UNIT: I_Chapter 1_FOOD SERVICE ESTABLISHMENTS

Food Safety

- **WHO,**

"all ***conditions and measures*** that are necessary during the ***production, processing, storage, distribution and preparation*** to ensure that it is ***safe, sound and wholesome*** and fit for human consumption".

➢ Primary aim is to prevent food poisoning and other food borne illnesses

With changes in the socio-economic scenario, food service and catering has evolved into an industry that is expanding, as there is much greater demand for food outside home which is tasty, hygienic, healthy and aesthetically served. In some situations, there is a demand for food with longer shelf life. Scientific and technological advancement has helped those involved in mass production of food to streamline their activities, be more effective, improve the safety and quality and yet make it less tiring. Use of computers has also contributed tremendously- not just for maintenance of records, accounting systems, but also for on-line ordering of food, information about equipment manufactured in different parts of the world and recipes for various preparations.

- Food - not only an agricultural or trade commodity, but also a public health issue
- Food safety - an essential public health function
- Must be integrated with the three sectors— government, industry and consumers
- Necessary that food safety forms an essential component of health-based nutrition policies and nutrition education.

Eating establishments

- Restaurants & Hotels
- Dhaba
- Snack Bars
- Canteens (Schools, Colleges, Office, Institutions)
- Food Service at religious places
- Neighbourhood Tiffin Services / dabba walas
- Street food vendors

Table 4.1: Types of Food Service Establishments

Welfare Catering	Commercial Catering
Mid-day meals in schools	Small to large hotels, restaurants, dhabas, cafes
School food services	Expensive luxury restaurants, Spas, Speciality restaurants
Industrial canteens(when employers provide free or subsidised food to employees)	Guest houses, Holiday camps
Institutions – school and college hostels, working women's hostels	Fast food joints/ Take away(quick service restaurants)

Special needs e.g. hospitals,	Snack bars
Old age homes, nursing homes	Coffee shops, speciality food services e.g. ice cream parlours, pizza
Orphanages	Food services in cinema halls, theatres, malls
Prisons	Wine Bars
Dharmashalas	Travel services on sea, land, air (Transport catering) e.g. flight kitchens, buffet cars in trains
Langar, Prasad including meals offered to devotees at temples	Catering for seminars, workshops, conferences, parties and weddings
Feeding programs undertaken by religious orders e.g., Ramkrishna Mission, ISKCON	Catering for industries and institutions on contract basis (in-house food service)
Creches	Chain catering organisations
Supplementary feeding programmes of government/municipality e.g., Midday meal programme, ICDS' supplementary feeding	Clubs/gymkhanas
	Mobile Catering

Eating establishments

Specific characteristics that make them potential focus of food borne outbreaks or epidemics:

- ✓ Single infection may affect many people simultaneously
- ✓ Much of the food is prepared in advance of the normal mealtime rush
- ✓ Hours tend to encourage poor and unsatisfactory methods of dish-washing

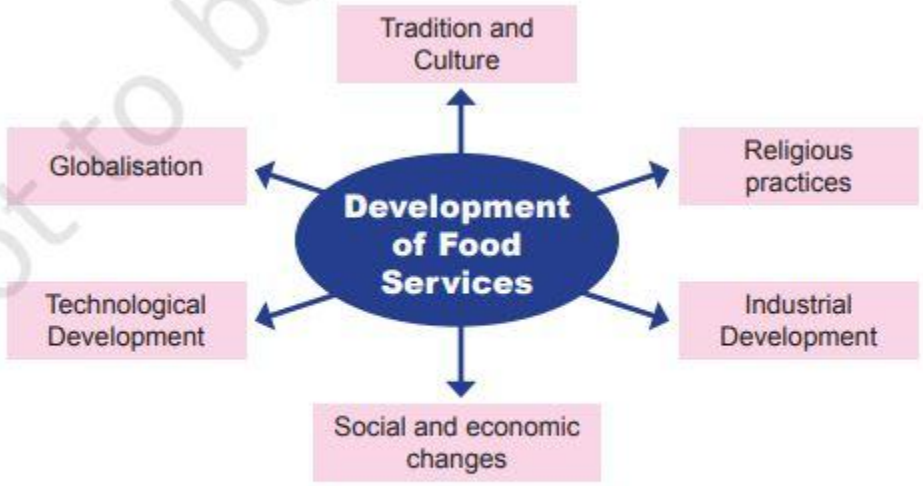


Fig. 4.1: Factors Influencing Development of Food Services

Establishment – Food borne illness outbreak can cost an establishment thousands of pesos, it can even be the reason an establishment is forced to closed.

- Loss of customers and sales
- Loss of prestige and reputation
- Lawsuits
- Increase insurance premiums
- Lowered employee morale
- Employee absenteeism
- Increase employee turn over
- Embarrassment

Eating establishments

- Improper holding temperatures
- Inadequate cooking, such as undercooking raw shell eggs
- Contaminated equipment
- Food from unsafe sources, and
- Poor personal hygiene

Standards of eating establishments

Location and surroundings:

- away from environmentally polluted areas and industrial activities
- not be used for residential purpose

Layout and design of food establishment premises:

- food preparation / manufacturing process are not subject to cross-contamination from receiving & pre processing
- Area occupied by machinery shall not be more than 50% of the manufacturing area.

Standards of eating establishments

Kitchen premises- General principles:

- Spacious, lighted, fly proof, rat proof, airy and spotlessly clean
- Floors: must have non slip surfaces should be impervious
- Ceiling: should be smooth, resist condensation with provisions for exhaust/chimney vents
- Lighting: must be good both natural and artificial
- Ventilation: both natural and artificial is necessary
- Toilets: Foot operated flushes are more preferable

Standards of eating establishments

- ✓ Kitchen proper
- ✓ Kitchen equipment
- ✓ Preparation room
- ✓ Store room
- ✓ Scullery
- ✓ Dining Room

Washing arrangements

- ✓ Good layout of washing-up area
- ✓ Correct temperature of wash and rinse water
- ✓ A good detergent suited to the type of water
- ✓ Orderly methods of work in rinsing, stacking, racking, and storage

Standards of eating establishments

Washing Arrangements

- ✓ One Sink Method
- ✓ Two Sink Method
- ✓ Dish washing machine

Waste disposal:

- Within the kitchen - pedal-operated bins
- Outside the kitchen

Environmental control:

- Control of Flies
- Cockroaches
- Sprays and other insecticide formulations

UNIT: 1_Chapter 2_Hygiene during preparation, display, among food handlers

The role of health workers in food safety

- Education in food safety
- Focused and relevant to the target audience
- Specific target groups for food safety education
- HACCP-based approach
- Surveillance of food borne diseases

Food Handlers

- Immaculate personal hygiene of the cooks - prime importance in the prevention of food borne infections
- Cooks must be subjected to regular medical examinations for communicable diseases
- Worthwhile doing a stool examination
- They should also be vaccinated against the enteric group of fevers.

Disease	Work status	Duration of Work Restriction / comments
Abscess, boils, etc	Relieve from direct contact and food handling.	Until drainage stops and lesion has healed or employee has negative culture.
AIDS or ARC (AIDS related complex) 18/5/2015	May work (per CDC guidelines). No open lesions, upper respiratory diseases, or communicable diseases.	Employee will be counselled and educated. 38

Acute stage (aetiology known)	Relieve from direct food handling.	Until symptoms resolve and infection with Salmonella, Shigella or Campylobacter is ruled out
Campylobacter	Relieve from direct food handling.	Until symptoms resolve or after appropriate antibiotic therapy for 48 hours
Salmonella	Relieve from direct food handling.	Until stool is free of the infecting organism in two consecutive cultures, not less than 24 hours apart

Shigella	Relieve from direct food handling.	Until stool is free of the infecting organism in two consecutive cultures, not less than 24 hours apart
Hepatitis A	Relieve from direct food handling.	Until seven days after onset of jaundice. Must bring note from physician upon return
Staphylococcus aureus	Relieve from direct food handling.	Until lesions have resolved and the employee has negative culture

Personal cleanliness

- Any cut or wounds - not come in direct contact
- Wash their hands with soap and clean potable water
- Refrain themselves from smoking; spitting; chewing or eating; sneezing or coughing over any food
- Trim their nails periodically

Street food safety in India

Challenges to street food safety:

- Lack of basic infrastructure and services
- Difficulty in controlling the large numbers of street food vending operations
- Insufficient resources for inspection and laboratory analysis.
- General lack of factual knowledge
- Poor knowledge in basic food safety measures.
- Inadequate public awareness of hazards

Policies and provision on street foods:

- National Policy on Urban Street Vendors - Ministry of Housing and Urban Poverty Alleviation in 2009
- "Street Food Vendors- Food Safety Requirements"- BIS
- More recently, 2012- schedule 4 of the FSSAI

Hazard Analysis and Critical Control Points(HACCP)

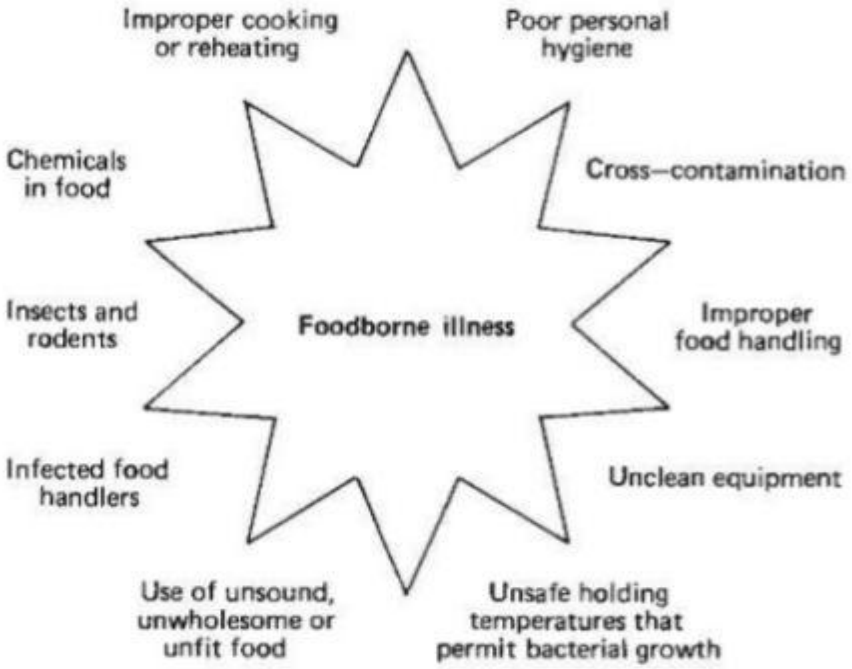
- Approach to food safety focusing on identifying and controlling critical points
- Food handlers are trained to implement key strategies to eliminate infection triggers at critical points
- Specified by the Codex Alimentarius, 1997

Five keys for safer food

1) Keep clean
2) Separate raw and cooked food
3) Cook thoroughly
4) Keep food at safe temperatures
5) Use safe water and raw materials

Knowledge = Prevention

Causes of food borne illness:



Types of food contaminants:

- Biological Contaminant
- Physical Contaminant
- Chemical Contaminant

Biological contaminant - may cause a food borne illness (bacteria, viruses, fungi, parasites, biological toxins)

- Examples:
- Sea food toxins
- Mushroom toxins
- Clostridium Botulinum
- Salmonella bacteria

Preventing Biological contaminant

- Purchase foods only on reputable supplier
- Do not use wild mushrooms
- Maintain good personal hygiene
- Observe proper hand washing
- Clean and sanitize equipment
- Maintain clean and sanitize facilities
- Control pests

**** Cooking does not destroy toxins****

Physical Contaminant – any foreign object that accidentally find its way into food

- Hair
- Staple wire
- Dust
- Metal shavings
- Nails
- Earrings
- Hair clips
- Plastics
- metal
- Glass fragments
- Insects
- Extraneous vegetable matter
- stones

Preventing Physical Contaminants

- Wear hair restraint
- Avoid wearing jewelry when preparing, cooking and holding foods (ring, earrings)
- Do not carry pencil or pen
- Do not wear nail polish or artificial nails when working with foods
- Clean can openers regularly
- Remove staple wire in the receiving area
- Place shields on lights

Chemical Contaminant – a chemical substance that can cause food borne illness. Substances normally found in restaurant

- Toxic metals
- Pesticides
- Cleaning product
- Sanitizers
- Preservatives

Preventing Chemical Contaminants:

- Teach employees how to use chemicals
- Store chemicals in original containers to prevent accidental misuse, as well as leakage into food
- Make sure labels are clearly identify chemical contents of chemical containers
- Always chemical according to chemical recommendation
- Always test sanitizing solution
- Wash hands thoroughly after working with chemicals
- Wash foods in cold running water
- Monitor pest control operator and make sure chemicals do not contaminate foods

Utensils and equipment containing potentially toxic metals:

- Lead
- Copper
- Brass
- Zinc
- Antimony
- Cadmium

Highly acidic foods such as tomatoes or lemons can react with metals

- Cross- Contamination
- Time-Temperature Abuse
- Poor Personal Hygiene

Cross Contamination

- occurs when microorganisms are transferred from one surface or food to another.
  The bacteria can transfer from:

1. Hand to food
2. Food to food
3. Equipment to food

Preventing

Hand to food:

✓ Wash hands properly

✓Cover cuts, sores and wounds

✓Keep fingernails short, unpolished & clean

✓Avoid wearing jewelry, except for plain ring

Preventing Time Temp. Abuse

- Never expose the food to Temperature danger zone: 41°F - 140°F
- Not to exceed 4 hours, except cool-down
- Document temperatures & time
- Includes receiving, storage, preparation, holding, serving, cooling, and reheating
- Pass food through danger zone quickly

When to wash hands?

Before:

- **Beginning food preparation**
- **Putting on disposable gloves**
- **Serving customers**

After:

- **Arriving at work and after break**
- **Using the restroom, washing sinks**
- **Eating, drinking, smoking, chewing tobacco and gums**
- **Using the telephone**
- **Using handkerchief or tissue**
- Using handkerchief or tissue
- Handling inventory
- Handling raw foods
- Touching or scratching a part of the body
- Coughing, sneezing
- Handling garbage
- Touching dirty surfaces

Food to Food Contamination

- - When harmful organisms from one food contaminate other foods. (raw meats, thawing meat on top of the shelf where it can drip on the other foods)

Preventing food to food contamination

- Store cooked foods that will not be cooked in the refrigerator on a higher shelf than raw foods.
- Best to practice mix left over foods with fresh foods
- Wash fruits & veg, in a cold running water
- Do not let raw meat and raw vegetables be prepared on the same surface at the same time

Equipment to Food Contamination

- How to prevent:
- Use separate cutting boards for different foods (meat- veg)
- Prepare raw foods in separate area from fresh and ready to eat foods
- Clean & sanitize equipment, work surfaces & utensils after preparing each foods
- Use specific containers for various food products.
- Make sure cloth and paper towel use for wiping spills are not used for any other purposes

- TIME TEMPERATURE ABUSE – happens when the food is exposed to Temperature Danger Zone ($41^{o}F$ - $140^{o}F$) for more than 4 hrs.

Time Temperature Abuse occur when:

- Food is not stored, prepared or held at a required temperature
- Food is not cooked or reheated to temperature high enough to kill harmful microorganisms
- Food is not cooled low enough fast
- Food is prepared in advance and not set to a safe required internal temperature while the food is on hold

POOR PERSONAL HYGIENE

Stay home if someone is suffering from these illnesses:

- Hepatitis A
- Shigella
- E-Coli Infection
- Salmonella

- *** Sick employees must not work with foods***

Keeping Good Personal Hygiene

- Medicines should be kept inside the locker and away from foods
- Clean and cover cuts and wounds
- Never use bare hands when handling ready to eat foods
- Disposable gloves should be used once
- Take a bath everyday
- Wear appropriate attire
- Refrain from wearing jewelry, make ups, and nail polish
- Observe proper hand washing procedures at all times

UNIT: II_CHAPTER 3_ENVIRONMENTAL SANITATION & PUBLIC HEALTH

It means the art and science of applying sanitary, Biological, Chemical and Physical science principles and knowledge to improve and control environment and factor therein for protection of the health and welfare of the public.

What is Sanitation?

The process of keeping places free from dirt, infection, disease, etc., by removing waste, trash and garbage, by cleaning streets, Washing yours self, safe drinking water, etc

COMPONENTS OF ENVIRONMENTAL SANITATION

- WATER SANITATION
- FOOD SANITATION
- AIR SANITATION

COMPONENTS OF ENVIRNOMENTAL SANITATION

- WATER SANITATION
- FOOD AND MILK SANITATION
- EXCRETA DISPOSAL
- SEWAGE DISPOSAL
- REFUSE DISPOSAL
- VECTOR AND VERMIN CONTROL
- HOUSING
- AIR SANITATION

WATER SANITATION

- Water, Sanitation and Hygiene, or WASH, are issues that affect the health and wellbeing of every person in the world. Everyone needs clean water to drink. The quality of water, sanitation and hygiene in a person's life is directly correlated to poverty, as it is usually joined by lack of education, lack of opportunity and gender inequality.

Problems-

- The bacterial infection Trachoma generally comes from contaminated water and is a leading cause of blindness in the world.
- Cholera, Typhoid and Dysentery.

FOOD SANITATION

Food Sanitation is protection from contamination.it includes all practice involved in protecting food from risk harmful bacteria and poisions and destroying any harmful bacteria in food by through cooking or processing. Because all bacteria exist in a vegetative stage.

AIR SANITATION

The system of removing the impurities present in **air** inside buildings to protect people from infections. Sanitation of air is essential in enclosed places like hospital wards, operation theatres and burns unit to prevent infection.

Why is Sanitation Important?

Why is Sanitation Important cont...

Good Sanitation can prevent you from getting diarrhoea and can also help prevent other serious diseases.

When you practice good sanitation, your family saves money on healthcare and treatment.

When you keep yourself & your surroundings clean, you fall sick less often & are more likely to attend school/work regularly. If you are Healthy you can help build a strong society.

When you get rid of waste properly, you can help to protect water sources. It also means that you don't have to smell the disgusting mess all around you.

Better Sanitation is possible....but it all starts with me and you!!!

What does poor sanitation Cause?

Poor sanitation gives many infections the ideal opportunity to spread causing disease and illness in the community!!

Human excreta have been implicated in the transmission of many infectious diseases including cholera, typhoid, infectious hepatitis, polio.

- Trachoma is another infection/ disease caused by poor sanitation and causes blindness. It is spread by a combination of:
  - • poor sanitation, allowing the flies that spread the infection to breed;
  - • poor hygiene associated with water scarcity and poor water quality;
  - • lack of education and understanding of how easily the infection can spread in the home and between people.

How are diseases spread?

How to prevent Diseases from spreading....

- Use a clean toilet which have covers as this prevent flies from landing on the poop. If you don't have a toilet make a small whole to poop in and cover with sand when done.

- Wash yours hands after using the toilet with safe water and soap.

- Use safe and clean bottles or buckets to carry or store water in.
- Clean your environment to avoid bad smells and breeding places for flies.
- Cover food to keep flies from sitting on it.

GOVT. INITIATIVES FOR SANITATION

- National Urban Sanitation Policy
- Central Rural Sanitation Program
- Nirmal Bharat Abhiyan and Total Sanitation Compaign
- Nirmal Gram Puraskar

NATIONAL URBAN SANITATION POLICY

"All Indian cities and towns become totally sanitized, healthy and livable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women".(2008)

CENTRAL RURAL SANITATION PROGRAM

- Central Rural Sanitation Programme (CRSP) was launched in 1986 primarily with the objective of improving the quality of life of the rural people and also to provide privacy and dignity to women.

NIRMAL BHARAT ABHIYAN

- The Nirmal Bharat Abhiyan was initiated in the year 1999 by the then government. The Nirmal Bharat Abhiyan was also known as the Total Sanitation Campaign. The prime focus of the scheme was to improve the sanitation conditions in the rural regions of the county.

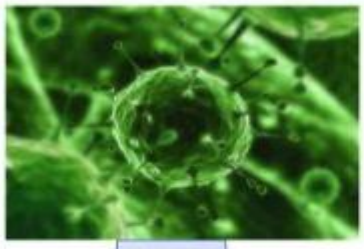
Environmental sanitation strongly depends on soc environmental sanitation can act on reducing exposure to infectious agents by limiting contact to wastes or polluted media, and by changing hygiene and socio-cultural practices.ial and cultural practices and beliefs.

Normal Flora – Friend or Enemy

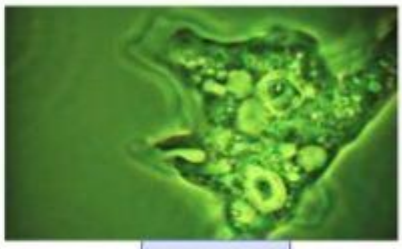
" microbes that are normally found on or in the human body without causing disease. Some of these microbes, like intestinal residents, are necessary for normal human function. "

- But still they may harm human body if local defense mechanism is compromised or if they reach the areas they should not be.
- For example, E-coli reach the part of body other than intestine may cause infection and ultimately disease.

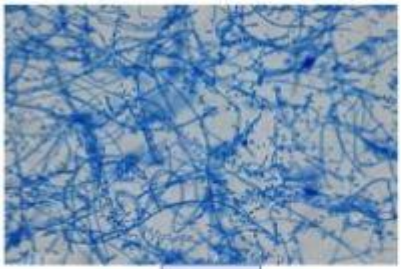
4 groups of disease causing microbes



Virus



Protozoa

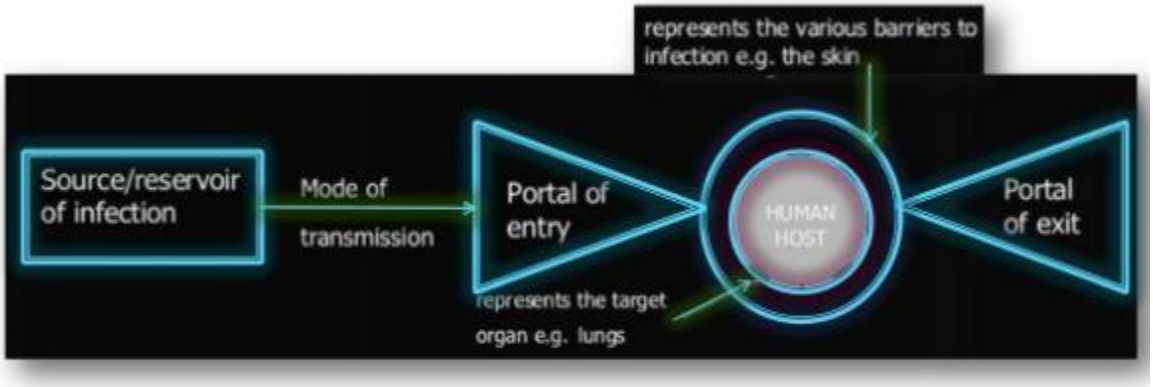


Fungi

Bacteria

Infectious disease	Microbe that causes the disease	Type of microbe
Cold	Rhinovirus	Virus
Chickenpox	Varicella zoster	Virus
German measles	Rubella	Virus
Whooping cough	*Bordatella pertussis*	Bacterium
Bubonic plague	*Yersinia pestis*	Bacterium
TB (Tuberculosis)	*Mycobacterium tuberculosis*	Bacterium
Malaria	*Plasmodium falciparum*	Protozoan
Ringworm	*Trichophyton rubrum*	Fungus
Athletes' foot	*Trichophyton mentagrophytes*	Fungus

Chain of infection



1. Source/reservoir of infection
2. Mode of transmission
3. Portal of entry
4. Portal of exit

Origin/Source of Infection – Pathogens

- Once these pathogens are inside your body they cause disease because they reproduce rapidly.
- Bacteria do this by splitting in two.
- The often produce toxin at the same time.
- Viruses actually take over cells, damaging and destroying them.

Reservoir & Susceptible host

- Reservoir
  - A supply of pathogen/infection/disease.
  - For example, female anopheles mosquito is a reservoir of *Plasmodium falciparum* for malaria.
- Susceptible host
  - Likely or liable to be influenced or harmed by a pathogen.

Reservoir and Susceptible host both are equally dangerous

Portal of Entry

- Skin
- Intestinal tract
- Respiratory tract
- Genitourinary tract

Microbes enter in the body

- Microbes enter in body by various transmission methods.

Mode of Transmission

1) Contact Transmission

a) Direct Contact Transmission
- Person to person transmission. No intermediate object is involved.
- Examples: Touching

b) Indirect Contact Transmission
- Agent is transferred via a nonliving object.
- Examples: towels, eating utensils, thermometers, stethoscopes, bedding, clothes, money, and syringes.

c) Droplet Transmission
- Microbes are spread in mucus droplets that travel short distance (less than 1 meter).
- Examples: sneezing, coughing, talking and laughing.

2) Vehicle Transmission:

- Transmission of disease via medium such as water, food, air, blood, body fluids, and intravenous fluids.

a) Waterborne Transmission

- Usually caused by water contaminated with sewage.

b) Airborne Transmission

- Spread of agents by droplets in dust that travel more than 1m to host

3) Vector Transmission

- Animals that carry disease from one host to another, Arthropods (insects) are most important animal vectors.

a) Mechanical Transmission

- Passive transport of pathogens on insect's body. For example, Bee

b) Biological Transmission

- Pathogen spends part of its life cycle in the vector. For example, Mosquito

Portal of Exit

Site at which microbes leave body. Most common exit portals are respiratory and gastrointestinal tracts.

a) Respiratory Tract:
- Exit in discharges (mucus droplets) from nose and mouth. Transmission by coughing, sneezing, spitting, etc.
- Examples: Tuberculosis, influenza etc.

b) Gastrointestinal Tract:
- Exit in feces or sliva.
- Feces: Cholera, typhoid fever, salmonella.
- Saliva: Rabies virus, herpes simplex 1.

Portal of Exit

c) Urogenital Tract
- Exit in secretions of urine

d) Skin and Wound infections
- Spread through direct contact or through fomites.

e) Blood
- Transmission through insects, needles, and syringes.
  - Insects: Malaria, yellow fever etc.
  - Needles: AIDS and Hepatitis B.

To be a pathogen, it is must:

- **Gain entry** to the host.
- **Colonise** the host's tissues.
- **Resist** the host's defences
- **Damage** the host's tissues.

Defense

- Natural resistance
  - Provides defense against infection by a number of inherent, mechanical, and chemical barriers
- Nonspecific defense mechanism
- Immune response
  - Antibody
  - Antigens

Prevention – Hygiene

- Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases. Medical hygiene therefore includes a specific set of practices associated with this preservation of health, for example environmental cleaning, sterilization of equipment, hand hygiene, water and sanitation and safe disposal of medical waste.

Use antimicrobial agents

Prevention – Sanitation

- Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal.