% in Asia, Northern Africa, Eastern Europe and the Eastern Mediterranean region to more than 30% in most English-speaking countries.

The child who is “*always sick*” or “*missing school*” is a common problem in many communities, creating concern for parents, teachers and doctors.

Maternal smoking during pregnancy and second-hand tobacco smoke are two of the main risk factors associated with chronic respiratory disease and the development of

asthma, particularly if the exposure to smoke occurs during periods of lung growth and development. While the lack of immunological challenge by infections in early life appears to favour the development of allergies later in life, the relationship between early infections and asthma is less clear. Early-life exposure to allergens may sensitize children, thereby increasing the risk of the so-called atopic diseases such as hay fever, eczema, dermatitis and asthma. It is yet unclear whether air pollution contributes to the development of asthma. However, exposure to biomass fuels is strongly associated with chronic obstructive pulmonary disease (COPD), and exposure to coal smoke with lung cancer.

Indoor and outdoor air pollutants can enhance the severity of chronic respiratory disease, and increase both the frequency and severity of asthma attacks. Important indoor air triggers include smoke (from cooking, smoking and heating), moulds, dust mites, cockroach allergens and other biological agents, while known outdoor air triggers include ozone and particulate matter. Additional non-environmental triggers of asthma include pharmaceuticals, rigorous exercise, temperature changes and emotional factors.

Asthma and allergic disorders particularly affect urban children. Poor households and schools are more likely to be reservoirs for dust mites, cockroach allergens, moulds and other indoor triggers of asthma. Poor children are more likely to be hospitalized for asthma, and more likely to suffer chronic health effects and social dysfunction. Poor children are also least likely to benefit from the best care practices: they tend to receive treatment in emergency rooms without follow-up by chronic care providers, are less likely to receive the maintenance medication required, and have no access to environmental and social counselling.

Scaling-up of actions

Stronger advocacy is required to raise the awareness of decision-makers and the general public about the burden that chronic respiratory disease in children imposes on the family, the community, and the health system about the associated economic costs and preventive and curative solutions available. Policy-makers, healthcare workers, and communities – in particular families and schools – have specific roles to play in the prevention and treatment of chronic respiratory diseases that start in childhood. Healthcare workers are in a position to identify children at particular risk of chronic respiratory disease, and to suggest appropriate actions that families and communities can take to protect them.

Policy measures to eliminate smoking are to be strengthened in all countries, especially in those settings where children spend most of their time. Furthermore, measures to control outdoor air pollution are key elements in the prevention of chronic respiratory disease in children. Research into the causes of asthma, and the effectiveness and cost-effectiveness of preventive measures should be strengthened.

3.4 Disease vectors

Major global demographic, environmental and societal changes occurring in the last decade contribute to the re-emergence of vector-borne and other diseases, many of which have an important impact on children's health and development. A considerable proportion of the disease burden for four key vector-borne diseases – malaria, schistosomiasis, Japanese encephalitis and dengue haemorrhagic fever – falls on children under five years of age.

Malaria is rampant in Sub-Saharan Africa and many countries in Asia and Latin America,

where children under five suffer high mortality and morbidity. In older children, malaria remains an important cause of mortality and morbidity and significantly contributes to low educational achievement. Malaria exists in 100 countries and accounts for more than 800 000 deaths annually, mostly in children under five. About 90% of the disease burden resides in Africa.

Schistosomiasis is a water-borne disease that affects children and adolescents mainly because of their specific behaviours: lack of hygiene and swimming in contaminated water. It is endemic in 74 developing countries, with more than 80% of infected people living in Sub-Saharan Africa. High infection rates and individual worm loads set the scene for a debilitating infection which may cause severe damage to the liver or bladder over many years, and can result in premature death.

Japanese encephalitis occurs only in South and South-east Asia, where it is linked with irrigated rice production ecosystems. Outbreaks occur in cycles. The annual number of clinical cases is estimated at about 40 000. Some 90% of these cases are children in rural areas, with a 20% case-fatality rate.

Dengue affects mainly urban populations (the *Aedes* species that transmit dengue are adapted to the man-made environment), and in children the infection can develop into dengue haemorrhagic fever or dengue shock syndrome with high levels of mortality. Annually, mortality due to dengue fever is estimated at around 13 000; more than 80% of these deaths occur in children.

A combination of five interventions in different settings is proposed for the mosquito-borne diseases: use of insecticide-impregnated mosquito nets; the fitting of screens to windows, doors and eaves of houses; the application of zooprophyllaxis in places where mosquitoes are distinctly zoophilic; the use of insect repellents; and improved water management.

For the control of schistosomiasis, case detection and drug treatment proved to be most cost-effective in the short term, but as prevalence levels drop it becomes increasingly expensive to keep them low. Enhanced environmental management, provision of basic sanitation and community health education should be put into place to make the achievement of drug treatment sustainable.

Scaling-up of actions

Sound and sustainable approaches to controlling disease vectors, and integrated prevention strategies should be put in place. This requires increased research into the development of safe alternative pesticides, and on alternative approaches such as biological control and integrated vector management. The use of such approaches should be promoted at community level. Decision-making criteria and procedures for community-based interventions should be developed, with the aim of reducing the transmission risk in specific agricultural ecosystems.

Efforts should build on existing programmes for vector-borne disease control. In the case of malaria, collaboration with the Roll Back Malaria (RBM) programme on rapid assessment of the malaria situation, on promoting the use of bednets and chemoprophylaxis, and on developing zooprophyllaxis for malaria control in rice irrigation schemes offers opportunities in this respect.

Given the importance of personal behaviours for prevention of vector-borne diseases, education on hygiene practices and behaviours among parents, child care-givers and children should be provided. Safe domestic water management should be promoted with the aim of reducing dengue risk.

3.5 Chemical hazards

The use of chemicals has increased dramatically due to the economic development in various sectors including industry, agriculture and transport. As a consequence, children are exposed to a large number of chemicals of both natural and man-made origin. Exposure occurs through the air they breathe, the water they drink or bathe in, the food they eat, and the soil they touch (or ingest as toddlers). They are exposed virtually wherever they are: at home, in the school, on the playground, and during transport.

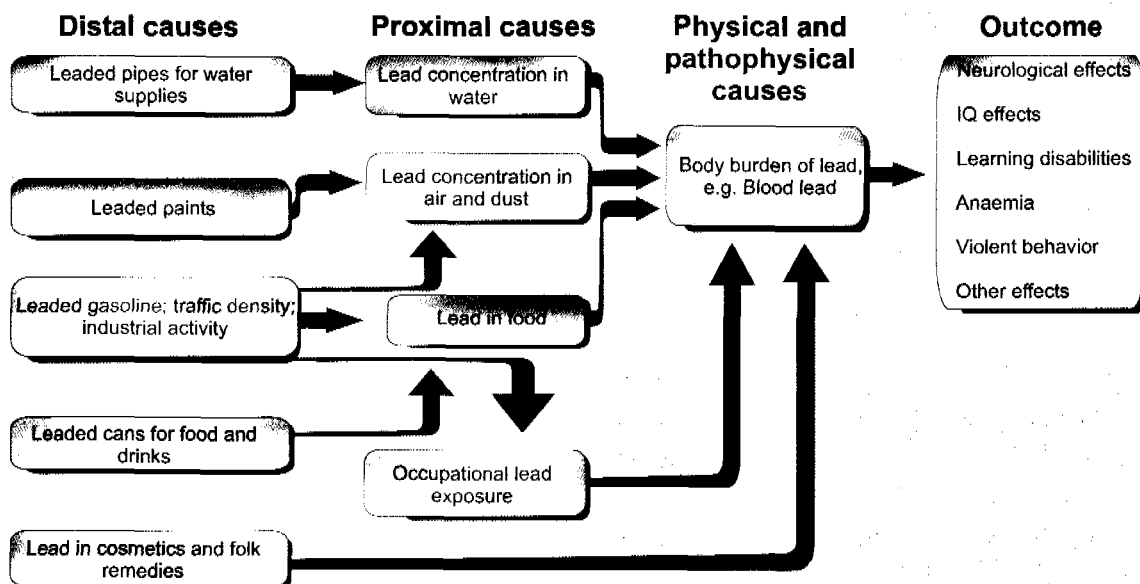
Chemicals may have immediate, acute effects, as well as chronic effects, often resulting from long-term exposures. About 47 000 persons die every year as a result of such poisoning. Many of these occur in children and adolescents, are unintentional ("accidental"), and can be prevented if chemicals were appropriately stored and handled. Chronic exposures to various chemicals may result in a number of adverse outcomes, including damage to the nervous and immune systems, impairment of reproductive function and development, cancer, and organ-specific damage. Sound management of chemicals,

particularly heavy metals, pesticides and persistent organic pollutants, is a prerequisite for the protection of children's health. Due to the magnitude of their health impact on children, the initial focus for action will be on lead and pesticides, but this by no means implies that other chemicals should be ignored.

Lead

Children are particularly vulnerable to the neurotoxic effects of lead: relatively low levels of exposure can reduce IQ scores, and cause learning disabilities, poor school performance, or violent behaviour, and result in reduced lifetime earnings. This has economic and social consequences for society as a whole. In certain developing regions of the world, more than one third of all children are still affected by high levels of lead. In developed countries, only a small minority of children are affected by high lead exposures, mainly the urban poor. Focused action aimed at prevention of exposure is essential. The main sources of exposure may vary according to local context, and lead-health interactions can be complex, as shown in the diagram.

Sources of exposure vary according to local context e.g. lead in gasoline and paint, in



glazed ceramics, in emissions from smelters, in battery recycling industries, use of lead pipes for water supply, or a contaminant in food or an ingredient in traditional medicines.

A number of activities are being undertaken, including awareness-raising, preparation of study protocols and documents on lead exposure, estimation of the global burden of disease (GBD), and provision of technical advice to countries on a case-by-case basis. Focused action aimed at prevention of exposure is essential and efforts to reduce lead exposure have to be intensified in the light of the large percentage of children in the world who are affected.

Pesticides

Pesticides are used in agriculture and in public health programmes as important elements in an integrated approach to vector control. However, they may pose a serious health problem to the whole population. The risks are higher for infants, children and adolescents, as they may be exposed during periods of special vulnerability.

Unsafe use, storage and disposal of pesticides are the main causes of acute poisoning. Pesticides such as insecticides, herbicides and rodenticides are accessible to children in rural areas, but may also be found by toddlers exploring their home, garden sheds or garages. A study in Canada showed that almost 60% of poisoning cases registered at a paediatric hospital were due to pesticides and that the effects of most pesticides were acute and severe. In developing countries, the real incidence of pesticide poisoning is difficult to assess, but is assumed to be high. A large number of child and adolescent workers are exposed to pesticides through agricultural work, as they are commonly involved informally in the preparation and application of pesticides. Children are also exposed as bystanders during spraying for agricultural pest control.

Chronic, low-level exposure to pesticides is linked with neurological, developmental, reproductive and other effects in children. Persistent pesticides that are present in the diets of small children (including breast milk) raise particular concern. They accumulate in fatty tissue, and remain stored in the fatty tissue of the body over long periods.

Scaling-up of actions

More child-specific research, as well as activities to strengthen surveillance mechanisms and promote regulatory measures and risk-reduction interventions, are required in addition to the ongoing provision of information and technical advice to countries, collection of case data on children's exposure and poisoning, classification of pesticides by hazard, and recommendations on the public health use of pesticides.

Policy actions and regulatory measures should be put in place to reduce or eliminate exposure to priority chemical pollutants affecting child health and development, such as persistent organic pollutants and heavy metals. As a first step in reducing children's exposure to lead, governments should be urged to phase out the use of leaded gasoline. Mechanisms should be put in place to provide logistical, financial and technical support for such efforts. Regulatory measures should be encouraged to promote safe use of chemicals and substitution by safer alternatives. Integrated agricultural practices should be promoted to reduce reliance on the use of toxic pesticides.

At the local level, action should be taken to promote the safe use of chemicals through the provision of evidence-based information on health risks from exposure to chemicals and on cost-effective interventions to decision-makers. Aspects of chemical safety and health should be incorporated into school curricula, and health personnel should be trained to recognize and prevent toxic exposures. The commitment and active

involvement of communities in such efforts should be solicited.

3.6 Injuries and accidents

Each year unintentional injuries account for more than 400 000 deaths globally, the majority in children and adolescents. Most of these occur in low- and middle-income countries. Many of those who survive these injuries suffer life-long disabling health consequences. In the European region, 3 to 4 deaths out of 10 that occur in children between the ages of 0 and 4 years are a consequence of injury.

Injuries are commonly classified based on "intentionality". Most road traffic injuries, poisoning, falls, fire and burn injuries, and drowning are unintentional. Intentional injuries include interpersonal violence (homicide, sexual assault, neglect and abandonment, and other maltreatment), suicide, and collective violence (war). Evidence suggests that some children and adolescents are more vulnerable to certain types of injuries. For example, poisoning, drowning, burns, and maltreatment by caregivers affect primarily small children, while road traffic accidents, interpersonal violence and sports injuries tend to affect older children and adolescents. In addition, injuries tend to be more prevalent in boys.

Unfortunately, poor children commonly live in unsafe environments and are, therefore, exposed to risks that increase their likelihood of being injured. These children are particularly vulnerable as they have less chance of overcoming these risks, and have fewer advantages such as access to educational opportunities and health services.

The injury rates and patterns differ from country to country, even within the same region, and from urban to rural areas. For example, in the rural areas injuries are related

mainly to farming activities, pesticide poisoning, and drowning. In the urban areas, most injuries are traffic related, or linked to gadgets and electrical appliances, falls or poisonings resulting from household chemicals and pharmaceuticals ingested by small children. The environmental factors leading to injury may also be associated with social factors, such as family stress and critical life events (e.g. hospitalization or chronic disease of a parent, or change of residence).

The environmental factors leading to injuries are often associated with other environmental health risks. For example, home and school construction and furnishing materials can lead to unintentional injuries, and poisoning may result from exposure to chemicals unsafely used or stored. Intentional injuries resulting from child maltreatment are associated with physical and cognitive deficits in the abused infants, poor parenting skills, marital conflict, and lack of social support systems for families. Urban transport, land use patterns, and recreation areas are linked to road traffic injuries, as well as to exposure to air pollution and noise. Workplaces pose specific physical and chemical risks to adolescent workers, whose vulnerability is increased by unsafe behaviours.

There is a need to identify how these multiple environmental health risks cluster in certain settings in order to plan preventive strategies that can lead to cost-effective health gains among children and adolescents. The key settings to consider include, for example, the home, the school and the route to the school, playgrounds, leisure and sports areas, the rural-agricultural environment, and urban transport.

Community-based interventions using relevant information on local patterns of injury and their causes have reduced the rates of injuries in many countries (especially the industrialized ones). The prevention of injuries is achieved through environmental

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modifications, changing the designs or structures (engineering), applying and/or reinforcing regulatory measures, and, overall, changing unsafe behaviours through education.

Scaling-up of actions

Further work is required on reviews of the existing evidence on the links between environmental factors and injuries occurring in specific settings. The preparation and dissemination of reports on the magnitude of those risks, their common determinants, and on the most susceptible groups would help communities to plan interventions.

Strategies for action should be defined and proposed for each of the settings considered

(home, school, playground, other), based upon the priority issues identified and the experience with preventive interventions and their effectiveness. Pilot projects to address childhood environmental and injury risks through integrated preventive strategies and their evaluation especially in developing countries will stimulate the policy process and ensure that interventions are based on evidence.

Regulatory measures, environmental changes, and education play a crucial role in the prevention of injuries and accidents in children's environments. However, the most successful interventions are those where these three approaches are combined.

4. CREATING HEALTHY SETTINGS

Children are often exposed not just to one physical risk factor at a time, but to several of them simultaneously. Their effects are mostly modulated by behavioural, social and economic conditions, resulting in an exacerbation of ill-health outcomes. Sound approaches to create healthy environments for children, therefore, need to address a whole plethora of factors acting in concert. Bearing this in mind, it is evident that the child itself should be placed in the centre of action, and not individual risk factors. This necessitates taking a holistic approach, with a view to improving the settings or places where children spend their lives.

The focus is on places where children live and grow: the home, the school and the

community. Health hazards and their determinants in children's everyday environment have to be identified and protective measures that can be adopted by parents, families, neighbours, teachers, health and community workers, the local population, and the children themselves have to be devised, promoted and facilitated.

Many of the determinants of risk in children's microenvironments lie beyond the control of the local community. Policies and strategies will be advocated and promoted to address the larger socioeconomic and political factors contributing to contamination and deterioration of the environment and impeding progress towards a resolution of these problems.

Health hazards in the home and the community

Indoor air pollution from cooking and heating (notably using wood, coal and charcoal) and inadequate ventilation are the major hazards in the family home in rural areas of developing countries. Tobacco smoke is a significant indoor contaminant in many places. Lack of clean water is another major hazard and the further the source of water from the home, the greater the risk to health. Contamination of food and poisoning from household products is difficult to avoid in cramped and ill-equipped homes or shelters. Overcrowding exacerbates sources of infection. Houses may provide inadequate shelter; they may be too cold, too hot, inadequately lit and damp. Dangerous substances in building materials, such as lead or asbestos, pose additional problems, as do various building standards, for example unsafe electrical wiring.

Settings in the community include the school, the street, the playground, the workplace (farming, commerce, industry, the informal sector, "cottage industries"), industrial sites, waste dumps, and the interior of vehicles during transport and in rural areas, the home and the surrounding fields.

The school environment shares some of the same problems as the home. The physical school environment includes the school building and all its contents (including physical structures, infrastructure, furniture, and the use and presence of chemicals and biological agents), the site on which a school is located, and the surrounding environment including air, water, nearby land uses, roadways and other hazards, as well as materials that children may come into contact with. Provision of safe water, sanitation and shelter are basic necessities for a healthy physical learning environment. Equally important is protection from biological,

physical (e.g. noise) and chemical risks that can threaten children's health. Hazards including infectious diseases transmitted through water, and physical risks associated with poor construction and maintenance practices are examples of risks children face at school throughout the world.

The safety of outdoor air in the community depends on proximity to the polluting industry, power plants, and areas of high traffic load. Inside cars and buses, and in the street, especially in urban areas, children are exposed to high levels of the classic contaminants associated with motor vehicle exhaust. Millions of street children in the world live, work, sleep and breathe in the street 24 hours a day, and are particularly vulnerable to multiple potentially fatal hazards including abuse, unintentional injury and violence.

In the workplace, children's exposure may not be very different from adults but children are less experienced, less aware and less able to ask for or comply with safety regulations. They are also more vulnerable to adverse health effects, such as musculo-skeletal trauma and stress, as well as to exposures to toxic chemicals. In rural areas, children work in the fields without any protection even when pesticide spraying is going on all around and above them.

Children often play near dumps, landfills, and illegal discharges and may be exposed to dangerous levels of toxic substances. The ground itself (including the floor of houses) is also a source of chemical and biological contaminants such as pesticide residues and lead if near heavy traffic.

Components of healthy environments for children

Provision of basic necessities	<ul style="list-style-type: none"> ■ Shelter ■ Warmth ■ Water ■ Food ■ Light ■ Ventilation ■ Sanitary facilities ■ Emergency medical care
Protection from biological threats	<ul style="list-style-type: none"> ■ Moulds ■ Water-borne pathogens ■ Food-borne pathogens ■ Vector-borne diseases ■ Venomous animals ■ Rodents & hazardous insects
Protection from physical threats	<ul style="list-style-type: none"> ■ Traffic and noise ■ Violence and crime ■ Injuries and accidents ■ Radiation ■ Heat and dust
Protection from chemical threats	<ul style="list-style-type: none"> ■ Air pollution ■ Water pollution ■ Pesticides and other chemicals ■ Hazardous waste ■ Hazardous materials and finishes ■ Cleaning agents ■ Second-hand tobacco smoke

Who can do what in the community?

Many health hazards are common to all settings and appropriate interventions will take this into account. However, problems in each setting may best be tackled by a specific set of actors. There is a need to identify and support solutions, which build on the capacity of community members, local resources and vested interests.

Typical patterns of risk and the most frequent, by resulting health hazards, can be identified so that efforts can be devoted most efficiently to priority problems. Teachers, parents, health and social workers, local organizations and,

in some cases, older children can all contribute to an initial assessment which is the community's first task.

Core messages, key targets, and priority action can then be decided by local committees of teachers, health workers and local community leaders (such as religious leaders, village councils, and civilian groups). Simple measures requiring materials and equipment, which can be made locally, can be undertaken through collective community effort, with financial and technical support from local municipal or national authorities when required. Such an initiative could be the creation of smoke-free public spaces and

schools. Next comes the identification and adaptation of appropriate technologies and facilitatory mechanisms to support action (financially and technically), which is locally controlled and implemented.

A key protective factor in the home is *parental* (usually maternal) *presence*. Given their multiple responsibilities, poor women are unlikely to be able to devote much time to watching their children. Fuel and water sources close to the home to reduce the hours spent in these survival activities are essential. Basic education in simple and cheap hygiene and nutrition (handwashing, breastfeeding) and prevention of unintentional injuries can significantly reduce risks. Simple appropriate technologies such as fuel-efficient, closed stoves are urgently needed.

Teachers play a major role in education on prevention and protection; older children and young people who are particularly effective in conveying essential messages and providing examples to young children can assist them in this task. Community groups, coordinated by local health workers, can also provide information and simple training to groups of adults. This requires finding or designing clear, simple educational materials and basic protection messages to be integrated into school curricula. Targeted mass media programmes, such as radio and TV campaigns, could effectively support this process.

5. MECHANISMS FOR IMPLEMENTATION

The key to implementing a programme on Healthy Environments for Children will be the creation of a concerted, popular, participatory and inclusive "movement", which addresses the issue in an integrated manner, centring on the children rather than on individual environmental hazards. The basic principle on which the movement builds is that the stakeholders at every level can make a difference e.g. decision-makers at international, regional, national and community levels, community leaders, teachers, NGOs, the private sector and families. Besides the health sector, the movement must involve various other sectors, including environment, energy, transport, housing, agriculture and education. Action needs to be based on scientific evidence to ensure that the major environmental determinants of adverse health outcomes in children are adequately addressed, and that the most appropriate interventions are

considered. It needs to be driven by a strong commitment to act primarily at the local and national level.

While working towards achieving the Millennium Development Goals and their specific targets, the movement needs to go further than only reducing child mortality by aiming at combating morbidity and improving the quality of life of children. In developing strategies for action, the principle of subsidiarity should prevail i.e. actions should be taken at the lowest appropriate level, and as near as possible to the respective target group. Decisions and actions that can most effectively be taken at the local level should not be taken at the national level or higher. As a first step, specific, ambitious but achievable targets for action with clearly identified responsibilities, and traceable milestones must be established at the local, national, and international level. Mechanisms need to be put in place to ensure the provision

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of technical, financial and other support required in countries to implement national initiatives through integrated, intersectoral mechanisms and building national partnerships for action.

The major elements of the implementation strategy are envisaged to be:

- ***Taking stock of ongoing efforts.*** A major preliminary step is to evaluate work currently underway. This requires the collection of information on ongoing efforts that are targeting children in the field of health and environment at all levels, with an emphasis on international and major national efforts, and the preparation of an inventory highlighting the need for action and the potential for cooperation and synergies.
- ***Creating a popular movement.*** Healthy environments for children will only become a reality if all the potential players feel that they can make a difference from their respective angle. Taking responsibility for action with the knowledge that everyone can make a difference will ensure the success of the initiative. The movement needs to encompass all children, rich and poor, living in rural and urban communities, both in developing and in industrialized countries.
- ***Consolidating and disseminating scientific knowledge.*** Action to be taken must be evidence-based. The collection, evaluation and dissemination of information on children's health, environmental determinants, and their linkages, as well as on cost-effective interventions and their efficacy constitute a first line of action. Use of generally agreed, scientifically validated indicators is essential to measure progress. Finally, simple and easily accessible systems to disseminate this information need to be established.

- ***Research and development.*** Evidence-based actions require an investment in research to supplement existing knowledge, in particular leading to an improved knowledge base on children's environmental health risk factors and their linkages, and to the development and evaluation of operational interventions and their cost-effectiveness. However, this investment into research should not delay immediate action on issues where adequate knowledge is already available.
- ***Influencing policies.*** Healthy environments for children should be placed high on the public health agenda, and should be an integral part of development policies. Children's health and the environment should be a driving force for multisectoral policies. One success story is that of lead removal of lead from gasoline, a transport policy measure, was based on evidence of the adverse cognitive effects in exposed children, and resulted in improved environmental conditions and child health. Efforts should be made to increase awareness among high-level decision-makers of the importance of providing safe and clean environments for children, and of promoting healthy behaviours in order to ensure children's growth, development and good health.
- ***The healthy settings approach.*** Integrated approaches are the key to creating healthy environments for children. The concept of healthy schools, healthy homes, and healthy communities provides an appropriate mechanism to implement such approaches. It covers the dissemination of information about, and the promotion of, cost-effective, economically sustainable and culturally appropriate interventions for improving the quality of the children's homes and schools, and community environments. This includes education and awareness-

building, provision of basic necessities in the respective setting, and ensuring protection from biological, physical and chemical risk factors. In the case of communities, the healthy settings approach allows the mobilization of community leaders to champion the necessary actions, and the creation of mechanisms for participatory action by various community groups.

- **Support to the health sector.** Raising the awareness of health professionals about environmental risk factors in children and their linkage to adverse health outcomes, whether they occur during childhood or later in life, is key. It requires the development of appropriate training and guidance materials for physicians, nurses, midwives, and other health professionals, and the inclusion of such material in curricula. Expanding monitoring, surveillance and response systems should

allow the detection and management of paediatric disease outbreaks of environmental etiology. Specific health sector interventions need to be developed and evaluated, building on existing services and networks, and making better use of available interventions and tools.

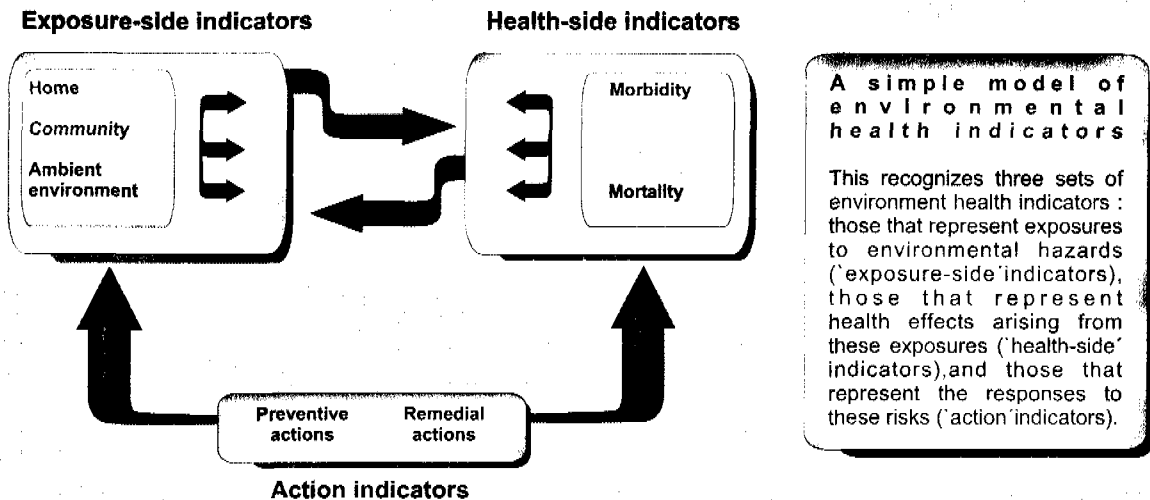
- **Intersectoral cooperation.** Multi-sectoral, integrated approaches are required. Interventions through appropriate sectors, other than the health sector, can in many instances better ensure that preventive actions are taken through cost-effective interventions. Sectors to be involved include environment, transport, agriculture, housing, energy, and others. Sound agricultural policies, for example, could result in a reduction of children's exposure to pesticides. The education sector is key here, since knowledge is one of the most effective tools to avoid unhealthy environments and behaviours.

6. MONITORING CHILDREN'S ENVIRONMENTAL HEALTH

Children's health and wellbeing are strongly affected by environmental problems, but too little is known about how much of the burden of disease caused by environmental problems falls on children. A programme of independent auditing and monitoring of progress in improving the health status of children in relation to their environment has to be established at the national and international level. Several recent international declarations, including the G8 Ministerial Statement on the World Summit on Sustainable Development (2002), highlighted the need for more information and called for action to develop children's environmental health indicators.

These indicators will not only guide policies and action, and help governments to assess the success of their programmes, but will also speak more forcefully for children than words alone. A project to launch an international, collaborative effort to develop, pilot-test and monitor indicators will be initiated at the World Summit on Sustainable Development by the US Environmental Protection Agency, in cooperation with a variety of national and international partners. The initiative builds on ongoing efforts, such as the framework for children's environmental health indicators developed by WHO and the activities of regional institutions in Europe and the Americas.

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The Joint Monitoring Programme for Water Supply and Sanitation (JMP), which combines WHO's and UNICEF's experience and resources, may serve as a model system for monitoring children's environmental health. Since 1991, the JMP has regularly reported on the status of the water supply and sanitation sector, and supports countries in their monitoring efforts.

The estimation of the environmental burden of disease at the national and local level will also contribute directly to the monitoring of children's environmental health. Guidance for this assessment is currently being prepared for ten environmental risk factors. Future assessments will directly reflect the disease burden borne by children and thereby monitor progress in reducing different environmental health problems over time.

7. BUILDING A GLOBAL ALLIANCE

Why a Global Alliance?

The diversity of challenges and players involved in addressing children's environmental health indicates that no single entity – be it a government or WHO – can tackle the problems alone. Rather, a broad-based alliance is needed that draws on the unique and complementary strengths of several government departments and sectors (at local and national level), consumer groups and NGOs, the private sector, the UN family as well as Foundations, and research and academic groups. By working together, they will more effectively address the gaps in capacity and the needs that exist in many

countries to develop and implement effective programmes and policies. Moreover, by working together they will be able to accomplish the tasks and objectives that would otherwise be unattainable or delayed.

An alliance can draw upon new and compelling evidence of the effectiveness of interventions to tackle the various dimensions of children's environmental health, link that knowledge to community action, and mobilize additional resources for implementation. Further, a strong and multi-institutional alliance could advocate globally for increased resources to promote healthy environments for children, as well as for the

use of effective tools. Acting together, the alliance members could provide a clearinghouse for information and research, which will be a basis for community and national action.

The structure of the alliance will be critical for providing the political links, direction and form which will facilitate intersectoral action and community participation. Experience in many other areas of public health suggests that for the goals and objectives of the initiative to be optimally met, a flexible structure will work best. It needs to reflect global diversity, be able to endorse a selected number of strategic directions and actions, and remain open to future partners who may wish to join over the months and years to come.

In each area of environmental risks described above, many players are already active. It is crucial to acknowledge past and ongoing work, and to highlight the potential value that will be added as alliance members are drawn into scaled-up, and more globally oriented actions. The alliance's success, however, will not be limited to its ability to address each of the issues separately, but rather by the way in which, through acting together, better solutions will be found for addressing children's health issues and environmental risk factors in a more effective and synergistic way.

The sharing of information, expertise and efforts will result in the following important benefits: firstly, increasing the effectiveness of interventions; secondly, expanding the reach of limited resources; and thirdly, stimulating governments and others to act in a collective, coherent approach. The alliance is expected to make a measurable difference to the attainment of its objectives within a 3 to 5 year framework.

Local, community-based approaches are essential to support the sustainability of interventions. Local movements will require not only political backing from national

governments and the close involvement of communities and civil society, but also the support and guidance of an international alliance.

Global direction, advocacy and resource mobilization are essential. However, national movements are vital for creating and ensuring safe and healthy environments for children and promoting hygienic behaviours. National movements will catalyse the efforts of different stakeholders, coordinate actions, and strengthen networks. They will help identify the main environmental risks and prepare local strategies for informing their communities, and for promoting education and research on environmental health issues. They will ensure that global ideas are translated into local reality.

Developing the Global Alliance

The first activities for developing the alliance are adequate planning and agreements on how to operate. The Alliance should aim at becoming fully functional by early 2003. The tasks to be accomplished are likely to include:

- An event to mark the founding of the alliance, and to give an indication of priority areas for future action.
- Initial alliance members at the global and national levels will be identified through widely published "calls to action". Identification of appropriate alliance members is a critical step as it determines the legitimacy of the initiative and the ability to develop new insights, ideas and approaches, and to establish consensus. Alliance members should be interdependent in reaching solutions to identified problems and issues.
- A small interim stakeholder group will be set up (to be broadened with time), whose first task will be to convene a series

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of consultative and “brainstorming” meetings to help further define the key objectives, functions and outcomes of the alliance, and to steer the alliance in the agreed direction.

- A communication and advocacy strategy will be developed which will focus on mobilizing additional financial resources and encouraging key decision-makers to support the planned actions.
- In this process, the specific contribution of each alliance member in the initiative will be identified and agreed upon.
- Task Forces to tackle specific issues and develop draft plans of action will be set up. They will, for example, identify operational research priorities, or select specific issues and work areas like water

and sanitation, indoor air pollution, chemical hazards, injuries, and disease vectors. This will help to focus the interests and energies of the diverse groups.

- Continuous review of ongoing or planned activities of the different alliance members will help determine emerging opportunities for future collaboration.
- As this work progresses, the alliance founders will announce sets of time-bound objectives attainable within the newly created resource and political base for the Healthy Environments for Children initiative, and action plans for implementation will rapidly be put in place.

ANNEX

THE BANGKOK STATEMENT

A pledge to promote the protection of Children's Environmental Health

We, the undersigned scientists, doctors and public health professionals, educators, environmental health engineers, community workers and representatives from a number of international organizations, from governmental and nongovernmental organizations in South-East Asian and Western Pacific countries, have come together with colleagues from different parts of the world from 3 to 7 March 2002 in Bangkok, Thailand, to commit ourselves to work jointly towards the promotion and protection of children's health against environmental threats.

Worldwide, it is estimated that more than one-quarter of the global burden of disease (GBD) can be attributed to environmental risk factors. Over 40% of the environmental disease burden falls on children under 5 years of age, yet these constitute only 10% of the world population. The environmental burden of paediatric disease in Asia and the Pacific countries is not well recognized and needs to be quantified and addressed.

We recognize:

That a growing number of diseases in children have been linked to environmental exposures. These range from the traditional waterborne, foodborne and vector-borne diseases and acute respiratory infections to asthma, cancer, injuries, arsenicosis, fluorosis, certain birth defects and developmental disabilities.

That environmental exposures are increasing in many countries in the region; that new emerging risks are being identified; and that more and more children are being exposed to unsafe environments where they are conceived and born, where they live, learn, play, work and grow. Unique and permanent adverse health effects can occur when the embryo, fetus, newborn, child and adolescent (*collectively referred to as "children" from here onwards*) are exposed to environmental threats during early periods of special vulnerability.

That in developing countries the main environmental health problems affecting children are exacerbated by poverty, illiteracy and malnutrition, and include: indoor and outdoor air pollution, lack of access to safe water and sanitation, exposure to hazardous chemicals, accidents and injuries. Furthermore, as countries industrialize, children become exposed to toxicants commonly associated with the developed world, creating an additional environmental burden of disease. This deserves special attention from the industrialized and developing countries alike.

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That environmental hazards arise both from anthropogenic and natural sources (e.g. plant toxins, fluoride, arsenic, radiations), which separately and in combination can cause serious harm to children.

That restoring and protecting the integrity of the life-sustaining systems of the earth are integral to ensuring children's environmental health now and in the future. Therefore, addressing global changes such as human population growth, land and energy use patterns, habitat destruction, biodiversity loss and climate change must be part of efforts to promote children's environmental health.

That despite the rising concern of the scientific community and the education and social sectors about environmental threats to children's health and development, progress has been slow and serious challenges still remain.

That the health, environment and education sectors must take concerted action at all levels (local, national, global), together with other sectors, in serious efforts to enable our countries to assess the nature and magnitude of the problem, identify the main environmental risks to children's health and establish culturally appropriate monitoring, mitigation and prevention strategies.

We affirm:

That the principle "*children are not little adults*" requires full recognition and a preventive approach. Children are uniquely vulnerable to the effects of many chemical, biological and physical agents. All children should be protected from injury, poisoning and hazards in the different environments where they are born, live, learn, play, develop and grow to become the adults of tomorrow and citizens in their own right.

That all children should have the right to safe, clean and supportive environments that ensure their survival, growth, development, healthy life and well-being. The recognition of this right is especially important as the world moves towards the adoption of sustainable development practices.

That it is the responsibility of community workers, local and national authorities and policy-makers, national and international organizations, and all professionals dealing with health, environment and education issues to ensure that actions are initiated, developed and sustained in all countries to promote the recognition, assessment and mitigation of physical, chemical and biological hazards, and also of social hazards that threaten children's health and quality of life.

We commit ourselves:

To developing active and innovative national and international networks with colleagues, in partnership with governmental, nongovernmental and international organizations for the promotion and protection of children's environmental health, and urge WHO to support our efforts in all areas, especially in the following four:

PROTECTION AND PREVENTION – To strengthen existing programmes and initiate new mechanisms to provide all children with access to clean water and air, adequate sanitation, safe food and appropriate shelter:

- Reduce or eliminate environmental causes and triggers of respiratory diseases and asthma , including exposure to indoor air pollution from the use of biomass fuels and environmental tobacco smoke.
- Reduce or eliminate exposure to toxic metals such as lead, mercury and arsenic, to fluoride, and to anthropogenic hazards such as toxic wastes, pesticides and persistent organic pollutants.
- Reduce or eliminate exposure to known and suspected anthropogenic carcinogens, neurotoxicants, developmental and reproductive toxicants, immunotoxicants and naturally occurring toxins.
- Reduce the incidence of diarrhoeal disease through increased access to safe water and sanitation and promotion of initiatives to improve food safety.
- Reduce the incidence of accidents, injuries and poisonings, as well as exposure to noise, radiation, microbiological and other factors by improving all environments where children spend time, in particular at home and at school.
- Commit to international efforts to avert or slow global environmental changes, and also take action to lessen the vulnerability of populations to the impact of such changes.

HEALTH CARE AND RESEARCH – To promote the recognition, assessment and study of environmental factors that have an impact on the health and development of children:

- Establish centres to address issues related to children's environmental health.
- Develop and implement cooperative multidisciplinary research studies in association with centres of excellence, and promote the collection of harmonized data and their dissemination.
- Incorporate children's environmental health into the training for health care providers and other professionals, and promote the use of the environmental history.
- Seek financial and institutional support for research, data collection, education, intervention and prevention programmes.
- Develop risk assessment methods that take account of children as a special risk group.

Initiating an Alliance for Action

EMPOWERMENT AND EDUCATION – To promote the education of children and parents about the importance of their physical environment and their participation in decisions that affect their lives, and to inform parents, teachers and caregivers and the community in general on the need and means to provide a safe, healthy and supportive environment to all children:

- Provide environmental health education through healthy schools and adult education initiatives.
- Incorporate lessons on health and the environment into all school curricula
- Empower children to identify potential risks and solutions.
- Impart environmental health expertise to educators, curriculum designers and school administrators.
- Create and disseminate to families and communities culturally relevant information about the special vulnerability of children to environmental threats and practical steps to protect children.
- Teach families and the community to identify environmental threats to their children, to adopt practices that will reduce risks of exposure and to work with local authorities and the private sector in developing prevention and intervention programmes.

ADVOCACY – To advocate and take action on the protection and promotion of children's environmental health at all levels, including political, administrative and community levels:

- Use lessons learned to prevent environmental illness in children, for example by promoting legislation for the removal of lead from all gasoline, paints, water pipes and ceramics, and for the provision of smoke-free environments in all public buildings.
- Sensitize decision-makers to the results of research studies and observations of community workers and primary health care providers that need to be accorded high priority to safeguard children's health.
- Promote environmental health policies that protect children.
- Raise the awareness of decision-makers and potential donors about known environmental threats to children's health and work with them and other stakeholders to allocate necessary resources to implement interventions.
- Work with the media to disseminate information on core children's environmental health issues and locally relevant environmental health problems and potential solutions.

For all those concerned about the environmental health of children, the time to translate knowledge into action is now.

Bangkok, 7 March 2002