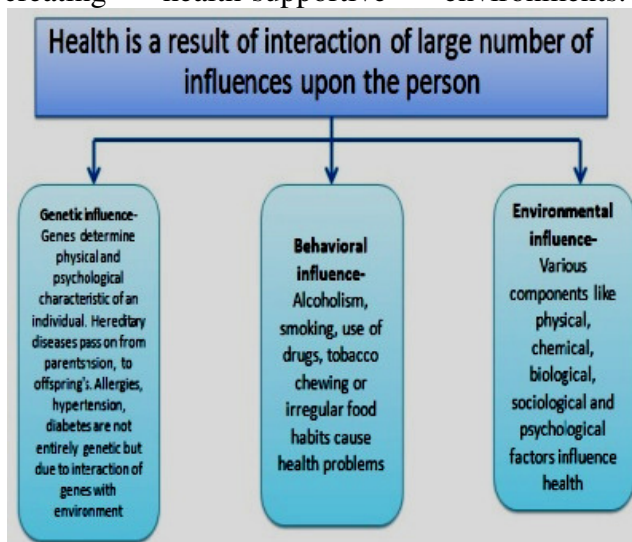


11. ENVIRONMENT AND HEALTH

- Environmental health is the study of how environmental factors can harm human health.
- It encompasses the assessment and control of those environmental factors that can potentially affect health.
- It is targeted towards preventing disease and creating health-supportive environments.

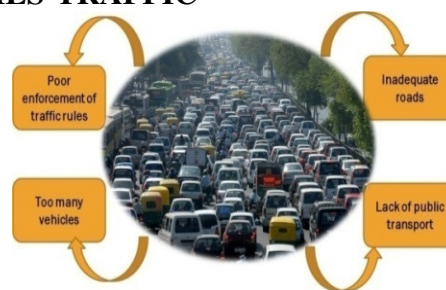


- Diseases due to poor waste disposal practices and water supply, sanitation, personal and domestic hygiene cause about 4.0% of all deaths and roughly about 5.7% of all disability or ill health in the world.
- Scarcity of clean drinking water, contamination of food and poor personal hygiene are the major cause for the spread of many water borne diseases.
- The sanitation problems such as lack of safe drinking water, poor drainage system, ignorance of sanitation, hygiene and improper ventilation etc. faced by the people of rural India.
- The sanitation problems faced by the people of Indian cities as



- In city-slums, unplanned hutment arranged very closely without any space for roads, parks, drains, without proper ventilation and cooking on chullahs have been a cause of respiratory and other health problems.
- Unavailability of clean drinking water adds to the health hazards of these city-slum dwellers also.
- Many industries are established in unplanned manner and without environmental impact assessment which has resulted in air, water, soil and noise pollution.
- The environmental health issues are no less in residential cum commercial areas:
 - Lot of overcrowding
 - Haphazard parking
 - Lot of noise
 - Garbage dumping
- The chaotic city traffic has also been a source of many health problems faced by the people of Indian cities.

CITIES-TRAFFIC



- Polluted water is the breeding ground for a large number of pathogenic organisms.
- These pathogenic organisms can cause various gastrointestinal problems, liver infection, cancer etc.
- Large number of children dies because of diarrhoea. Eye diseases such as trachoma and conjunctivitis too can be spread by contaminated water.

- Water borne diseases can be spread by drinking contaminated water, using untreated water for personal hygiene, washing food items, washing clothes etc.
- The various water borne diseases, their causative agent and symptoms as follows:

A. Bacterial diseases:				
Disease	Causative organism	Mode of spread	Symptoms	
Typhoid	<i>Salmonella typhi</i>	Contaminated food, water, milk, unwashed raw vegetables and flies	Continuous fever which increases day by day Temperature higher in evening than morning, body ache, headache and constipation. Haemorrhage from an ulceration in small intestine	
Cholera	<i>Vibrio cholerae</i>	Water or food contaminated by bacteria from stools of cholera patient	Painless diarrhoea, vomiting, 30–40 stools per day which soon becomes typically watery and colourless with flakes of mucus floating in them	
Bacterial Diarrhoea	<i>Shigella</i> spp.	Contaminated food, water and by direct personal contact	Diarrhoea, with blood and dysentery mucous in the stools along with severe gripping pain in the abdomen. Stools not too frequent (4-10 per day), faecal matter scanty. Patient looks ill	
Leptospirosis	<i>Leptospira</i>	Rodents primary hosts-carry organisms in kidneys. Infection by wading or swimming in water contaminated with rodent urine	Fever, pain in legs, nausea, vomiting are common, congestion of the conjunctival blood vessels around corneas of the eyes	
B. Viral diseases:				
Infective Hepatitis	<i>Hepatitis virus</i>	Food and water contaminated with virus in stools	Loss of appetite, nausea, vomiting and diarrhoea, accompanied with fever. Urine dark coloured. Eye and skin appear yellow	
C. Protozoan diseases:				
Amoebic dysentery	<i>Entamoeba histolytica</i>	Ingestion of cysts in food and water	Abdominal discomfort and diarrhoea, with or without blood or mucus in stools, fever, chills and gripping pain in abdomen	
Diarrhoea	<i>Giardia (=Lamblia) intestinalis</i>	Food or water contaminated with faeces having cysts	Intestinal disorders leading to epigastric pain, abdominal discomfort, loss of appetite, headache and loose bowels	
D. Helminth diseases:				
Bilharzia	<i>Schistosoma</i> spp	Cercaria larvae of flukes in water penetrate skin of persons wading in water	Allergy-like itch, rash, aches, fever, eosinophilia etc. When infection heavy, eggs may block arterioles of lungs cardio-pulmonary water causing schistosomiasis and may lead to congestive heart failure	
Guinea worm	<i>Dracunculus medinensis</i>	Unfiltered water	Blister near the ankle, causing allergy and aches	
E. Vector borne diseases related with water:				
Diseases transmitted by mosquitoes-				
Disease	Causative Organisms	Vector	Hosts	Symptoms
Malaria	<i>Plasmodium</i> sp	Female Anopheles (primary or final hosts)	Man (intermediate hosts)	Shivering, chills and sweating. As chills subside body temperature rises as high as 106° F. When temperature comes down patient sweats profusely and becomes comfortable until next attack which takes place at regular intervals
Filaria (Elephantiasis)	<i>Wuchereria (=filaria)</i>	<i>Culex fatigans</i>	Man (final hosts)	Enlargement of limbs and scrotum
Dengue	Barbo - virus	<i>Aedes aegypti</i>	Man (reservoir)	Sudden onset of moderately high fever, excruciating joint pain, intense pain behind eyes, a second rise in temp following brief remission, reduction in neutrophilic white blood cells

- Agriculture, mining, industries and increasing urban settlement have all contributed in increasing the pollutants in the air and thus posing an ever increasing threat to our health not only in India but also throughout the world.
- Our country's economy to a large extent is dependent on the agricultural sector.
- Agriculture is posing a threat to our health because of increased use of pesticides, fumigants and fertilizers.
- We need to use them judiciously and also regulate their use.
- Modern agriculture uses a lot of nitrogenous fertilizers and manures.
- This leads to increased levels of nitrates in the ground water as nitrates being soluble in water easily leach into the soil.
- When large amounts of nitrates in water are ingested by an infant, it is converted to nitrite by the intestinal bacteria.
- The nitrite then reacts with oxyhemoglobin (the oxygen-carrying blood protein) to form methaemoglobin, which inhibits the oxygen carrying capacity of the blood.
- If a large amount of methaemoglobin is formed in the blood, body tissues may be deprived of oxygen, causing the infant to develop a blue coloration of their mucous membrane (Methaemoglobinaemia).



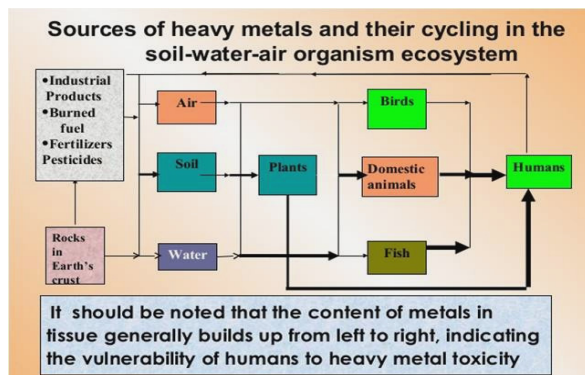
- Industries often emit large amounts of nitrogen and sulphur gases into the earth's atmosphere.
- When these gases react with water vapors in the atmosphere and form nitric acid and sulphuric acid respectively. The rain which contains large amounts of these acids is known as **acid rain**.
- Acid rain causes serious health problems such as cancer, skin disorders and even death.

- Mining operations like drilling, blasting, hauling, collection, and transportation are the major sources of emissions causing air pollution.
- Rapid urbanization has resulted in increasing urban air pollution in major cities, especially in developing countries.
- Carcinogens are cancer producing cells in living tissues.
- Cancer cells can spread to other parts of the body. Some cancers grow and spread fast. Others grow more slowly.
- Tumours can be either benign or malignant.
- Smoking tobacco is one of the causes of lung cancer, pneumonia, emphysema and chronic obstructive pulmonary disease.
- Smoking may increase the chances of causing cancer of stomach, liver, prostate, colon and rectum.
- Use of smokeless tobacco, chewing tobacco and snuff causes cancer of mouth and throat.
- The risk of lung cancer increases even in a non smoker if exposed to environmental tobacco smoke. This is called passive smoking.



- Another important environmental health hazard is UV radiation.
- Heavy metals are naturally occurring elements.
- Their multiple applications have led to their wide distribution in the environment; raising concerns over their potential effects on human health and the environment.
- Their toxicity depends on:
 - the dose
 - route of exposure
 - chemical composition
 - age, gender, genetics, and nutritional status of exposed individuals.

- The heavy metals present in the environment which are a real threat to our health
- The various sources of heavy metals and their cycling in soil, water and air ecosystem



- Lead interferes with body processes and is toxic to many organs and tissues including the heart, bones, intestine, kidney, reproductive and nervous system.
- Symptoms include abdominal pain, confusion, headache, anemia, irritability, and in severe cases seizures, coma and death.
- Mercury poisoning also known as hydrargyria or mercurialism
- The cause of arsenic poisoning is from ground water which is often due to naturally occurring high concentrations of arsenic in deeper levels of groundwater
- Arsenic poisoning causes:
 - Hyperkeratosis (scaling skin) and pigment changes
 - Circulatory problems in skin
 - Increased cancer risk some of which are mentioned here
 - Nerve damage
- Cadmium contamination of the fishes and endemic bone disease “Itai-itai” reported from Japan, where several hundreds of people were affected was the main cause of concern
- Occupational safety and health also referred to as workplace health and safety is an area concerned with the safety, health and

welfare of people engaged in work or employment.

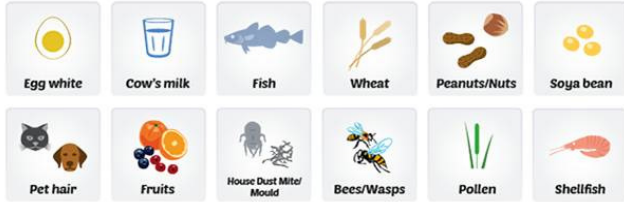
- The goals of occupational safety and health programs include fostering a safe and healthy work environment.
- An occupational hazard is a hazard experienced in the workplace which includes chemical hazards, biological hazards, psychological hazards and physical hazards.
- Scientific studies indicate that occupational diseases and work-related health problems are prevalent among workers involved in heavy physical activities. Common chemical hazards include:



- Noise is one of the most common occupational health hazards. Noise exposure can cause two kinds of health effects i.e. auditory effects and non-auditory effects.
- Auditory effects include hearing impairment resulting from excessive noise exposure.
- Non-auditory effects include stress and stress related physiological and behavioral effects.
- To prevent adverse outcomes of noise exposure, noise levels should be reduced to acceptable levels.
- Exposure to chemicals in the workplace can cause acute or long-term detrimental health effects.
- Common chemical hazards include:
 - skin irritation, disfiguring burns, eye injury or blindness caused by corrosive chemical products, toxic by-products such as vapors and fumes, caused by mixing incompatible chemicals
 - serious burns from flammable solvents that catch on fire
 - injury from exploding containers, such as spray cans
 - poisoning from accidental swallowing, especially with young children

**Senior Secondary Course
Learner's Guide – Environmental Science (333)**

- Allergy occurs when a person's immune system reacts to substances in the environment that are harmless for most people.
- These substances are known as allergens and are found dust, mites, pets, pollen, insects, moulds, foods and some medicines.
- Depending on the allergen and where it enters your body, you may experience different symptoms. Some common allergens are:



- Depending on the allergen and where it enters in the body, different symptoms may be found as you can see here



Nose and eye

Throat

Chest



Stomach



Skin



Check Yourself

- Alcoholism and smoking are related to-
 - Genetic influence
 - Behavior influence
 - Environmental influence
 - Social influence
- Allergy like rashes, aches, fever are the symptoms of--
 - Bilharzia
 - Guinea worm
 - Malaria
 - Leptospirosis
- Disease which are transmitted through water ----- is known as-----
 - contact transmission
 - vehicle transmission
 - vector transmission
 - chemical transmission
- Slums areas do not have clean drinking water. the people of this area suffer disease like-
 - malaria
 - typhoid
 - fever
 - dysentery
- Smoking may increase the chances of getting-
 - cancer
 - asbesbtosis
 - liver psoriasis
 - sclerosis

Ans: 1. b. 2. a. 3.b. 4.d. 5. a



Stretch Yourself

- Name the organism which is responsible for dengue.
- What is the major cause of spread of many water borne diseases?
- Give any two examples of genetic influences,
- Define the term metal toxicity?
- Which metal is responsible for Methaemoglobinaemia in infants?



Test Yourself

- What are the relation between environment and health? Explain
- Do you think sanitation plays an important role in human health? If yes, give reasons in support of your answer.
- Differentiate between contact transmission and vector transmission
- How does air pollutants make harm to your health?
- Describe the adverse effect of UV radiation in human beings?