

Environmental Health 2

- **Food Pollution**
- **Environmental Issues**

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- **Community Medicine**



Food Contamination

- ✓ A toddler is hospitalized as a result of drinking contaminated apple juice.
 - ✓ A preschooler dies because he eats a hamburger that is not thoroughly cooked.
 - ✓ A cruise ship comes back to port early because many passengers have become ill with the same symptoms.
 - ✓ A school cafeteria is unable to operate because half the staff is out with symptoms of vomiting, diarrhea, and fever.
- In each case, the illness or death was traced to something in the food supply.....this implies food contamination



What is Contamination?

- ***Contamination*** is the state of being impure or unfit for use due to the introduction of unwholesome or undesirable elements.



Contamination of food

- People's lives depend on a reliable and safe food supply that is free from harmful substances.
- ❑ Contamination occurs when something not normally found in the food is added.
- ❑ Contamination implies the addition is not intended or planned. The substance added may or may not cause health problems.



Contamination of food

The three main ways in which food can be contaminated are:

- 1) Microbial contamination (includes bacteria, moulds and viruses)
- 2) Physical contamination
- 3) Chemical contamination



Microbial contamination:

Mold often occurs if food is stored at the wrong temperature, at high humidity or beyond its recommended shelf-life.

Viruses may be brought into food on raw foods such as shellfish which have been bought from an unapproved source.

Bacterial contamination is the most significant in terms of microbial food poisoning and foodborne illnesses.



Bacterial Contamination of food

Bacterial cross-contamination may be defined as: “the transfer of harmful / pathogenic bacteria from one item / food / surface / person to food.”

Direct cross-contamination: occurs in food when there is direct contact between the source of the bacteria and food.

Examples include:

- Raw meat stored above or in contact with cooked meat
- Raw chicken stored above or in contact with coleslaw
- Food handler sneezing/coughing onto food



Bacterial Contamination of food

Indirect cross-contamination: This occurs when harmful bacteria are transferred from the source to the food via a vehicle.

Examples include:

- Using the same knife/chopping board to slice raw meat and then cooked meat without washing it and disinfecting it between tasks
- Using the same cloth to wash down the raw food preparation area and then the cooked food preparation area
- Touching food after blowing your nose, without first washing your hands



foodborne Infections (invasive Infections)

- Microbes release digestive enzymes that begin to damage body tissue and cause illness. This type of foodborne illness is called ***foodborne infection***.
- ❑ This infection cannot occur if the microbes are killed.
- ❑ Foodborne infections may be caused by bacteria and viruses. A large number of living organisms is usually required to cause illness.
- ❑ Symptoms caused by damage when organisms feed on their host (Fever, diarrhea, vomiting, abdominal pain).



Invasive Infection Bacteria:

- ✓ SALMONELLA
- ✓ AEROMONAS
- ✓ CAMPYLOBACTER
- ✓ SHIGELLA
- ✓ VIBRIO PARAHAEMOLYTICUS
- ✓ YERSINIA
- ✓ ENTERIC-TYPE ESCHERICHIA COLI (e-coli)



Viral Food Infections:

Three main types of viruses have been found to cause foodborne illness. These include:

- **Rotavirus**
- **Norwalk virus**
- **Hepatitis A virus.**
- **Infections have been traced to infected food handlers.**



Chemical Contamination of Food

Undesirable chemicals can enter foodstuffs during:

- **Growth – e.g. veterinary drugs (antibiotics and hormones), fertilizers, pesticides and environmental contaminants e.g. lead**
- **Processing – e.g. oils and lubricants from machines, cleaning chemicals**
- **Transport – e.g. as a result of spillage or leaks**
- **Sale – e.g. cleaning chemicals**



Chemical Hazards

ACUTE

SMALLER MORE ISOLATED OUTBREAKS
USUALLY ACCIDENTAL/MIS-USE

CHRONIC/LONG TERM

MAJORITY
EXCEPT TOXINS (USUALLY ACUTE)
LONG TERM EXPOSURE
CARCINOGENS/OTHER TOXIC EFFECTS

RISK ASSESSMENT

LESS STRAIGHT FORWARD (compared to biological hazards)



Classes of Chemical Residues

1. Food Additives (E.G. Vitamins, Colors, Flavors)
2. Pesticide Residues
3. Veterinary Medicines (E.G. Hormones And Antibiotics)
4. Environmental Residues (Lead: Leaded Gasoline, Solder For Tin Canned Food)
5. Cleaning Agents
6. Allergens



Physical Contamination

- ❑ Food can be contaminated physically by foreign objects.
- ❑ Foreign objects can be brought into the premises with raw materials or introduced during storage, preparation, service or display.
- ❑ Foreign objects which are commonly associated with food complaints include:
 - Nuts, bolts, wire, metal
 - Cardboard, plastic, string
 - Rodent droppings, hairs
 - Cigarette butts, glass, flaking paint
 - Earrings, fingernails



Global Environmental Problems



Global Environmental Problems

- Environmental health issues are major risk factors in the global burden of disease.
- The WHO has estimated that between 25 and 33 percent of the global burden of disease can be attributed to environmental risk factors.
- The burden of preventable environmental diseases are disproportionately felt by residents of poor developing countries.
- The reasons for this disproportionate effect in poor countries include: **lack of modern technology, weak protective environmental laws and regulations, a lack of awareness, and poverty.**



Global Warming:

- ✓ Climate changes like global warming is the result of human practices like emission of Greenhouse gases.
- ✓ Global warming leads to rising temperatures of the oceans and the earth' surface causing:
 1. melting of polar ice caps
 2. rise in sea levels and also
 3. unnatural patterns of rain such as flash floods, excessive snow or desertification in other areas.



Global Warming:

- ✓ These gases possess heat trapping capacity that are needed to create greenhouse effect so that this planet remains warm for people to survive.
- ✓ During past several decades, the accumulation of greenhouse gases have grown rapidly, which means more heat gets trapped in the atmosphere and few of these gases escapes back into the space.
- ✓ These gases heat up the earth's surface and this results in global warming. According to Environmental Protection Agency (EPA) reports, the earth's temperature has increased by 0.8 degrees Celsius over the past century.



Overpopulation:

- The population of the planet is reaching unsustainable levels as it faces shortage of resources like water, fuel and food.
- Population explosion in less developed and developing countries is straining the already scarce resources.
- Intensive agriculture practiced to produce food damages the environment through use of chemical fertilizer, pesticides and insecticides.



Natural Resource Depletion:

- ✓ Fossil fuel over-consumption results in emission of Greenhouse gases, which is responsible for global warming and climate change.
- ✓ Globally, people are taking efforts to shift to renewable sources of energy like solar, wind, biogas and geothermal energy.
- ✓ The cost of installing the infrastructure and maintaining these sources has decreased in recent years.



Waste Disposal

- ✓ The over consumption of resources and creation of plastics are creating a global crisis of waste disposal.
- ✓ Developed countries are notorious for producing an excessive amount of waste or garbage and dumping their waste in the oceans and in less developed countries.
- ✓ Nuclear waste disposal has tremendous health hazards associated with it. Plastics, fast food packaging, and cheap electronic wastes threaten the well being of humans.



Climate Change

It occurs due to rise in global warming which occurs due to increase in temperature of the atmosphere by burning of fossil fuels and release of harmful gases by industries.

- Climate change has various harmful effects but not limited to:
 - ✓ melting of polar ice
 - ✓ change in seasons
 - ✓ occurrence of new diseases
 - ✓ frequent occurrence of floods and
 - ✓ change in overall weather scenario.



Loss of Biodiversity

Human activity is leading to the extinction of species and habitats and loss of bio-diversity.

- Eco systems, which took millions of years to perfect, are in danger when any species population is being destroyed.
- Balance of natural processes like pollination is crucial to the survival of the eco-system and human activity threatens this balance.
- An example is the destruction of coral reefs in the various oceans, which support the rich marine life.



Deforestation

Forests are natural sinks of carbon dioxide and produce fresh oxygen as well as helps in regulating temperature and rainfall.

- At present forests cover 30% of the land but every year tree cover is lost amounting to the country of Panama due to growing population demand for more food, shelter and cloth.
- Deforestation simply means clearing of green cover and make that land available for residential, industrial or commercial purpose.



Ozone Layer Depletion

The ozone layer is an invisible layer of protection around the planet that protects us from the sun's harmful UV rays.

- Depletion of the crucial Ozone layer of the atmosphere is attributed to pollution caused by Chloro-fluoro carbons (CFC's).
- Once these toxic gases reach the upper atmosphere, they cause a hole in the ozone layer, the biggest of which is above the Antarctic (the south pole).
- The CFC's are banned in many industries and consumer products.



Urban Sprawl

Urban sprawl refers to migration of population from high density urban areas to low density rural areas which results in spreading of city over more and more rural land.

- Urban sprawl results in land degradation, increased traffic, environmental issues and health issues.
- The ever growing demand of land displaces natural environment consisting of flora and fauna (plants and animals) instead of being replaced.



Save the planet!
For our future generations

