healthy environments for healthy children

key messages for action

World Health Organization

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Healthy Environments for Healthy Children — key messages for action

This booklet presents key messages for action, summarized from a set of chapters on different environmental health issues, available at www.who.int/ceh/publications/healthyenvironmentsforhealthychildren. The work is a result of an on-going partnership between WHO, UNEP and UNICEF in the area of children's environmental health, and seeks to update the 2002 joint publication "Children in the New Millennium: Environmental Impact on Health."[1]

Over the last 20 years there have been acknowledgements at the highest level of the need to protect the environment in order to underpin efforts to safeguard child health. As far back as 1989, States pledged in the Convention on the Rights of the Child[2] to "combat disease and malnutrition… taking into consideration the dangers and risks of environmental pollution." Recently, the call for action to address children's environmental health (CEH) has been gaining momentum, as more is known about how adverse environments can put children's growth, development, well-being and very survival, at risk. Notably, the G8 Siracusa Environment Ministerial Meeting,[3] (April, 2009) recently expressed "We can do more to ensure that children are born, grow, develop and thrive in environments with clean air, clean water, safe food, and minimal exposure to harmful chemicals."

We have committed to this work faced with the knowledge that around three million children under five years die each year due to a number of largely preventable environment-related causes,[4] and conscious of the fact that environmental challenges, including climatic change and increased urbanisation, have the potential to make every one of the United Nations Millennium Development Goals, including those on eradicating poverty and improving the health and well-being of children and their caregivers, less achievable. The poorest and most marginalized children in developing countries suffer most. Although many commitments and international agreements have been made in relation to protecting children's health from environmental threats, progress towards stemming these risks has been slow.

Significant action is now required to achieve healthier, safer and cleaner environments – as this is not only imperative for child health, but also possible. Tools and mechanisms are available. Partnerships for acting together on many fronts, building

on existing programmes and adapting concrete actions to local needs, can make a difference.

WHO, UNEP and UNICEF are jointly taking a step forward in this booklet, proposing key messages for concrete action to confront the environmental health issues faced by children, their parents and communities all over the world. The aim is to provide decision makers at all levels (from the local to the international), including community leaders, teachers, health-care providers, parents, and other caregivers, with the information they need to promote healthier environments for children, using practical examples. The challenge is to ensure that everyone knows and understands the threats to child health and well-being from environmental risk factors and is motivated to take practical action to minimize these risks.

The future of our children and their lives as adults depend on a full enjoyment of good health in a safe, protective environment, from conception to adolescence and beyond.

Introduction

Globally, children are disproportionately exposed to a myriad of environmental threats. Evidence is mounting that worsening trends of global environmental degradation, including the erosion of ecosystems, increased pollution, and the effects of climatic changes, contribute to the burden of disease confronting children, in both developed and developing countries. These circumstances are affecting the world's ability to meet the Millennium Development Goals (MDGs) and the other internationally agreed upon development goals.

The health implications of environmental degradation for children are profound. Every year, around three million children under five die from preventable environment-related causes and conditions. This makes the environment one of the most critical contributors to the global toll of 8.8 million child deaths annually,[5] with the noteworthy killers – if a child survives the neonatal period – being respiratory and diarrhoeal diseases, and malaria. Air pollution, unsafe water, lead in soil, pesticide residues in food, and ultra-violet radiation are a few of the multitude of environmental threats that may alter the delicate organism of a growing child, causing disease, developmental problems or adverse effects later in life.

Children are especially vulnerable, as they respond differently than adults when exposed to environmental factors. Their immune defences are not fully mature and their developing organs are more easily harmed; thus environmental contaminants may affect children disproportionately. In addition, their airways are smaller than those of adults, and irritating particles may act very fast, causing respiratory difficulties. They generally spend more time active and outdoors than adults, increasing their risk of exposure considerably. Also proportionate to their size, children ingest more food, drink more water and breathe more air than adults, and children's normal activities – such as putting their hands in their mouths or playing outdoors – can result in higher exposures to certain contaminants. Even while in the womb, the child-to-be can also be exposed to adverse environmental risk factors that may give rise to diseases later in life – imposing a heavy burden on public health systems.

We still have an "unfinished agenda" to control those diseases linked to unsafe water and food, lack of sanitation and indoor air pollution. In addition, children may be exposed to new or recently recognized risk factors: climate change, ozone depletion, manufactured nano-particles and endocrine disrupting chemicals (EDCs) are among the relatively new concerns. Harmful chemicals in soil and effluent, originating from waste, traffic or other activities may be present in places where children spend time.

Some especially long-lasting contaminants (mercury and persistent organic pollutants – POPs) are widely recognized as a threat to health and the environment and are the focus of major international agreements.

Environmental threats and exposure are in many cases preventable. Pro-active coordinated actions are required to raise awareness and reduce risk and vulnerability. Preventive interventions on the environmental management and health sector sides have proven to be effective in protecting children from adverse exposures in many countries and provide a wealth of knowledge and experience from which we can build a strong foundation for informed and effective action.

Drawing on these experiences, as well as advances in the research and data available, we present in this booklet key messages for action in relation to the main environmental threats to children.

Global Environmental Change —

Actions to tackle global environmental change can be taken at all levels from the international, to the national, community, school and individual, and can bring about immediate benefits to child health.

CLIMATE CHANGE, by altering weather patterns and disturbing life-supporting natural systems, affects the basic requirements for health and well-being: clean air and sufficient water, sufficient food, functioning ecosystems and adequate shelter. There is growing evidence that climate change is contributing to the burden of disease, particularly in developing countries[6], where health-care systems are under-equipped to deal with the compounding effects of these changes. Sustained and immediate climate change mitigation and adaptation measures are essential for the protection of children, as many of their main killers (malaria, diarrhoea and undernutrition) are highly sensitive to climatic conditions.

Key messages: what every family and community should know about climate change

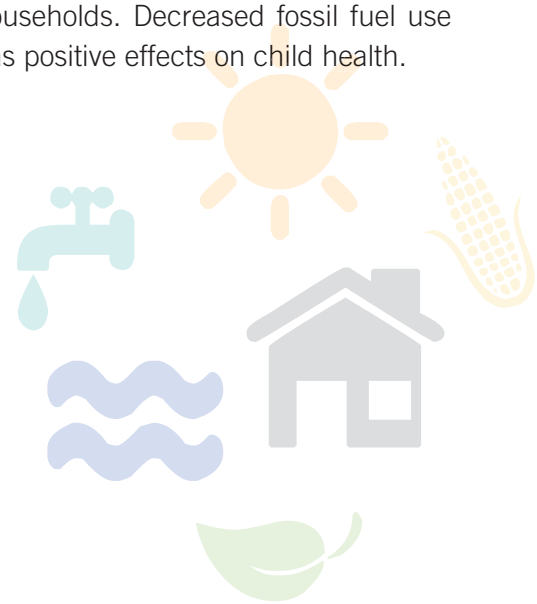
1. Climate change is likely to increase the frequency and intensity of natural disasters. Communities need to be informed about risks and vulnerabilities, and supported to develop preparedness and response strategies, with a focus on the vulnerability of children and teaching them how to respond.

2. Climate change threatens water supplies and quality. Communities need to be supported in managing water resources in an integrated way, protecting existing sources and the ecosystems that support them, and sustainably utilizing safe alternative sources (i.e. rainwater harvesting).

3. Weather disruptions, exacerbated by climate change, including rises in temperature and shifts in rainfall patterns, will impact food supplies, threatening nutrition and health. Water stress and scarcity will increasingly impact community water supply. Communities should be supported in terms of adjusting agricultural practices to avoid losing crops to drought or floods, i.e. where available, using more drought resistant crop varieties, better suited to the changed climate.

4. Climate change can make vector-borne diseases, such as malaria, which are highly sensitive to temperature and rainfall, more widespread. Communities should use insecticide-treated nets. They should, if applicable, allow sprayers to come into their homes to apply residual insecticide on walls, and stop mosquitoes from breeding by eliminating stagnant water areas, and improving sanitation.

5 Climate change will undermine air quality, compounding risks of respiratory diseases. Solar cookers and lamps, smokeless stoves and clean energy alternatives are becoming more affordable and should be promoted for households. Decreased fossil fuel use has positive effects on child health.



DEFORESTATION. Forests play a critical role in regulating the world's climate and supporting agricultural production, filtering and maintaining water supplies, protecting against soil erosion, and preventing natural disasters. Millions of people – including children – depend on forest products and services for food, medicine, building materials, fuel for cooking and heating, and to support livelihoods. Deforestation is affecting the availability and production of food, access to clean water, exposure to disease, vulnerability to disasters, and respiratory health, and thereby children's health. The rich medicinal resources stored in forests are another link to child health.

Key messages: what every family and community should know about deforestation

1. Deforestation affects the availability and production of food directly through the availability of forest foods and indirectly through the impact on land with serious implications for child nutrition.

2. Deforestation impacts watersheds, compromises aquifer levels and rainfall patterns, and intensifies flooding and droughts, threatening water supplies that are vital for child health. By preserving and managing forests, communities are protecting valuable water sources.

3. Deforestation leads to soil erosion and land degradation, which can lead to desertification, mudslides or floods, all with significant implications for child health and well-being. Communities can protect their land and improve its productivity by planting trees, especially indigenous types.

4. Deforestation and subsequent land-use changes can increase vector breeding grounds, making diseases such as malaria more widespread. Families and communities can prevent such diseases by preserving the forests and taking action to stop mosquitoes and other vectors from breeding.

> "Children are more likely to succumb to natural disasters. They are born into this climate change problem – trees being cut, rubbish being burned. These are serious issues affecting a child's health and future."
>
> Honorable Maria Mutagamba
> Minister of Water and Environment Republic of Uganda

❺ Deforestation contributes to climate change, which in turn impacts child health. By preserving the forests, communities are both mitigating and adapting to climatic changes.

❻ Deforestation impacts respiratory health – with indoor air pollution from fuel-wood use and outdoor air pollution from fires set to clear land. Communities should be supported in shifting to cleaner, more sustainable sources of energy, and in using traditional energy sources more efficiently.

BIODIVERSITY. Child health is highly dependent on the maintenance of functioning ecosystems that can provide clean water and air, food and medicine. The loss of ecosystem productivity, such as decreased soil fertility or over-fishing, can lead to malnutrition, stunted growth and development, and increased vulnerability to disease. Biodiversity loss and ecosystem degradation also compromise the resilience of communities in the face of natural disasters, altering exposure and vulnerability to disease outbreaks, and increasing the risks faced by children living in harsh environmental conditions.

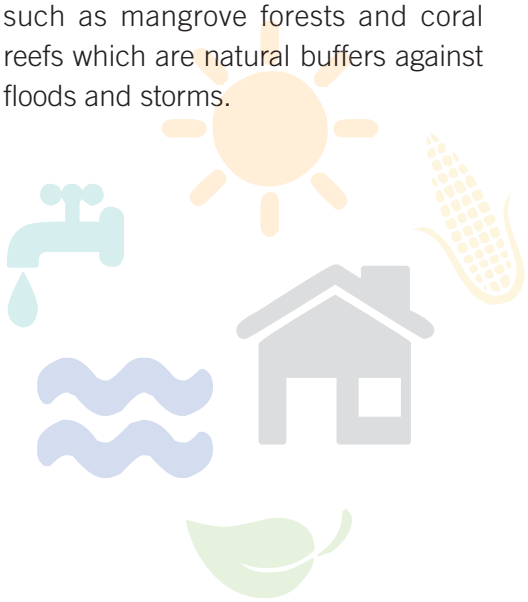
Key messages: what every family and community should know about biodiversity

❶ Biodiversity plays a crucial role in child nutrition, enabling the production of foods, both wild and cultivated. Actions to conserve biodiversity and promote ecosystem management help improve food security and child nutrition, by providing a stable environmental basis for sustained food production. Support should be given to communities to cultivate a variety of traditional foods (including in school gardens), to plant and care for indigenous trees, and to organize awareness campaigns.

❷ Biodiversity loss compromises the ability of ecosystems to provide and purify water. Ecosystems, particularly wetlands, act as sponges that filter impurities from rainfall and runoff. Children, in particular, need clean water to survive.[12] Communities need to be enabled to protect and manage ecosystems in an integrated way, including protecting watersheds to support water supply and quality.

❸ Biodiversity provides a unique and irreplaceable source for medicines and advances in understanding disease, thereby supporting child health. For many centuries, plants have been used to make medicines, and more recently, soil microbes have provided the source for antibiotics. New advances are being made all the time, reaping as yet unknown and innumerable benefits biodiversity. Communities and youth groups should be enabled to conserve and benefit from their local biodiversity, including learning from traditional practices and focusing on plants that have medicinal value.

❹ Biodiversity is essential to reduce the vulnerability of communities. The loss of biodiversity destabilizes ecosystems, weakening their resilience and ability to deal with the frequency and impact of natural disasters. Communities should be enabled to preserve key ecosystems, such as mangrove forests and coral reefs which are natural buffers against floods and storms.



LAND DEGRADATION AND DESERTIFICATION.

The consequences of land degradation and desertification include malnutrition and famine, and the increase of waterborne, infectious and respiratory diseases. They have massive socio-economic effects including destroying livelihoods and deepening poverty. Studies show that the average infant mortality rate (about 46 per 1,000) in developing nations newly affected by desertification, the so-called "drylands", exceeds that for non-"dryland" countries by one fifth or more.[7]

Key messages: what every family and community should know about desertification

❶ Land degradation and desertification undermine ecosystem services, including soil productivity, with consequences for food production and child nutrition. Practical measures to prevent and restore degraded land, include a range of sustainable land, water, forest and livestock management practices. Planting trees in degraded land – and among crops – can have many benefits – including restoring soil productivity, preventing soil erosion and sequestering carbon.

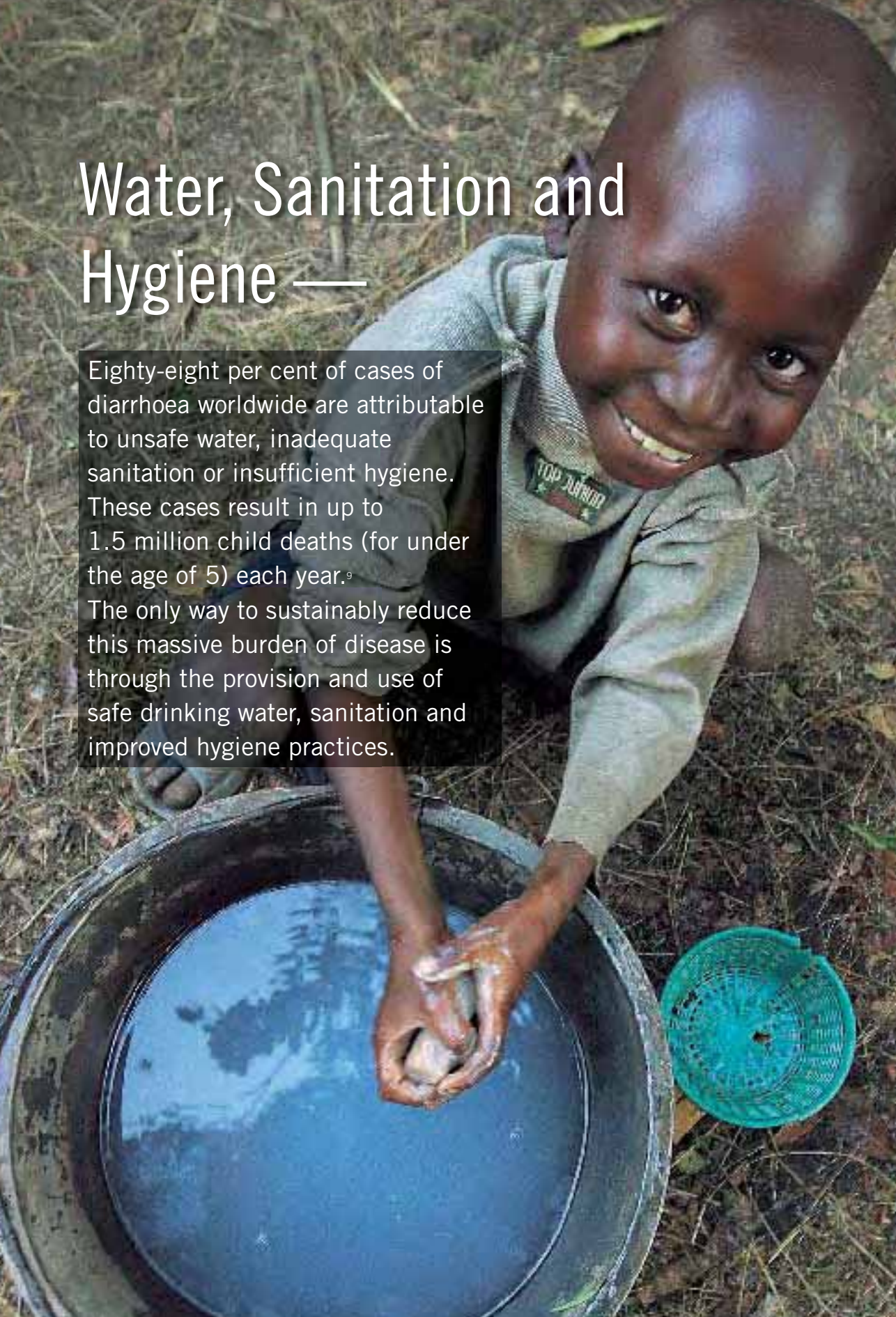
❷ The scarcity of water in drylands reduces access to clean drinking water, adequate sanitation and water for food production and survival, with direct impact on children. The loss of water sources forces people to use polluted water. In addition, traditional water-fetchers, namely mothers and children, must walk further to fetch water, often alone – increasing their caloric and water need – and putting them at risk of physical and sexual assault.[8] Sustainable integrated water management is particularly urgent in dry-land areas.

❸ Land degradation and desertification increases wind-blown dust, causing sore eyes, dry skin (that cracks easily permitting the entry of microbes and other infections), fever, coughing and other respiratory ailments. Communities can erect windbreaks and buffers to prevent the movement of soil particles. i.e. Trees, shrubs, and other plants can help reduce the movement of soils and sand and fences and boulders can act as barriers from soil, dust and sand.

4 Land degradation and desertification have enormous social costs. Worldwide, desertification threatens to swell by millions the number of poor forced to seek new homes and livelihoods, with direct implications for child well-being. Improved natural resources management and the creation of viable livelihood alternatives for dryland populations are required to reverse these trends.

Water, Sanitation and Hygiene —

Eighty-eight per cent of cases of diarrhoea worldwide are attributable to unsafe water, inadequate sanitation or insufficient hygiene. These cases result in up to 1.5 million child deaths (for under the age of 5) each year.[9]
The only way to sustainably reduce this massive burden of disease is through the provision and use of safe drinking water, sanitation and improved hygiene practices.



WATER is vital to all aspects of human life. Healthy freshwater ecosystems provide essentials to life, health and livelihoods. In 2006 the number of people in the world without access to a suitable water supply finally dipped below the one billion mark.[10] However, there are still 884 million people in need of access to improved sources of drinking water, and therefore, much remains to be done.[11] Expanding safe drinking water access would drastically cut the loss of life from water-related illness and improve community health in developing countries.

Key messages: what every family and community should know about water

1. Drinking unsafe (contaminated) water can cause severe illness and even death. The immature immune systems and small bodies of young children cannot easily cope with the detrimental effects (i.e dehydration, fever and malnutrition) of diarrhoeal diseases. Children under five are therefore more vulnerable than any other age group to the ill effects of unsafe water, poor sanitation and poor hygiene practice, particularly lack of proper handwashing. In the developing world 24,000 children from under the age of five die every day from preventable causes like diarrhoea contracted from unclean water.[12] Nearly 90% of the burden of diarrhoeal disease mortality is borne by children under five years old.[13]

2. Simple and cost-effective household treatment and storage reduces diarrhoeal disease. Water carrying and storage containers need to be kept clean, including the water therein, and covered to maintain water quality. Improvements in drinking-water quality through household water treatment, such as boiling, filtration, solar disinfection, chlorination at point of use and adequate safe domestic storage, can lead to a reduction of diarrhoeal episodes by approximately 39 per cent.[14]

3. Having a water source near the home decreases potential for contamination during transport and reduces the risks incurred and time that must be spent (mainly by women and girls) collecting water, thereby significantly improving safety and opportunities for education, productive activities and leisure time.

4. A lack of water security is an increasing problem worldwide due to climate change, over-use and degradation of water supplies. Population growth,

urbanization, and increased demand for food, energy and bio-fuels are also putting incredible strain on scarce water sources. In little more than two decades, it is estimated that 47 per cent of the global population will be living in areas of high water stress.[15] This makes it essential to promote sustainable methods for managing water and extracting it efficiently, involving all users. Increased availability of safe and sufficient water reduces the risks to children's health and also encourages better hygiene practice.

SANITATION facilities and services for the safe disposal of human urine and faeces, garbage collection and wastewater disposal are crucial to maintain health and protect water resources. Inadequate sanitation is a major cause of disease world-wide. Globally 2.6 billion people do not have access to adequate sanitation; 1.1 billion – almost a fifth of the world's population – practice open defecation. [16] By far the great majority of people practising open defecation live in rural areas, but this number is declining. However, partly because of rapid increases in the urban population, a growing number of people in urban areas defecate in the open. Diseases such as cholera, worms, diarrhoea and some malnutrition, among other maladies, that cause disease and death in millions of people are propagated by poor sanitary practices. Improving sanitation is key to accelerating socio-economic development and especially better health for children.

Key messages: what every family and community should know about sanitation

1. All faeces, including those of babies and young children, should be disposed of safely and in an environmentally-acceptable manner. Making sure that all family members have access to a toilet, latrine or dedicated "chamber-pot" that is cleaned daily is the best way to reduce exposure to faeces. The use of sanitation facilities, together with good hygiene practice, form direct barriers to the faecal-oral transmission routes of pathogens.

2. Unsafe disposal of human waste risks the contamination of unprotected water sources. Water-borne diseases are transmitted through contaminated and unsafe water. Disposal of faeces in all cases should be done so that it does not contaminate water resources, particularly those used for household supply.

3. Involving children at school and home and considering them as communicators for behaviour change offers hope for sustainability. As the children grow, they will continue to implement and appreciate better sanitation and hygiene practices and influence their own children and community to do the same.

4. Everyone needs to be consulted in the design, construction and use of sanitation facilities to protect water sources and safely dispose of waste. Women in particular should be consulted

as the primary caregivers responsible for the toileting (and training) of children and elderly. It is important for governments to support communities by planning and facilitating construction of low-cost latrines and toilet facilities.

5. Increased frequency and intensity of flooding may expose sub-surface sanitation systems to greater leakage. Sanitation systems should be "flood-proofed" such as by raising latrine slabs, in communities that are affected by frequent flood events. Design of waste disposal systems needs to consider the possibility of overtopping and movement through the subsurface of contaminants, such as faecal bacteria and viruses from buried waste.

6. Animal and human faeces should be kept away from homes, water sources, food and children's play areas. Dedicated areas for human defecation, especially if there is no option other than open defecation, should be planned so that even when faeces dry they cannot be inhaled by humans, particularly children, because pathogens can survive and be aspirated.

HYGIENE. Most germs which lead to diarrhoea and cholera come from exposure to human and animal faeces. Many illnesses can be prevented by good hygiene practices and access to sanitation. Much of the health benefit of water supply and sanitation is realized through changes in behaviour. Hygiene education and promotion of good practice, especially in primary schools, should be a fundamental component of sanitation and water-supply programmes.

Key messages: what every family and community should know about hygiene

1. To obtain the health benefits of improved sanitation and water supply, key issues on how to change habits and long-held beliefs about hygiene need to be addressed. Sanitation issues are unmentionable in some societies. Behaviour change programmes and hygiene education are particularly essential in these societies.

2. All family members, including children, need to wash their hands thoroughly with soap and water after any contact with faeces and unsafe water, before touching or preparing food, and before feeding children. Children should also wash their hands, particularly after playing with other children, who often transmit illnesses. Where soap is not available a substitute that is culturally appropriate, such as ash, can be used. Washing hands with soap can reduce the risk of diarrhoeal diseases by up to 47 per cent.[17]

3. Raw or leftover food can be dangerous. Raw food should always be washed with safe water or cooked; cooked food should be eaten without delay, stored in appropriate facilities if available, or thoroughly reheated.

4. Washing the face and hands with soap and water every day helps to prevent disease, including diarrhoea and eye infections. Untreated eye infections can lead to trachoma, which can cause blindness.

HAZARDOUS WASTES. Both in industrialized and developing countries, adults or children may come in contact with hazardous wastes in the confines of the home, living near a waste disposal site, or just coming across hazardous waste incidents. Hazardous substances released from these sites can produce injury or poisonings as they enter the body through the lungs, skin, and/or mouth.

Key messages: what every family and community should know about hazardous waste

1. Children are prone to contact with potential sources of hazardous waste, as they are "little explorers" with frequent hand-to-mouth activity, living and playing close to the ground. They are at higher risk of exposure than adults to hazardous substances in water and soil. Even teenagers can be at risk, as they may ignore warning signs and venture into contaminated areas.

2. Hazardous wastes are usually generated in unsafe, industrial contexts, but may also be found in or around homes. Hazardous substances are sometimes disposed of or stored near residential areas, especially slums, representing a risk to children.

3. Children's exposure to hazardous wastes can be reduced through education. From the earliest stages, children can be taught to identify danger signs, read and interpret labels, learn about hazardous wastes and be prepared to protect themselves before an emergency occurs.

4. Regulations on hazardous wastes need to be implemented everywhere they are needed. Governments and the private sector need to be encouraged and monitored to ensure any wastes with potential risks to human health are managed and discarded properly, i.e. in an environmentally friendly way, and in safe conditions and surroundings.

Nutrition, Growth and Development —

Undernutrition is the underlying cause of at least 3 million deaths each year,[18] and of more than one third of deaths in children under five years of age. An undernourished child is significantly more likely to suffer from a serious infection or to die from common childhood illnesses. Unhealthy and unhygienic environments and poor sanitation play a significant role in contributing towards undernutrition. Undernutrition may also be exacerbated by more frequent or severe extreme weather events caused by climate change.

Climate Change and Children
A Human Security Challenge
UNICEF Innocenti Research Centre

NUTRITION. Undernutrition is the underlying cause of more than a third of all child deaths in developing countries. It blunts the intellect, saps productivity and perpetuates poverty. Undernutrition is not only the lack of quality food; it is also caused by frequent episodes of infectious illnesses, lack of care, inadequate health services and unhealthy environments. Poverty, illiteracy, inequitable social norms and discriminatory behaviour also underlie undernutrition. Poor agricultural productivity, environmental degradation, poor socio-economic status and climate change are among some of the factors that cause or combine to limit the ability of people to produce and/or acquire food. Unhealthy and unhygienic environments with poor sanitation and inadequate hygiene are also major contributing factors to undernutrition, because diseases, especially diarrhoea and worms proliferate in these contexts. Children deserve to be well nourished and therefore healthy, productive and able to learn. Good nutrition benefits families, their communities and global development.

Key messages: what every family and community should know about nutrition

❶ Proper nutrition during pregnancy and good feeding practices in early childhood have lifelong effects. The period of a child's most rapid physical growth and development is also the period of greatest vulnerability. Stunting that occurs before age two cannot be reversed later, and it negatively impacts a person's ability to learn, to work and to prosper throughout their life. Thus to prevent undernutrition and its related consequences, it is particularly important to ensure good nutrition – meaning a sufficient caloric intake and a good mix of carbohydrates, protein, fats, and vitamins & minerals. This is particularly important during pregnancy. Exclusive breast-feeding during the first six months of life is vital to nourish and develop the immune system of the child. Promotion of exclusive breastfeeding, including encouraging mothers to continue up to two years of life, is a vital lifesaving practice.

❷ All family members, including children, need to wash their hands thoroughly with soap and water after any contact with faeces and prior to preparing and eating food. Handwashing is one of the key steps that can be taken to avoid getting sick and spreading germs to others. Keeping hands clean will help prevent diarrhoeal diseases and help

limit the transmission of respiratory disease. Handwashing can also play an important role in combating a host of other illnesses, such as helminths (worms), eye infections (e.g. trachoma) and skin infections (e.g. impetigo).[19,20]

3. Improved production and use of locally available plant crops, including through community and school gardens, can increase intake of vitamin and mineral-rich foods. Children need foods rich in vitamins and minerals (especially vitamin A, iron, zinc and iodine) to protect their physical wellbeing and mental abilities. For example, many children are much more likely to get sick and die from infectious illnesses because of a lack of immune system-boosting vitamin A in their bodies. Vitamin A comes from breast-milk, dark green leafy vegetables, and from red, orange and yellow fruits and vegetables, as well as from animal-source foods such as eggs, milk and liver. Children should also be taken to receive vitamin A supplements and de-worming treatments in areas where child-survival campaigns are being conducted.

4. Promoting sustainable agricultural practices and improved eco-system management, including of soil, water, bio-diversity and coastal areas, supports the production of food, both wild and cultivated. Such practices can help communities cope with some of the negative consequences of climate change, particularly in regions where livelihoods depend heavily on rain-based agriculture and animal production, and where droughts and floods, and the resultant crop failures, have a serious impact on the survival and nutrition of children and mothers.

5. Iodized salt is essential to prevent learning disabilities and delayed development in children. Small amounts of iodine are essential for children's growth and development. Many diets are low in iodine. The best way to ensure people get enough iodine is to iodize salt. Iodine, especially for pregnant women and young children, is essential to prevent stillbirth, miscarriage, cretinism, mental, hearing or motor deficits, and reduced economic productivity. It has been shown that children from communities and populations who are iodine deficient, can lose on average 13.5 IQ points.[21]

BREASTFEEDING of infants under two years of age has a huge impact on child survival, with the potential to prevent at least one million deaths in children under five in the developing world.[22]

Key messages: what every family and community should know about breastfeeding

❶ An infant should be exclusively breastfed until 6 months of age. This means that she/he receives no other food or drink, not even water, other than breast milk, with the exception of drops or syrups of vitamins, minerals or medicines. Thereafter, breastfeeding, along with appropriate complementary feeding should continue up to 2 years or beyond. Newborn babies should have skin to skin contact with their mothers and begin breastfeeding within one hour of birth. A study in Ghana found that having the baby start to breastfeed soon after birth stimulates the mother's milk production and can reduce overall neonatal mortality by around 20%.[23,24]

❷ Breast milk alone is the best possible food and drink for a baby as it contains the right balance of all nutrients an infant needs for the first 6 months of life for optimal growth. It also contains numerous anti-infective factors such as antibodies and white blood cells. Even in hot, dry climates, breast milk contains sufficient water for a baby's needs.

❸ Babies fed on breast milk have fewer illnesses, are less likely to die and are less malnourished than babies who are formula-fed. Bottle-feeding is a risk where parents may not be able to afford sufficient milk-powder, may not be able to sterilize teats and feeding bottles, and where there is a lack of clean and safe water. When a baby is given water or other drink made with water, the risk of getting diarrhoea or other illnesses increases. Breastfeeding should also be encouraged in developed countries. A study in the United Kingdom found that 6 months of exclusive breastfeeding

"Among the key causes of hunger are natural disasters, conflict, poverty, poor agricultural infrastructure and over-exploitation of the environment."

World Food Programme 2009
http://www.wfp.org/hunger

was associated with a 53% decrease in hospital admissions for diarrhoea and a 27% decrease in respiratory tract infections.[25] Studies from developing countries show that infants who are not breastfed are 6 to 10 times more likely to die in the first months of life than infants who are breastfed.[26] Diarrhoea and pneumonia are more common and more severe in children who are artificially fed. Other acute infections, including otitis media, *Haemophilus influenzae* meningitis, and urinary tract infection, are less common and less severe in breastfed infants.[27]

4. Between the ages of 6 months and 2 years a baby benefits from breast milk as well as needing other foods. When introducing food into an infant's diet, care should be taken on how the food is handled. Food should be stored in an appropriate place and hands should be washed before handling. The foods should contain the right nutrients and should be fed frequently to ensure the infant grows properly.

OBESITY and overweight are defined as abnormal or excessive fat accumulation that presents a risk to health and are based on weight-for-height and BMI-for-age. Obesity is a complex condition, one with serious social and psychological dimensions, that affects virtually all age and socioeconomic groups and threatens to overwhelm both developed and developing countries. Environmental conditions affect food availability and quality of nutrition as well as levels of physical activity. Prevalence of obesity in children and adolescents is on the rise in both developed and developing regions, with an estimated 115 million obese people in the latter.[28] In 2007, an estimated 22 million children under the age of five years were overweight throughout the world.[29] In more developed countries, childhood obesity is most common in low-income households, because it is driven in part by low-cost foods of poor nutritional value. Economic growth, modernization, urbanization and globalization of food markets are just some of the forces thought to underlie the obesity epidemic.

Key messages: what every family and community should know about childhood obesity

❶ To combat obesity and create an environment conducive to healthy eating and living, measures are needed that simultaneously address a number of issues, from the quality of nutrition and enhanced levels of physical activity, to land use, air pollution, and urban planning and transportation issues, and far-sighted policy action to promote agricultural/food systems that are socially and environmentally more responsible.

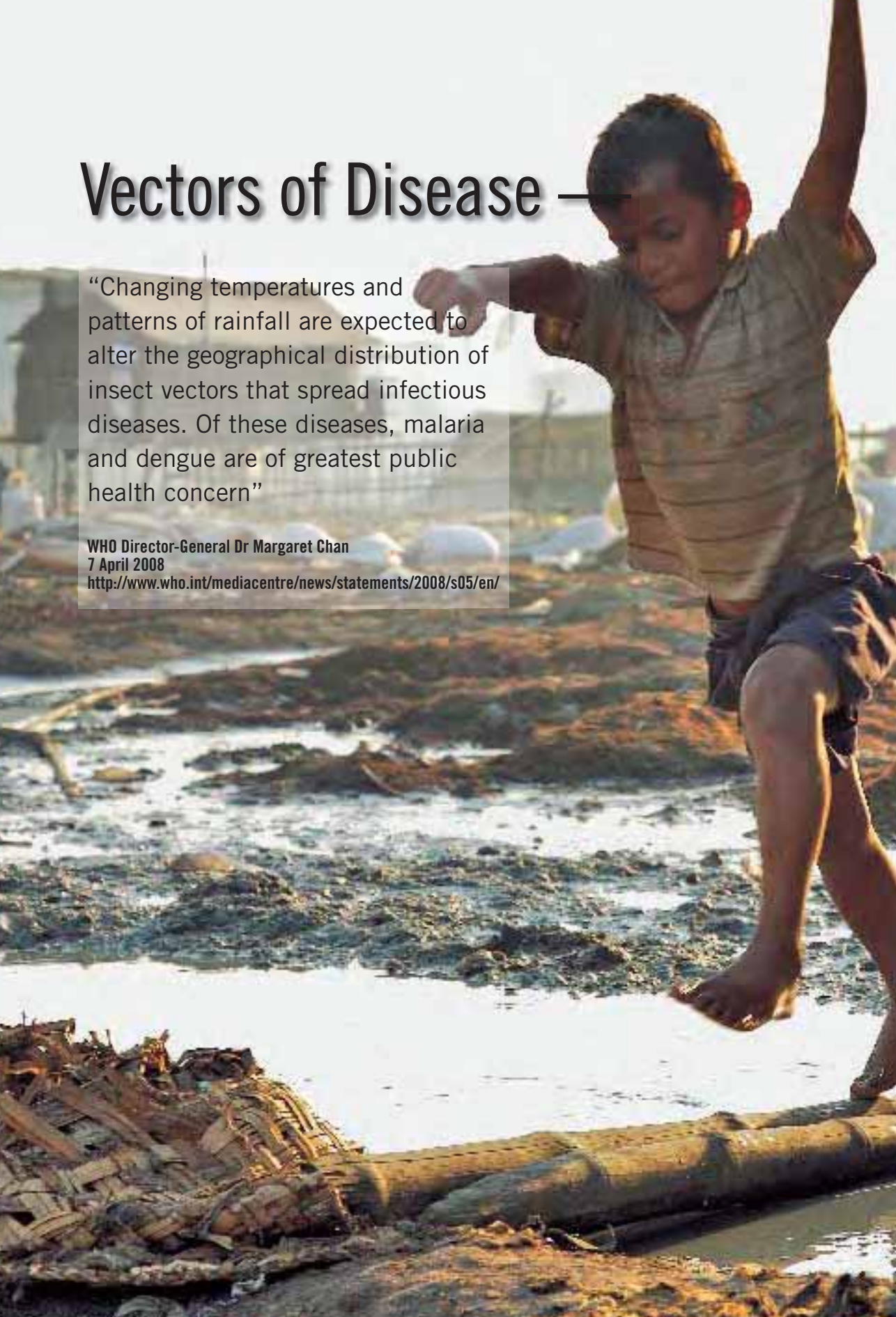
❷ Childhood obesity is dangerous to health. Many adverse health effects associated with being overweight are observed in children and adolescents. Being overweight during childhood and particularly adolescence is related to increased morbidity and mortality in later life from chronic diseases such as type 2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. Psychosocial effects and stigma associated with being overweight can be damaging for a child.

❸ Childhood obesity is increasing in low-income communities and developing countries, especially in urban areas, resulting in a double burden of undernutrition and overnutrition side by side.[30] To achieve gains in children's nutritional health these two problems

must be addressed simultaneously. Once considered a problem only in high-income countries, overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings. An analysis of several studies has shown that breastfeeding may have a protective effect on the prevalence of obesity.[31,32] The strong relationship between quality of diet and obesity indicates that appropriate complementary feeding with diverse, nutrient rich foods, can be protective against overweight and obesity. In countries facing double burden malnutrition (both under and over-nutrition), optimal infant and young child feeding is critical. Support for school food programs and community gardens can increase access to healthy foods.

4. Childhood obesity is influenced by changes in lifestyle due to modernization, the affordability, availability and promotion of unhealthy foods, and a lack of information about healthy eating. It is a problem that must also be addressed in education systems, nutritional programmes, government policies and initiatives by the private sector. It is important to ensure neighbourhoods that are walkable, and local markets that offer healthful food. Families who have access to safe places to be active, are likely to be more active and to eat more healthy foods – which both help avoid and tackle obesity.

Vectors of Disease –



"Changing temperatures and patterns of rainfall are expected to alter the geographical distribution of insect vectors that spread infectious diseases. Of these diseases, malaria and dengue are of greatest public health concern"

WHO Director-General Dr Margaret Chan
7 April 2008
http://www.who.int/mediacentre/news/statements/2008/s05/en/

MALARIA is caused by parasites that spread from person to person through the bites of infected mosquitoes. Malaria is preventable and treatable, yet a child dies of malaria every 30 seconds.[33] The main symptoms include: fever, chills, headache, diarrhoea and vomiting. Severe complications and death may occur if malaria is not diagnosed and treated promptly with effective medicines. The effectiveness of conventional control programmes are increasingly hampered by drug resistance and insecticide resistance. Children and pregnant women are most vulnerable to the disease. Changes, often man-made, to ecosystems can alter the ecological balance and context within which vectors breed, develop, and transmit diseases. Human exposure and vulnerability to disease outbreaks are also affected by changing ecosystems. For example, deforestation and subsequent changes in land-use can make vector-borne diseases such as malaria more widespread and their transmission more intense in some parts of the world.

Key messages: what every family and community should know about malaria

1. Use of insecticide-treated nets provides effective protection against malaria. Malaria transmitting mosquitoes usually bite at night. All community members, but especially children and pregnant women, should be protected against being bitten. Sleeping under an insecticide-treated net is the best way to prevent mosquito bites.

2. Vector control remains an effective measure to combat malaria. Integrated Vector Management includes a combination of interventions, adapted to local circumstances, including indoor residual spraying with insecticide, use of insecticide-treated nets, and environmental management approaches, such as land and water resource management.

3. Spraying indoor walls with synthetic pesticides such as DDT, malathion or pyrethroids is an effective method to interrupt transmission and protect communities from malaria. Experts are concerned however, that incorrect application and management of DDT can have a damaging effect on the environment and health. There is also concern over increasing mosquito resistance to the pesticide. Efforts are underway to combat malaria with an incremental reduction of reliance on DDT, by supporting sustainable alternatives. These include chemical

and non-chemical methods ranging from increasing distribution of insecticide-treated nets, eliminating potential mosquito breeding sites, environmental engineering, securing homes with mesh screens and deploying mosquito-repellent trees and the introduction of fish that eat mosquito larvae.

4. Families and communities can help prevent malaria by controlling mosquito breeding grounds. Filling in, draining or securing places where water collects, and cleaning areas inside and around their houses where mosquitoes can hide can help reduce the number of vectors present in homes.

5. Children are particularly vulnerable to malaria. A child with fever should be seen immediately by a trained health worker, either in the community or at a health facility. In highly endemic areas they need to receive appropriate anti-malarial treatment as quickly as possible. For falciparum malaria, the currently recommended anti-malarial treatment is an artemisin-based combination therapy.

6. Pregnant women are particularly vulnerable to malaria. Pregnant women are more likely to develop complications from malaria. During pregnancy, the disease can cause severe anaemia ('thin blood'), miscarriage, premature birth, or stillbirth. Babies born to mothers who have had malaria during pregnancy are likely to be born underweight and therefore more vulnerable to infection or deaths during their first year. In malaria endemic areas, women should sleep under an insecticide-treated net every night, and be seen by a trained health worker if a fever or other symptoms of malaria develop.

7. Public awareness campaigns about the dangers of malaria and dengue fever are especially important in places where these diseases were previously eradicated or which have historically been too cold for mosquitoes to breed. Malaria could easily be introduced in areas where malaria vectors are still present.

DENGUE is a viral illness that is spread among humans by the bites of infected Aedes mosquitoes. Symptoms range from a mild fever, to incapacitating high fever, with severe headache, pain behind the eyes, muscle and joint pain, and rash. There are no specific antiviral medicines for dengue. It is important to maintain hydration. The most severe form of dengue (haemorrhagic fever) affects mainly children. Dengue occurs in more than 100 tropical and subtropical countries around the world, mostly in urban and semi-urban areas.[34] It often spreads rapidly, causing epidemics that disrupt the health services and affect the economies of countries. Approximately one third of the world's population lives in areas where there is a risk of dengue transmission. An estimated 50 million infections occur each year, with 500,000 cases of dengue haemorrhagic fever and at least 18,000 deaths, mainly among children.[35]

Key messages: what every family and community should know about dengue

1. Dengue is spread through the bites of mosquitoes which thrive close to humans. They are present in urban areas and bite mainly in the early morning and late afternoon, and the only way to control or prevent the disease is to control the mosquito.

2. Dengue haemorrhagic fever is very severe and affects mainly children. It causes fever, abdominal pain, vomiting, and bleeding. An early diagnosis and treatment are required.

3. Early recognition of the warning signs of serious illness and prompt clinical care can save lives. Dengue has an unpredictable clinical course. Most patients have a period of fever lasting 2–7 days.

4. It is very difficult to curb an epidemic of dengue once it has begun. The best investment is in mosquito control, training health care providers on the recognition and treatment of dengue and preventing epidemics from occurring.

5. Environmental management approaches to controlling mosquitoes are essential and involve influencing land, water or vegetation conditions so as to reduce vector habitats. Methods to control egg-laying by female mosquitoes include improving water storage, covering water containers, jars and drums, proper disposing of used automobile tires and other items that collect rainwater, in combination with using select insecticides or biological methods.

TICK-BORNE DISEASES are transmitted to humans through tick bites. Depending on the country where you live, you may get exposed to different ticks carrying different diseases. Children who play, walk and camp in infested areas during the tick season (usually spring to early autumn) are at risk. The seasonal transmission and distribution of diseases that are transmitted by ticks (i.e. Lyme disease, tick-borne encephalitis) may be affected by climate change.

Key messages: what every family and community should know about tick-borne disease

1. Tick-borne diseases are spread by ticks biting humans. Ticks may be carried over long distances because they remain attached to their hosts (i.e. deer) for many days.

2. Appropriate clothing provides protection. Insect repellents in sprays or powders can be used to protect people and animals from tick bites. Curbing vegetation growth and using insecticides in a controlled manner can help to reduce tick habitats.

3. Check the body for possible ticks after being outdoors where ticks are common. Ask your health care provider for guidance on how to safely remove ticks.

WHO. Africa Malaria Day, Nigeria, April 25th 2001. Children installing a malaria bednet.

Air —

Indoor air pollution and household energy is an issue that concerns many sectors. Although this is an energy problem, it is not a traditional concern of the energy sector. It is a health problem but the answer only partly lies within the health sector. It is an environmental problem but the environment sector is often too isolated to put comprehensive solutions into practice. Therefore, the implementation of technical solutions, such as cleaner fuels or improved stoves, calls for joint action by several different sectors.

INDOOR AIR POLLUTION from solid fuel use is a known risk factor for pneumonia and other acute infections of the lower respiratory tract (ALRI) among children under five as well as chronic obstructive pulmonary disease and lung cancer among adults. Inhaling indoor air pollution doubles the risk of pneumonia and other acute respiratory infections (ARI) and was responsible for nearly 900,000 child deaths in 2004.[36] It may also be associated with an increased risk of low birth weight and asthma. Globally, pneumonia remains the leading cause of child deaths.

Key messages: what every family and community should know about indoor air pollution from solid fuel use

❶ Indoor air pollution from solid fuel use is a neglected problem that requires urgent action. In developing countries, the traditional use of household energy can pose a serious threat to children's health: cooking and heating with biomass fuels and coal produces high levels of small particles, carbon monoxide and hundreds of other pollutants. Newborns and infants are often carried on their mother's back while cooking, or kept close to the warm hearth. Consequently, they spend many hours breathing polluted air during their first years of life when their developing airways and their immature immune systems make them particularly vulnerable.

❷ Many low-cost or no-cost approaches exist to reduce exposure to indoor air pollution, while meeting household energy needs, and decreasing the amount of fuel needed. Switching from wood, dung or charcoal to more efficient, modern and less polluting fuels will bring about a noticeable reduction in health problems.

❸ Programmes to improve access to cleaner fuels and improved stoves can generate large health and productivity gains and are highly cost-beneficial. Similarly, locating the stove outside or in a well-ventilated area may be a partial remedy. Eaves spaces and extraction through smoke hoods can also curb indoor air pollution levels. Changing behaviours plays an important supportive role, (i.e. keeping children away from the smoking hearths, drying fuel wood before use, using lids on pots

to shorten cooking time and improving ventilation by opening windows and doors).

4 Other indoor air pollutants may alter children's health. These include second-hand tobacco smoke, pesticides, cleaners, disinfectants and solvents used in the homes. Humid or unventilated homes can also breed mould and mites in homes or other places where children spend much of their time. No smoking, safe use and storage of household chemicals and good ventilation can ensure that children grow up in a healthier environment.

OUTDOOR AIR POLLUTION remains a serious problem in cities throughout the world, particularly in the mega-cities of developing countries. It is estimated that a quarter of the world population is exposed to unhealthy concentrations of air pollutants.[37] Children are particularly at risk due to the immaturity of their respiratory systems. Pollution levels tend to be the highest close to the pollution source (i.e. smoke stacks, coal-burning factories). However some pollutants are transported over long distances in the air, often for hundreds or thousands of kilometres, causing health problems far away from the sources.

Key messages: what every family and community should know about outdoor air pollution

❶ In urban areas, a significant proportion of air pollution is generated by older vehicles (with poor vehicle maintenance and low fuel quality). In some cities, air pollution can reach such high levels that people may be advised to stay indoors and schools might close. Cost-effective strategies exist to reduce pollution levels, including more integrated transport and land use (i.e. the development of high capacity, dedicated busways and pedestrian/cycle networks), reducing transport pollution emissions through the use of cleaner (lead-free, low-sulphur) fuels and cleaner vehicle standards and technologies, and establishing air quality monitoring and warning capacities.

❷ Contaminants in the air include ground-level ozone, particulate matter, carbon monoxide, lead, sulfur dioxide, and nitrogen dioxide. Several of these pollutants, including ozone and particulate matter, are associated with increases in respiratory-related diseases in children, including reduction of lung function, increases in respiratory symptoms, and increased severity or frequency of asthma attacks. Lead damages the central nervous system in children and is a dangerous air contaminant in countries where it is added to gasoline. It has been shown that when lead is removed from gasoline, lead levels in children's blood decrease.

Climate change will undermine air quality, compounding risks of respiratory diseases. Decreased dependence on fossil fuels will have a positive health effect on children.

❸ Rural areas are affected by outdoor air pollution primarily from burning agricultural land and forest fires. In addition, with growing desertification, dust storms may become major contributors to outdoor air pollution.

❹ Reduction of exposure decreases the risk of health effects. Common air pollutants affect health with a severity proportional to the pollution level. Communities should act urgently to reduce health risks by identifying and reducing emissions from local pollution sources.

❺ Relatively low pollution levels can still have an effect on heath especially when people are exposed to the pollutant for a long time. Exposure can often start very early in childhood.

❻ Actions to reduce air pollution will benefit child health beyond the avoidance of direct impacts, particularly in terms of lowering emissions of certain greenhouse gases, and thus helping to mitigate climate change and its impact on health.

OZONE, the thin layer at the top of the earth's stratosphere that protects from the sun's harmful ultraviolet radiation, plays a major role in maintaining the Earth's living systems. Some chemical reactions cause the stratospheric ozone layer to break down and become depleted. The chemicals that are responsible for ozone layer depletion are called Ozone Depleting Substances. Ground-level ozone is a health risk for humans, as it may cause shortness of breath and headache, trigger asthma and irritate the eyes and throat. Normally these effects stop soon after exposure ceases, but long-term exposure can cause permanent health problems. While the ozone in the stratosphere protects life, excess ozone in the air at ground level is harmful to our health.

Key messages: what every family and community should know about ozone

1. Protect children from high ozone levels in the air. This prevents asthma crises in predisposed children or other effects (e.g. in case of urban summer smog). Standards for ozone levels in air are set up by relevant authorities as well as advisories for the community.

2. Protect children from the effects of ozone depletion. The skin and eyes should be protected from sun exposure, especially when it is hot and the sun is high, with hats, sunglasses and covering clothes. Face and eyes, especially, should be protected – children's skin is highly prone to sunburn.

3. Be aware about freezers, refrigerators, spray cans, air conditioners and pressurized cans that have ozone-layer depleting substances and should be recycled with special care. Labels of these products should be checked to make sure that they are ozone-friendly.

Chemicals —

Contaminants in air, water, food and soil, such as heavy metals, pesticides put children at risk of acute poisoning.

LEAD is recognized today as an important risk factor contributing to the global burden of disease. Eliminating lead exposure from gasoline has been one of the most significant environmental health improvements in recent times. But lead-containing products are still widely made and sold across much of the developing world. Lead in paint is the second largest source of exposure after lead in gasoline. House dust is the most common way in which children are harmed by lead in paint. The evidence of neurological damage, especially to children (whose intelligence can be impaired) is beyond doubt. Lead damage is irreversible, and its effects appear to persist into adolescence and adulthood.

Key messages: what every family and community should know about lead

1. Children are very susceptible to the health effects of lead exposure. Their brains are especially vulnerable during periods of development and even relatively low levels of exposure can cause serious neurological damage, lowering their IQ, among other effects. Children are more likely to be exposed to lead due to their hand-to-mouth behaviour and high absorption of the metal ingested. Prenatal exposure occurs because lead crosses the placenta.

2. Early recognition of exposure is crucial. Signs and symptoms are nonspecific and include: malaise, headaches, anaemia, behavioural changes and abdominal pain. Learning disabilities and mild mental retardation can occur, as well as stunted growth. If exposure is high, a severe toxic encephalopathy may cause death or irreversible health effects.

3. Be aware of the potential sources of exposure within your community; they include leaded gasoline (still in use in certain countries), leaded paint, lead smelters and the recycling of car batteries all of which may contaminate the soil of places where children live and play. Lead may be found in traditional remedies and cosmetics (such as “surma”) and glazed ceramics.

4. Prevention of exposure to lead is crucial: good hygiene, washing hands, preventing children from playing with contaminated soil, detecting and stopping “pica” (habit of eating paint chips), even moving children out of heavily contaminated areas, are some of the measures to apply – together with good nutrition and calcium intake.

5. Strong and well-enforced lead regulations are of the utmost importance.

MERCURY poses a particular threat to the development of the child *in utero* and early in life. It occurs in various forms, including the liquid, shiny "quicksilver" (elemental mercury) that vaporizes readily and enters into a global cycle that ends up accumulating in some types of large predatory fish, seafood, and marine mammals. Methyl mercury (an organic form of mercury) also accumulates in fish, and represents a significant health risk to the fetus if contaminated fish are consumed by the mother. In the last decade, concern has increased about the special susceptibility of the fetus and small child to heavy metals during the "critical windows of vulnerability". Their special behaviours and dynamic physiology may predispose them to higher environmental exposures and adverse effects. Children may also be exposed to inorganic mercury through the skin by using soaps and creams which contain mercury.

Key messages: what every family and community should know about mercury

1. Children should not be allowed to handle or play with elemental mercury ("quicksilver").

2. Avoid eating fish with high levels of mercury. While a well-balanced diet that includes a variety of fish contributes to health and children's proper growth and development, some fish and shellfish contain higher levels of mercury that may harm an unborn baby or young child's developing nervous system. Local advisories about which types of fish tend to contain higher levels should be made available to parents.

3. Contact the health or environment department if mercury is spilled – never vacuum a spill. Never heat or burn mercury.

4. Advocate use of non-mercury containing products, such as mercury-free thermometers (digital), blood pressure meters, batteries and dental fillings.

PESTICIDES. In recent decades, the adverse effects of pesticides have raised concern. On a broad scale, pesticides bring benefits – they are used by farmers to spray crops and treat livestock; and they are used in public health programs that can include indoor spraying of individual houses or public places, such as schools. However, pesticides can disrupt ecological balances by killing natural biological controls. This situation can cause outbreaks of pests previously of minor importance and lower crop yields. Once used, pesticides may end up in the air, water, and land, where they can cause harm to non target species. By polluting ecosystems, they diminish biodiversity. By contaminating groundwater, lakes, rivers, and other water bodies, they endanger water consumption, fishing, and other water uses, often vital for life and livelihoods. By polluting soil, they endanger children playing in fields or gardens.

Key messages: what every family and community should know about pesticides

1. Keep pesticides away from children. Store pesticides and toxic chemicals where children can not reach them – never put them in containers that children can mistake for food or drink. Read product labels and follow the specific instructions for using pesticides.

2. Children behave and play differently than adults, resulting in greater potential exposure to pesticides. In addition to playing closer to the ground, normal hand-to-mouth activity means that children may be exposed to more pesticides in dust and soil. A child who is already weakened by dehydration or malnutrition will be more susceptible to toxic effects from pesticide exposure.

3. Store food and trash in closed containers to keep pests such as flies, cockroaches, and rodents from coming into the home. Use baits and traps when you can; place baits and traps where children can not reach them. This can reduce the need for pesticides in the home.

4. Keep children, toys, and pets away when pesticides are applied. Do not allow children to play in fields, orchards, and gardens after pesticides have been used. Ventilate the rooms sprayed with pesticides thoroughly, before letting the children in for playing or sleeping.

5. Wash fruits and vegetables under running water before eating and peel them whenever possible.

6. Consult with the poison centre if a child has been exposed to a pesticide or if you have any concern. Make sure you know how to contact them rapidly, in case of need.

PERSISTENT ORGANIC POLLUTANTS (POPS)

are a group of chemicals of particular concern. They break down slowly in the environment, so are persistent, can travel long distances through air, water and living creatures, and can be found in areas where they were never used or produced. They store easily in fatty tissue and build up in food-chains. Children may be exposed to these POPs when still in the womb and during breastfeeding, even in areas where such substances were never used. The Stockholm Convention on Persistent Organic Pollutants is a global treaty to protect human health and the environment from these chemicals and was adopted in 2001 and entered into force 2004. It requires measures to eliminate or reduce the release of POPs into the environment.

Key messages: what every family and community should know about POPs

1. Children and adults are exposed to POPs primarily through food, fish, meat, and dairy products. Large quantities of POPs were produced as pesticides and industrial chemicals during the 20th century. Most of these uses have now stopped. Some POPs are unintentional by-products of industrial and other processes. The use of best available techniques and best environmental practices can greatly reduce the production and release of these POPs.

2. During early infancy, children also come into contact with persistent and bio-accumulative substances that are passed on to them through breastfeeding. This can be a major source of exposure to infants. Because breast milk, even when contaminated, is the best source of nutrition for infants, protecting mothers from exposure to toxic contaminants is crucial.

3. Measures to reduce or eliminate POPs include targeting their production, use, unintended production, and identifying stockpiles and wastes containing POPs and managing them in a safe, efficient and environmentally-sound manner.

HOUSEHOLD PRODUCTS. Cleaners, solvents, and caustic products used to keep homes clean, in addition to pharmaceutical and hygiene products found within the home, may be toxic if ingested by children. About 20,000 children die every year as a result of poisoning;[38] hundreds of thousands more accidentally ingest poisonous substances or drugs. Prevention of exposure is easy when families know a few simple facts about poisons.

Key messages: what every family and community should know about prevention of poisoning from household products

1. Children are "little explorers" that easily find out and taste products in the home. If a child is found playing with colourful bottles or medicines or any other product found in the house, make sure he/she has not taken any. In case of doubt, call the Poison Centre for advice. In most cases, washing the mouth eyes and hands of the child may be enough – but it is best to consult a specialized centre or see a health provider, in order to evaluate the risk of poisoning.

2. Keep all chemicals and medicines out of the reach of children. It is important to keep all household products in safe places, either locked or stored in places which children will neither see nor access. This applies to cleaning products in kitchen and bathroom, paraffin or kerosene, medicines, fuels and caustic products in the garage or pesticides in the shed.

3. Child-resistant lids are proven to save children's lives, as they may provide parents and child-care providers with precious time to stop children from touching or ingesting the contents.

4. Families and communities should be aware of the Poison Centre. The World directory of poison centres (Yellow Tox) http://www.who.int/ipcs/poisons/centre/directory/en/ has the list of the existing poison centres around the world.

5. Where feasible, use 'natural' household cleaning products: such as vinegar, lemon juice, and baking soda.

PROTECT CHILDREN FROM ALL CHEMICAL HAZARDS:

❶ Ensure safe storage and packaging, and clear labelling of cleaners, fuels, solvents, pesticides and other chemicals used at home and in school.

❷ Promote the use of child-resistant packages for pharmaceuticals and for chemical products.

❸ Inform parents, teachers and child-minders about the potential chemical hazards in the places where children spend their time.

❹ Train health care providers on the recognition, prevention and management of toxic exposures, and on the use of the paediatric environmental history to investigate specific risks to which children are exposed.

❺ Incorporate the teaching of chemical safety and health into school curricula.

❻ Create and enforce legislation to promote the safe use and disposal of chemicals.

❼ Promote policies to reduce and remedy environmental pollution.

❽ Avoid the construction of homes, schools and playgrounds near polluted areas and hazardous installations.

❾ Poisons, medicines, bleach, acid, and liquid fuels such as kerosene should never be stored in drinking bottles. All such liquids and poisons should be kept in clearly marked closed containers out of children's sight and reach.[39]

Injuries —

Every day around the world the lives of more than 1800 families are torn apart by the loss of a child to an unintentional injury or so-called "accident" that could have been prevented. Once children reach the age of five years, unintentional injuries are a most important threat to their survival. Unintentional injuries are also a major cause of disabilities, which can have a long-lasting impact on all facets of children's lives: relationships, learning and play. Among those children who live in poverty, the burden of injury is highest, as these children are less likely to benefit from the protective measures others may receive.

WHO Director-General Margaret Chan and UNICEF Executive Director, Ann Veneman
Foreword to "World Report on Child Injury Prevention", WHO and UNICEF, 2008

INJURIES used to be spoken of as 'accidents'. There has been a move away from the use of the term 'accident' because of its connotations of inevitability and lack of apparent cause. In contrast, injuries are a result of events that can be predicted and prevented. Injuries can be categorized in a number of ways. The most commonly used categorization is according to intent: unintentional injuries (road traffic injuries, burns, drowning, poisoning and falls); and intentional injuries that are the consequences of acts of violence, either inter-personal (such as homicide or collective violence such as war) or self-directed (suicide, self-harm). The most common type of injury depends on the child's age and sex. For example, in children 1–4 years of age, drowning is the leading cause of death due to injury, while in children 5–9, drowning, road traffic accidents and animal bites are the leading causes. In those 10–17, road traffic deaths are the leading cause. Girls are more likely than boys to suffer from burn-related injuries, while boys are more likely to die from road traffic injuries and drowning.[40] Road-traffic injuries are the leading cause of injury-related deaths worldwide. Many of the unintentional injuries happen in or near the home and almost all can be prevented. While many of the steps to prevent these injuries must be taken by governments, there are steps families and communities can take to protect children from injuries.

Key messages: what every family and community should know about prevention of unintentional injuries

1. Unintentional injuries account for almost 85% of child injury deaths.[41] Almost all of these injuries can be prevented. The most common types of unintentional injuries include burns, drowning, poisonings and falls.

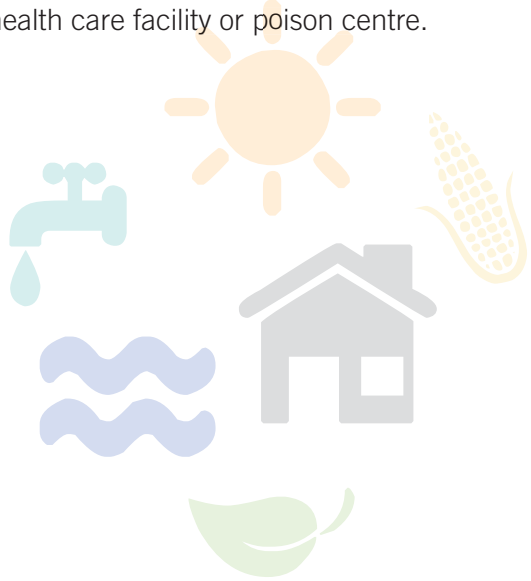
2. Fire causes a majority of burn-related deaths. Many burns in young children are from hot liquid, hot tap water or steam. Children should be well supervised and kept away from fires, cooking stoves, lamps, matches and general appliances.

3. A small child can drown in a few centimetres of water. Children should never be left alone when they are in or near water including in a flood situation. Unnecessary accumulation of water should always be drained and wells and rain water collection sites should be covered.

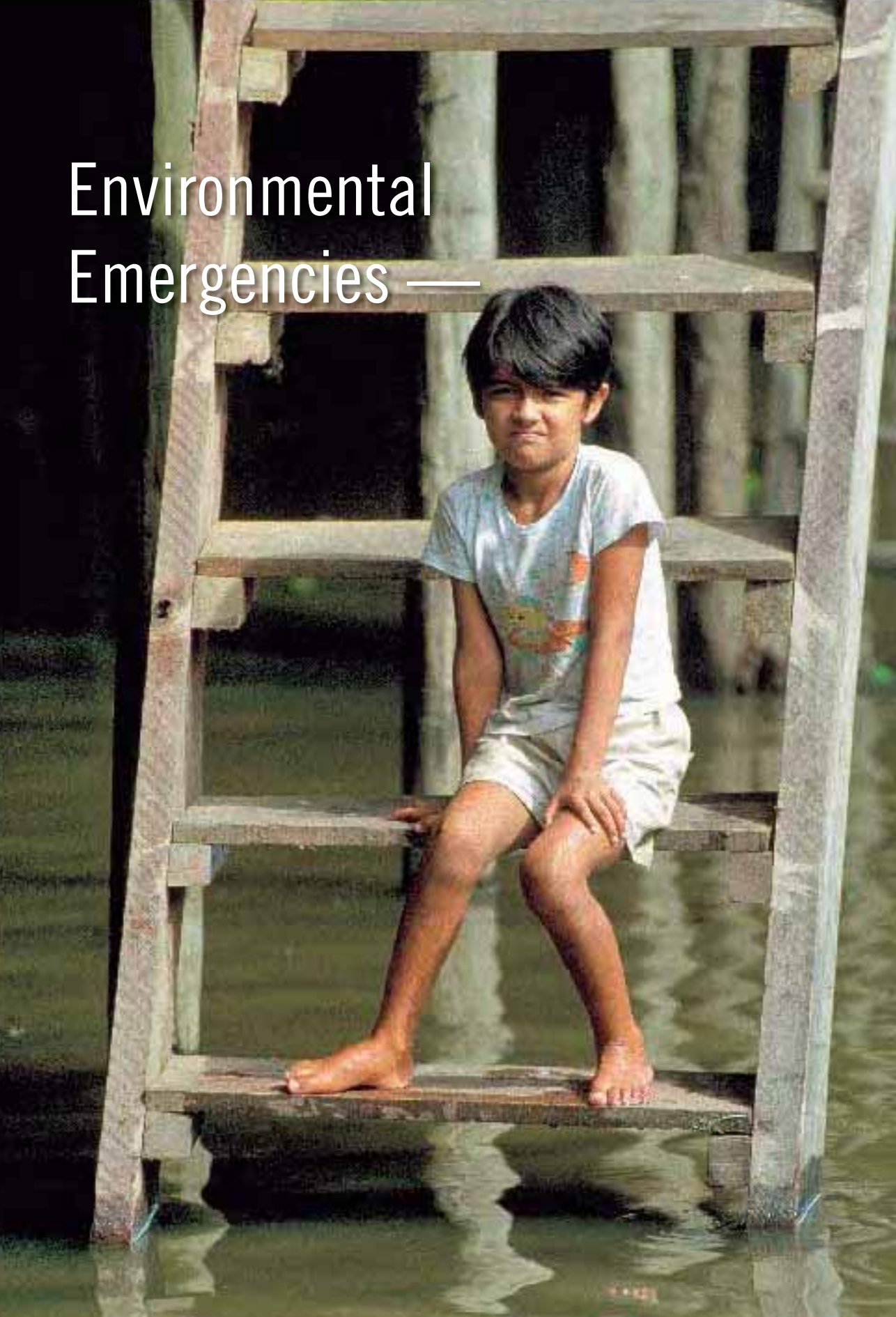
4. Falls are the leading cause of traumatic brain injury in children. It is often falls from high places, such as beds, changing tables and stairs and off play equipment that cause the most serious injuries. Using stair gates and guard rails will often prevent children from falling down stairs.

5. Children under five years old are particularly at risk on the roads. Young children do not think before they run onto the road. Families need to watch them carefully. Make children use helmets while riding bikes and motorized cycles and use safety belts and properly installed child safety seats wherever possible when riding in cars.

6. Bites and stings can be prevented. Avoid leaving children alone and make them aware of the potential dangers of insects and other creatures (i.e. snakes and spiders bite; scorpions and bees sting). In case of a bite or sting, consult with a health care facility or poison centre.



Environmental Emergencies —



ENVIRONMENTAL EMERGENCIES.

Children, including the unborn child, are particularly vulnerable to the health impacts of environmental health emergencies, whether of natural, technological or deliberate origin. This is due to their greater vulnerability to physical dangers, their increased susceptibility to toxic exposures and communicable diseases, and, particularly for young children, to their limited maturity and capacity to cope with emergency situations and escape danger. Furthermore, children are also likely to suffer long-term psychological consequences from such traumatic events. It is of outmost importance that children's specific vulnerabilities and needs are taken into account when planning for and responding to environmental health emergencies.

Key messages: what every family and community should know about prevention of environmental emergencies

1. Worldwide, large numbers of drowning deaths are associated with cataclysmic floods and ocean waves, which, in a single event, can leave thousands dead. Children accounted for about one third of those who died during the Indian Ocean tsunami in 2004.[42]

2. Children in makeshift urban settlements are often highly vulnerable to flooding and health systems in these places are generally less able to cope.

3. Environmental emergencies can lead to migration. Children are psychologically more sensitive to sudden disruptions of their lives caused by forced migration.

4. Education is not only a right, but in situations of emergencies, chronic crises and early reconstruction, it provides physical, psychosocial and cognitive protection which can be both life-saving and life-sustaining. Millions of children, youth and adults have benefited from the efforts of education authorities and humanitarian agencies.

5. Schools can start right now with the addition of some teaching about safety and natural hazards.

Noise —

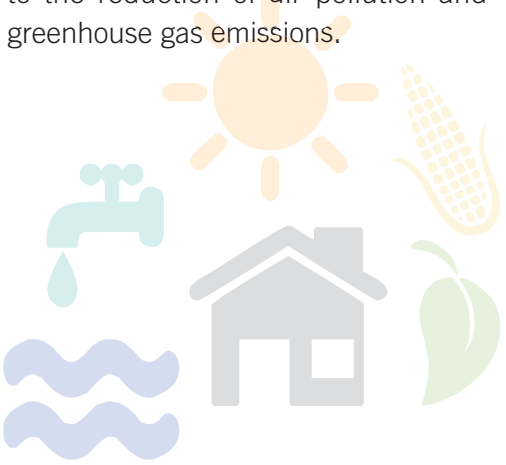
Although noise pollution receives little public attention, there is evidence that current environmental levels of noise are damaging our hearing.

NOISE is undesirable sound. Studies in Europe suggest that noise influences child mental health in terms of hyperactivity and that it may affect child stress responses and sense of well-being.[43] Noise and crowding adversely affect the interactions of caregivers with infants and toddlers. Parents in noisy environments are less likely to be highly involved in their child's activities.

Key messages: what every family and community should know about prevention of noise

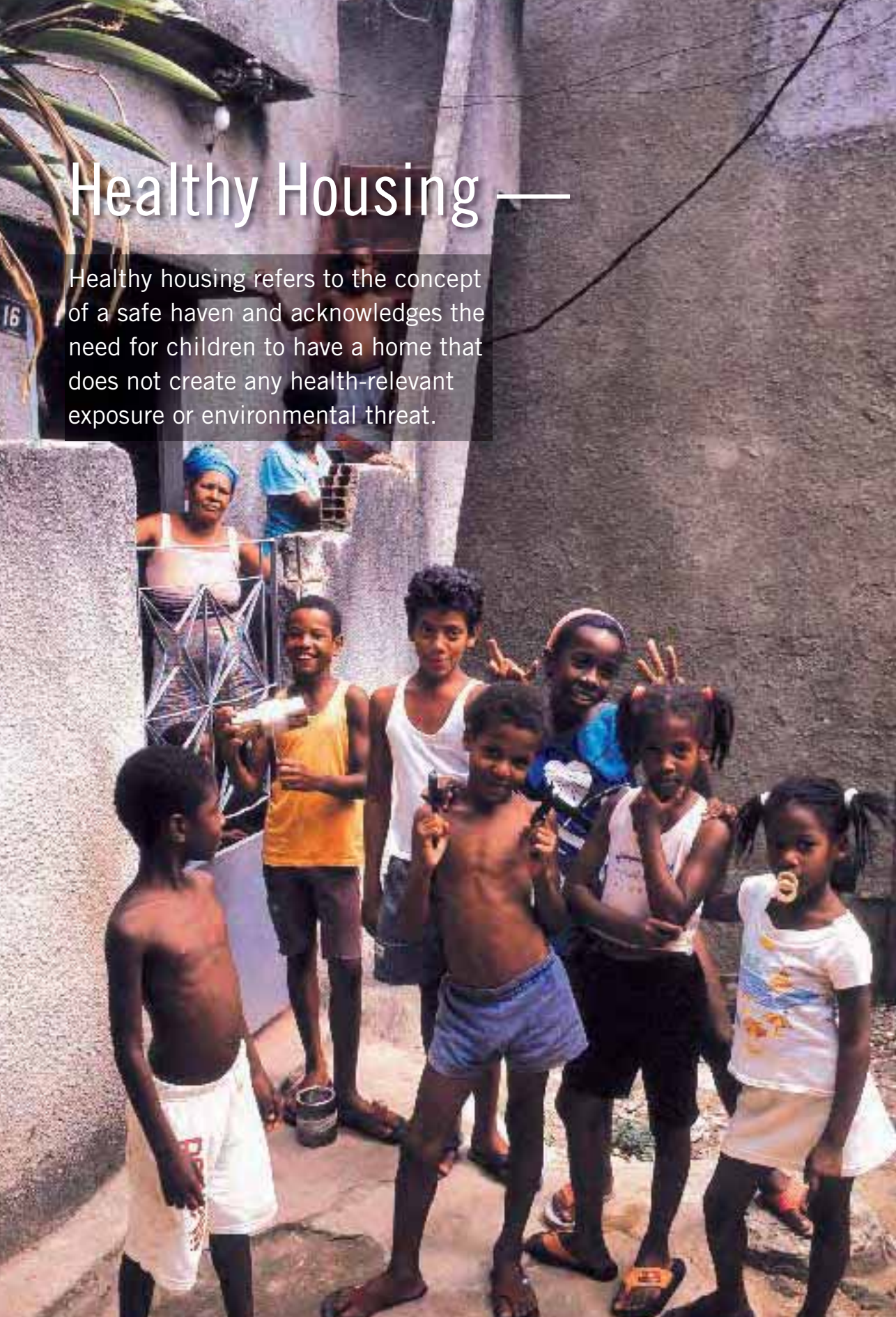
1. Exposure to moderate levels of noise can cause psychological stress. Annoyance, inability to concentrate and symptoms such as headaches, tiredness and irritability are common psychological reactions to noise. The degree of annoyance is related to the nature of the sound.

2. Health-relevant transport policies will reduce traffic noise and its impacts on mental health, and contribute to the reduction of air pollution and greenhouse gas emissions.



Healthy Housing —

Healthy housing refers to the concept of a safe haven and acknowledges the need for children to have a home that does not create any health-relevant exposure or environmental threat.



HEALTHY HOUSING is of special importance for children. As the design and architecture of housing is usually adapted to the average size and behaviour of adults, all the risk factors of housing (staircases, stove and oven, water heater, electricity, and cleaning detergents) are much more dangerous for children. They cannot anticipate the consequences of their behaviour, they cannot see what is on the table, and what is a small step for an adult is a huge step for a child. Looking at the home from the perspective of a toddler makes many dwelling items turn into a threat. Children are more vulnerable to indoor exposures due to their behaviour, the low level of immune system capacity, and the fact that they have – relative to body weight – a much higher intake of pollutants than adults.

Key messages: what every family and community should know about healthy housing

1. Everybody and every family has a right to housing.

2. Inadequate housing conditions are not only uncomfortable, but can have significant health effects for all household members. In an ideal case, healthy housing covers the provision of functional and adequate physical, social and mental conditions for health, safety, hygiene, comfort and privacy.

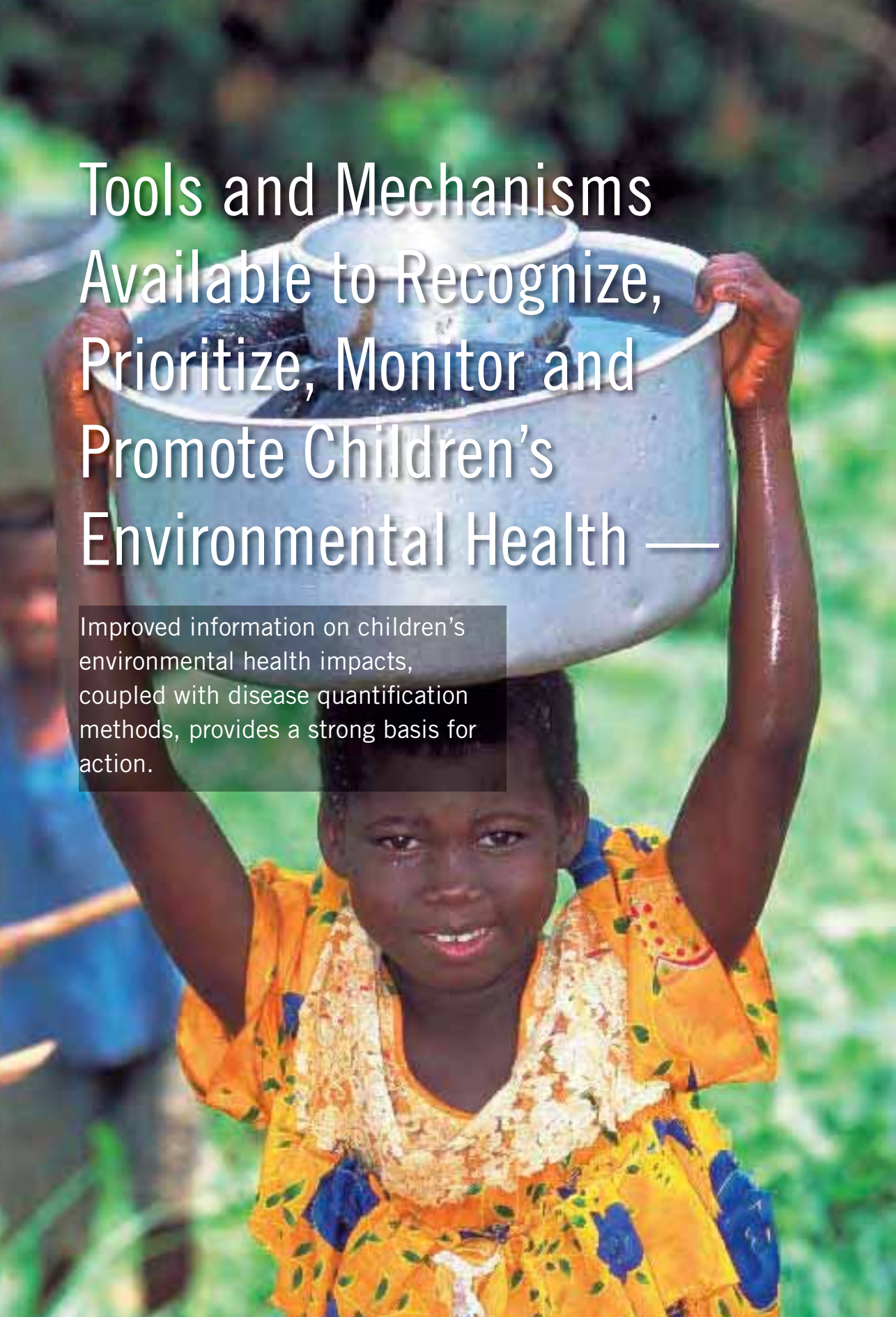
3. Housing inadequacy is a special threat to children and the elderly. Depending on age and behaviour, a variety of housing issues need to be considered. Especially for small children, the not yet fully developed capacity of their immune system should be taken into account.

4. Inadequate housing conditions are not exclusively linked to low socio-economic status.

5. Residents can do a variety of things to improve housing conditions and prevent or reduce the risk of injuries and disease, such as considering building products, architectural design, light and space conditions, ventilation capacities, non-toxic cleaning products and waste disposal.

6. Local authorities, housing agencies and owners have a key responsibility for the quality of the housing stock and the quality of the neighbourhood.

7. National governments play a major role by setting the overall standards and legal context for housing construction and renovation.



Tools and Mechanisms Available to Recognize, Prioritize, Monitor and Promote Children's Environmental Health —

Improved information on children's environmental health impacts, coupled with disease quantification methods, provides a strong basis for action.

ENVIRONMENTAL BURDEN OF DISEASE ESTIMATES

are a quantification of the health impacts related to the environment at population level. The World Health Organization is issuing estimates of health impacts globally and by region caused by a number of risk factors including indoor and outdoor air pollution, water, sanitation and hygiene, climate change, UV radiation and lead. Such estimates highlight the importance of the various environmental risks in terms of health impacts in a comparative way, and provide support for policy setting.

Why are estimates on the disease burden from the environment important?

Decision makers want to know: "How much disease is currently caused due to environmental risks?" and "How much disease burden could be averted by environmental improvements?" Evidence about how much disease is caused by environmental risks can assist in highlighting a public health problem and point to possible solutions for disease prevention.

Can environmental disease estimates specifically highlight the impact on children's health?

The disease burden from environmental risks can be estimated specifically for children. Such estimates also highlight the particular vulnerability of children when facing environmental risks. For example, while 24% of the global burden of disease is attributable to the environment, as much as 33% is attributable to the environment for children.[44] Burden of disease estimates are useful tools for additional purposes. They can be used for monitoring trends over time or to monitor the impacts of disease reduction activities. They can be used to estimate the cost-effectiveness of intervention activities. And finally, they can be used to raise awareness among the general population and policy makers about the health impacts caused by the environment.

Who can develop environmental burden of disease estimates?

Generally such estimates are developed by universities, specialized institutes, government agencies, or non-governmental organizations with a public health or environment background. The methods and their application are provided by the World Health Organization. The initial effort is most often to identify the sources of information and collect the required data in the country, because both health statistics and environmental exposure data are needed to develop the environmental burden of disease estimate.

Key messages: how can information on health impacts from the environment be used?

❶ For every country, an estimate of the environmental burden of disease is available. It contains a general overview by disease group, and more specific information for major risk factors. Further information is available at: www.who.int/quantifying_ehimpacts/countryprofiles.

❷ Major health impacts caused by the environment can be estimated specifically for children.

❸ Environmental burden of disease estimates can point to major threats to children's health and assist in identifying priorities for action, such as awareness raising, education, information, or policy making around an environmental risk.

NATIONAL PROFILES ON THE STATUS OF CHILDREN'S ENVIRONMENTAL HEALTH. Preparing a National Profile on Children's Environmental Health enables the country (or, as necessary, the province, state or geographical area) to assess and summarize the status of children's environmental health, highlighting the successes and challenges of current national activities and policies, and offering a baseline to evaluate progress. The rapid assessments are primarily qualitative and descriptive, and may be done in a relatively short time (one to three months time). They are planned and done in an interactive, consultatory manner, involving different sectors, and may complement the more in-depth quantitative efforts to assess children's health. They serve as a good basis for selecting, developing and reporting on children's environmental health indicators, as well as defining and identifying activities that will reduce environmental threats to children's health. Further information is available at: http://www.who.int/ceh/profiles/natprofiles/en/index.html

CHILDREN'S ENVIRONMENTAL HEALTH INDICATORS. Children's environmental health indicators are aimed at improving the assessment of children's environmental health, monitoring the effects of interventions to improve children's health in relation to the environment and reporting on the state of children's environmental health. The Global Initiative on Children's Environmental Health Indicators was launched at the World Summit on Sustainable Development in 2002. The initiative builds on existing international, regional and national work on child health and environmental indicators. These are being applied in many regions across the world through regional pilots and contributing projects to provide comprehensive information on the status of children's environmental health. These aim to help identify key environmental risks to children's health, pointing towards areas with strong needs for effective interventions. They provide opportunities to inform and guide the implementation of monitoring surveillance systems for children's environmental health. The Global Initiative on Children's Environmental Health Indicators is supported by the Office of Child Health Protection at US Environmental Protection Agency. http://www.who.int/ceh/indicators/en/

WHO'S TRAINING PACKAGE FOR THE HEALTH SECTOR ON CHILDREN'S HEALTH AND THE ENVIRONMENT is a collection of more than 30 modules with internationally harmonized information and peer-reviewed materials that are used to train health care workers, and enable them to become trainers. The modules include extensive notes, references and case studies. They are backed up by manuals and guidelines and also evaluation instruments. The issues covered include:

- The special vulnerability of children to environmental threats.
- The health and developmental effects of specific chemical, physical and biological hazards (e.g. pesticides, persistent toxic pollutants – POPs, lead, arsenic, radiation, noise, mycotoxins) present in specific settings (e.g. home and surroundings, school, recreation areas, workplace).
- Sources, routes and mechanisms of exposure (contaminants in air, water, food, cosmetics, objects, toys, and medical devices, which may be inhaled, ingested or absorbed).

Further information and training materials avaiable at http://www.who.int/ceh

PROMOTING ENVIRONMENTAL HISTORY TAKING. Taking the paediatric environmental history allows health providers to incorporate into the clinical records a description of environmental conditions, behaviours and risk factors relevant to a child's health. For example: the characteristics of the home/school/playground; potential exposure to pesticides; proximity to waste sites, polluting industries or traffic. Eliciting these together with other relevant information improves the capacity to identify, assess and follow up potentially exposed children at risk and respond with effective measures. These environmental records build the evidence base required for the collection of specific indicators, identify effective interventions and facilitate research. A concise version has been developed in Argentina and is being field-tested and available with guidance materials at www.who.int/ceh.

SETTING UP CEH CENTRES. These are specialized centres able to provide information and advice on environmental risk factors for children's health, specialized in dealing with environmentally-related paediatric issues. These centres may provide advice, information and care (if they are within a health care facility), and also train professionals, promote research, educate the public and inform decision-makers. The multi-disciplinary team created by a CEH centre captures the complexity of environmental health issues, is fully aware of the unique vulnerability of children and able to provide scientifically sound advice. CEH centres exist in the USA, Argentina, Uruguay, Canada, Mexico, Spain and other countries.

ENVIRONMENTAL HEALTH COMPONENTS IN THE INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESSES (IMCI) is an integrated approach to child health that focuses on the well-being of the whole child aiming to reduce death, illness and disability, and to promote improved growth and development among children under 5 years of age. As it includes both preventive and curative elements that are implemented by families, communities and health facilities, it represents an excellent mechanism to help identify, assess and prevent exposure to environmental risk factors that may be causing or worsening paediatric disease. More information on IMCI can be accessed at http://www.who.int/imci-mce/

LONGITUDINAL COHORT STUDIES – COLLABORATIVE RESEARCH. Promotion of collaborative research in children's environmental health among scientists from different countries is critical to address health problems in their national and global contexts and enhancing the sharing of experience and knowledge. Longitudinal cohort studies are the best available approach for detecting and evaluating environmentally-related effects on children from conception onwards. These collaborative activities also result in technology transfer and capacity building, in shared efforts and also in building up a network of trained scientists and policymakers. More information available at http://www.who.int/ceh

Busan Pledge for Action on Children's Health and Environment —

Evidence is increasing that environmental degradation, harmful chemicals, radiation and global climate change pose major threats to the health, development and survival of the world's children. Annually more than 3 million children under 5 years die from preventable environment-related effects, such as diarrhoeal diseases, respiratory infections, malaria and other vector-borne diseases. Moreover, children throughout the world are exposed to a complex array of environmental threats as new risk factors emerge in the context of global changes. The increased production, use and movement of harmful chemicals, unsafe disposal of hazardous waste, growing air and water pollution, poor access to sanitation and hygiene, unexpected effects of some new technologies and the effects of climate change, all have significant negative health impacts. Action is needed to protect the health of the children of today and the adults of the future.

To address these urgent issues, over 600 participants from 60 countries and organizations, a body of health and environment researchers, scientists, practitioners and policy-makers, met in Busan, Republic of Korea, from 7 to 10 June 2009. The mission of this global conference was to draw renewed and urgent attention to children's environmental health issues, reposition CEH in the global public health agenda and to improve and promote practical protective policies and actions at all levels. The following were our major findings, conclusions and recommendations:

- We acknowledge:
  - Chronic and acute health risks associated with children's exposure to mercury, lead, arsenic, pesticides, persistent organic/toxic pollutants and industrial chemicals, and to vectors of disease
  - The global threat to children posed by climate change, including increased air pollution, increased heat waves, weather-related disasters, increased infectious disease, loss of biodiversity, degradation of ecosystems, desertification, growing lack of availability of adequate food supplies and access to clean water

- Magnification of these risks in many parts of the world due to the cumulative impact of genetic susceptibility, disease, malnutrition and poverty
- The lack of knowledge regarding the potential health impacts of manufactured products such as nanoparticles and other new synthetic products
- The physical threats posed by the inappropriate use of radiation in health care
- The challenges associated with the built environment, including obesity.

- We acknowledge that old and new environmental threats may coexist in homes, schools, playgrounds, health care settings and other places where children spend time.

- We acknowledge the value of existing and developing international agreements and policy frameworks, including the upcoming negotiation for a mercury Convention, where consideration is given to the unique vulnerability of children.

- We recognize the renewed call of commitment to CEH made by the G8 Environment Ministerial Meeting held in Siracusa Italy (April 2009) on research collaboration, children's environmental health protection policies, indicators and programmes, climate change, increased attention to children's health and paediatric environmental health units and the importance given to collaboration between health and environment groups to ensure the promotion and protection of children's environmental health.

- We recognize the existing obstacles for protecting children´s health from environmental threats:
  - Lack of awareness of the effects of the environment on human health, and the differences in exposure and health effects for children compared to adults
  - Numerous research gaps and lack of coordination of research efforts across countries
  - Poor links among the health, environment and policy-making sectors
  - Lack of education and capacity building for health care providers on children´s environmental health issues
  - Limited practical scientific information for policy-makers and communities, who have limited resources, yet are concerned about the environment and their children´s health.

- We recognize that although much progress has been made, much more needs to be done to address the burden of environmental hazards on child health and survival. Many children´s environmental exposures can be reduced or eliminated because we have (i) a significant body of knowledge on the unique susceptibility of children;

(ii) the tools and mechanisms available to increase this body of knowledge and address the issues; (iii) existing and developing partnerships at various levels; and (iv) regional and international agreements for purposeful next steps.

- We reaffirm the outcomes of the 1st International Conference on Children's Health and the Environment (held in Bangkok, Thailand in 2002) which clearly outlined the main 'Environmental Threats to the Health of Children: Hazards and Vulnerability' and the 2nd International Conference on Children's Health and the Environment (held in Buenos Aires, Argentina in 2005), which addressed the need for 'Increasing Knowledge for Taking Action", while our focus at this 3rd International Conference on Children's Health and Environment was on the need to increase international collaboration to move with vigour to translate research results, new knowledge and international agreements into concrete political commitments and stronger practical policies for action.

As participants, organizations and individuals, we are committed to providing healthy environments for children. We pledge to translate research and knowledge into preventive policies and protective actions
and to strengthen our efforts and we will:

1. **Advocate for the recognition, assessment, and consideration of hazardous environmental influences on children's health and development**

2. **Contribute to raising the political profile of children's environmental health locally nationally, regionally and internationally**

3. **Raise awareness about global climate change, green growth, and children´s environmental health synergies**

4. **Train, educate and inform children, parents and key stakeholders at all levels (including health care workers, environment professionals, non-governmental organizations, industry, and policy-makers) about children's health and the environment**

5. **Integrate children's environmental health into existing public health programmes, especially into primary health care programmes, regional initiatives, Conventions and other programmes that address children and their environments**

6. **Develop and strengthen specialized children's environmental health centres in order to prevent, diagnose, manage and treat environmentally-related illnesses**

7. **Encourage collaborative CEH research studies that create new knowledge, incorporating biomarkers of environmental exposures and health effects**

8. **Advance the development and use of CEH indicators**

9. **Establish the efficacy of interventions taken to date**

10. **Establish dedicated partnerships and networks on children's environmental health issues as a platform for improving health and the environment**

11. **Strengthen communication among stakeholders as an integral component to advancing progress, create new channels and engage the media in promoting and championing children's environmental health issues**

12. **Develop strategic funding mechanisms that incorporate the environment into major development, educational, housing or welfare projects and into the context of international Conventions for country implementation of CEH activities.**

We pledge to develop a global plan of action to improve CEH, monitor and report on progress, and we urge WHO and its partners to facilitate the development of this plan in collaboration with all relevant agencies.

We will implement activities in close interactive partnerships with governmental and non-governmental organizations, centres of excellence, academia, professional bodies, educators and other sectors.

We commit to take CEH issues to the consideration of the higher authorities in our respective countries and to the attention of the international agencies concerned about children's health and the environment and the needs for green growth and sustainability.

We recognize and deeply acknowledge the Republic of Korea as the host of the 3rd WHO International Conference on Children's Environmental Health.

Drafted by Participants on 10 June 2009
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