

## PROTECTION OF HUMAN HEALTH AGAINST ENVIRONMENTAL HAZARDS

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### ABSTRACT

Environmental health consists of preventing or controlling disease, injury and disability related to the interactions between people and their environment. The interactions of humans with the environment affect quality of life and the longevity of life. Globally, nearly 25 percent of all deaths and the total disease burden can be attributed to environmental factors. Environmental health involves understanding the impacts of environmental and human-made hazards and protecting human health and ecological systems against these hazards.

Environmental risk factors are such as air, water and soil pollution, chemical exposures, climate change and ultraviolet radiation. It is essential to prevent the environmental health risks in the surrounding environment. Hence, steps are to be taken in creating awareness about hazards and also to manage the risks. Efforts should be taken to reduce the exposure to toxic substances and hazardous wastes, which are fundamental to environmental health.

**KEYWORDS:** World Health Organization (WHO), Environmental hazards, Human health, Risk factors

### INTRODUCTION

#### Definition of environmental hazard

An **environmental hazard** is a substance, state or event which has the potential to threaten the surrounding natural environment and / or adversely affect people's health. This term incorporates topics like pollution and natural disasters such as storms and earthquakes.

Environmental health hazards, like occupational health hazards, may be biological, chemical, physical, biomechanical or psychosocial in nature. **Environmental health** involves understanding the impacts of environmental and human-made hazards and protecting human health and ecological systems against these hazards. This includes studying the impacts of human-made chemicals on wildlife or human health, as well as how the environment influences the spread of diseases [17].

#### Types of Environmental Hazards

##### Physical hazards

Physical hazards are physical processes that occur naturally in the environment. These include natural disaster events such as earthquakes, tornadoes, volcanoes, blizzards, landslides and droughts. Not all physical hazards are discrete

events - some are ongoing, like ultraviolet radiation. UV radiation is considered a hazard, because it damages DNA and can cause human health issues like skin cancer and cataracts [15].

### Tornado



Figure 1

### Drought

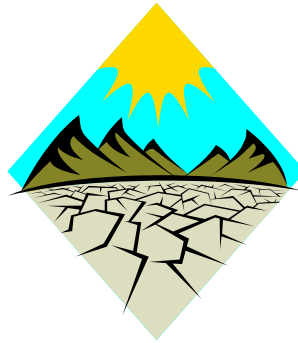


Figure 2

### Landslide



Figure 3

### Chemical Hazards

Chemical hazards are defined in the Globally Harmonized System and in the European Union chemical regulations. They are caused by chemical substances causing significant damage to the environment. The label is particularly applicable towards substances with aquatic toxicity. An example is zinc oxide, a common paint pigment, which is extremely toxic to aquatic life.

Chemical hazards can be both natural and human-made chemicals in the environment. Human-made chemical hazards include many of the synthetic chemicals we produce, like disinfectants, pesticides and plastics. Some chemical hazards occur naturally in the environment, like the heavy metals lead and mercury. Some organisms even produce natural chemicals that are an environmental hazard, such as the compounds in peanuts and dairy that cause allergic reactions in humans. Radioactivity is associated with an exposure dependent risk of some cancers, especially leukemia [16, 18].

Toxicity or other hazards do not imply an environmental hazard, because elimination by sunlight (photolysis), water (hydrolysis) or organisms (biological elimination) neutralizes many reactive or poisonous substances.

### Air Pollution

Air pollution in developing countries is derived not only from stack emission of pollutants from relatively large industries, like iron and steel, non-ferrous metals and petroleum products industries, but also from fugitive emission of pollutants from small-scale factories, such as cement mills, lead refineries, chemical fertilizer and pesticide factories and so on, where inadequate pollution control measures exist and pollutants are allowed to escape to the atmosphere.

Accidental releases of toxic substances into the atmosphere resulting in serious health risks are usually more common in developing countries. One of the worst of such accidents occurred in Bhopal, India, in 1984, where leaking methyl isocyanides killed 2,000 people.

The adverse health effects of ambient air pollutants in many urban areas, where levels are sufficiently high to contribute to increased mortality and morbidity, deficits in pulmonary function and cardiovascular and neurobehavioral effects [1, 2]. Indoor air pollution due to domestic combustion products is also a major issue in developing countries [3].

### Major sources of outdoor air pollutants

**Table 1: Major sources of outdoor air pollutants**

Pollutants	Sources
Sulphur oxides	Coal and oil combustion, smelters
Suspended particulate matter	Combustion products (fuel, biomass), tobacco smoke
Nitrogen oxides	Fuel and gas combustion
Carbon monoxide	Incomplete petrol and gas combustion
Ozone	Photochemical reaction
Lead	Petrol combustion, coal combustion, producing batteries, cables, solder, paint
Organic substances	Petrochemical solvents, vaporization of unburnt fuels

Source: Adapted from UNEP 1991b [4].

## Health Effects of Air Pollutants

Pollutants and their derivatives can cause adverse effects by interacting with and impairing molecules, crucial to the biochemical or physiological processes of the human body. Three factors influence the risk of toxic injury related to these substances: their chemical and physical properties, the dose of the material that reaches the critical tissue sites and the responsiveness of these sites to the substance. The adverse health effects of air pollutants may also vary across population groups; in particular, the young and the elderly may be especially susceptible to deleterious effects. Persons with asthma or other pre-existing respiratory or cardiac diseases may experience aggravated symptoms upon exposure [5].

### Nitrogen Oxides

Some epidemiological studies have reported adverse health effects of NO<sub>2</sub> including increased incidence and severity of respiratory infections and an increase in respiratory symptoms, especially with long-term exposure. Worsening of the clinical status of persons with asthma, chronic obstructive pulmonary disease and other chronic respiratory conditions has also been described. However, in other studies, investigators have not observed adverse effects of NO<sub>2</sub> on respiratory functions [6].

### Carbon Monoxide

The main effect of CO is to decrease oxygen transport to the tissues through the formation of carboxyhaemoglobin (COHb). With increasing levels of COHb in blood, the following health effects can be observed: cardiovascular effects in subjects with previous angina pectoris (3 to 5%); impairment of vigilance tasks (>5%); headache and dizziness (≥10%); fibrinolysis and death [7].

### Lead

Lead exposure principally affects heme biosynthesis, but also may act on the nervous system and other systems such as the cardiovascular system (blood pressure). Infants and young children less than five years old are particularly sensitive to lead exposure, because of its effect on neurological development at blood lead levels close to 10 µg/dl [8].

Ecological studies have shown an increase in mortality with respect to exposure to fine particulates [9] and an increase in emergency visits for asthma among children [10]. Studies of the adverse effect of ozone exposure conducted among healthy children have shown an increase in school absenteeism due to respiratory illnesses [11], and a decrease in lung function after both acute and sub-acute exposure [12]. Studies conducted among asthmatic children have shown an increase in respiratory symptoms and a decrease in peak expiratory flow rate after exposure to ozone [13].

### Biological hazards

Biological hazards come from ecological interactions between organisms. Viruses, bacterial infections, malaria and tuberculosis are all examples of biological hazards. When these pathogens and diseases are transferred between organisms, it's called an **infectious disease**. We suffer from these diseases and pathogens because we're being parasitized by another organism, which, while hazardous, is also a natural process. Biological hazards produce adverse health effects through infection and also those which produce adverse effects in non infection (allergic). Water, which is heavily contaminated with

pathogen coliform bacteria, will be associated with high risk of gastrointestinal and other infectious diseases [19].

### Health Consequences of Biological Contamination and Chemicals in Food

Despite progress in science and technology, contaminated food and water remain to this day major public health problems. Food borne diseases are perhaps the most widespread health problems in the contemporary world and important causes of reduced economic productivity [14].

- **Cultural hazards**, also known as **social hazards**, result from your location, socioeconomic status, occupation and behavioral choices. For example, smoking cigarettes is hazardous to the health, and this is a behavioral choice.

### CONCLUSIONS

The interactions of humans with the environment affect quality of life and the longevity of life. Environmental health hazards include traditional hazards of poor sanitation and shelter, as well as agricultural and industrial contamination of air, water, food and land. The exposure levels of air pollution in the general population in developing countries are usually higher than that in developed countries, where air pollution is more strictly controlled and residential areas are usually far from industries. All chemical hazards are mainly anthropogenic although there exist a number of natural carcinogens and chemical elements like radon and lead may turn up in health-critical concentrations in the natural environment. The diet, exercise habits, pollutants and primary mode of transportation all influence the health and the health of the environment around us. So, we must extend our awareness towards environmental hazards, which ultimately is a part of our responsibility.

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