ENVIRONMENTAL SANITATION

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EQUSAT

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CLINICAL SCENARIO FOR CRITICAL THINKING CASE

- Mrs. N., a 72-year-old woman, is admitted to the medical ward with a history of stroke 2 weeks ago. She is bedridden, has left-sided weakness, and impaired speech. She is incontinent of both urine and stool.
- On assessment:
- Bladder: Patient is using diapers; has frequent urine leakage and foul-smelling urine.
- Bowels: She has not opened her bowels in 4 days, complains of abdominal discomfort, and has a poor appetite.
- Oral cavity: Her mouth is dry, lips cracked, with coated tongue, and halitosis. She is unable to brush independently.
- Skin: The sacral area shows early redness and skin maceration due to prolonged contact with urine and stool.

QUESTIONS

- What are the priority personal hygiene care needs for Mrs. N.?
- What complications is she at risk of if hygiene is not maintained?
- How would you manage:
- a) Bladder care for her incontinence?
- b) Bowel care to address constipation?
- c) Oral care for her poor mouth hygiene?
- d) Skin care to prevent further breakdown?
- What outcomes would you expect after providing care?

RESPONSES

- Priority personal hygiene care needs:
- Bladder care (to manage incontinence, prevent UTIs, and protect skin).
- Bowel care (to relieve constipation and restore bowel function).
- Oral hygiene (to relieve halitosis, dryness, and improve comfort).
- Skin care (to prevent progression of pressure sores and maintain integrity).

- **Possible complications if neglected:**
- **Bladder:** Urinary tract infection (UTI), worsening incontinence, skin breakdown.
- **Bowel:** Constipation → fecal impaction, hemorrhoids, abdominal pain.
- **Oral:** Oral thrush, gingivitis, aspiration pneumonia, poor nutrition.
- **Skin:** Pressure ulcers, incontinence-associated dermatitis, infection.

Management

- **a) Bladder care for incontinence**
- Encourage regular toileting schedule (every 2–4 hrs if possible).
- Maintain perineal hygiene after each episode of incontinence (wash, dry, apply barrier cream).
- Use absorbent pads/diapers but change frequently.
- Monitor urine (color, odor, volume) and encourage fluids if not contraindicated.
- Assess for UTI (fever, burning smell, cloudy urine).
- b) Bowel care for constipation
- Encourage high-fiber diet (fruits, vegetables, whole grains).
- Encourage fluid intake (1.5–2L/day unless contraindicated).
- Facilitate mobility (passive/active exercises to stimulate motility).
- Establish toileting routine (after meals).If severe constipation persists → administer prescribed laxatives or suppository.

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- **c) Oral care**
- Perform oral care every 2–4 hrs (since patient is dependent).
- Use soft brush or gauze with antiseptic solution/chlorhexidine.
- Keep lips moist with Vaseline/glycerin.
- Position in lateral/high Fowler's to prevent aspiration.

- **d) Skin care**
- Perform bed bath, keeping skin clean and dry.
- Reposition every 2 hours to relieve pressure on sacrum.
- Apply barrier creams to protect against urine/stool irritation.
- Use pressure-relieving devices (air mattress if available).
- Monitor skin daily for redness or sores.

4. EXPECTED OUTCOMES

- Bladder: Patient remains free from UTI, skin dry, less odor, dignity maintained.
- Bowel: Regular bowel movements, relief from constipation and abdominal discomfort.
- Oral: Fresh breath, moist lips, improved comfort, reduced infection risk.
- Skin: Sacral redness resolves, no development of pressure sores.

LEARNING OBJECTIVES

By the end of this session, students should be able to:

- Define environmental sanitation
- Identify key components of environmental sanitation
- Understand the health impacts of poor sanitation
- Describe methods to promote and maintain sanitation
- Relate sanitation to disease prevention in clinical and public health settings

ENVIRONMENTAL SANITATION

- *"Environmental health addresses all the **physical, chemical, and biological factors** external to a person, and all the related factors impacting behaviors. (WHO)*

- *Refers to the assessment and control of those environmental factors that can cause disease or potentially affect health.*

- *Is the branch of public health that focuses on the **interactions between people and their environment** with the goal of **promoting health and preventing disease** caused by environmental factors.*

❖ Includes safe water supply, waste disposal, clean air, proper housing, and hygienic practices

COMPONENTS OF/ KEY AREAS IN ENVIRONMENTAL SANITATION

- **Water quality** (Safe water supply)
- **Air quality** (indoor and outdoor pollution)
- **Food** hygiene and **safety** (contamination, hygiene)
- **Waste management** (solid waste, liquid waste, medical waste)
- **Chemical safety** (pesticides, industrial toxins)
- **Housing conditions** (ventilation, crowding, dampness)
- **Vector control** (e.g. flies, rodents, mosquitoes causing malaria)
- **Climate change and disaster preparedness**
- Proper disposal of human waste (sanitation facilities)
- Water drainage systems

IMPORTANCE OF ENVIRONMENTAL SANITATION

- Prevents communicable diseases (e.g., cholera, typhoid, dysentery)
- Promotes mental and physical well-being
- Reduces healthcare burden
- Reduces on Chronic diseases (e.g., asthma, cancer from toxins)
- Prevents Injuries (e.g., from unsafe housing or work environments)
- Reduces on Global health crises (e.g., air pollution, climate change)
- Improves quality of life

POOR SANITATION RISKS TO;

Disease	Mode of Transmission
Cholera	Contaminated water/food
Typhoid fever	Poor hand hygiene, food/water
Diarrhea	Fecal-oral route
Malaria	Stagnant water (mosquitoes)
Intestinal worms	Contaminated soil/water

WATER SANITATION

- Access to **safe, treated drinking water**
- Prevents waterborne diseases
- Methods: **Boiling, chlorination, filtration**
- Protect water sources from **contamination**

HUMAN WASTE DISPOSAL

- Use of **toilets, pit latrines, or sewer systems**
- Avoid **open defecation**
- Promote **handwashing with soap** after toileting
- Community-level planning of sanitation infrastructure

SOLID AND LIQUID WASTE MANAGEMENT

- Segregation of waste: **biodegradable, non-biodegradable, hazardous**
- Proper collection and disposal to prevent **pollution and disease**
- **Recycling and composting** where applicable

VECTOR CONTROL AND DRAINAGE

- Eliminate **stagnant water** to prevent mosquito breeding
- **Cover garbage bins** to reduce flies and rodents
- Use of **insecticides, mosquito nets, and traps**
- Maintain **clean, covered drainage systems**

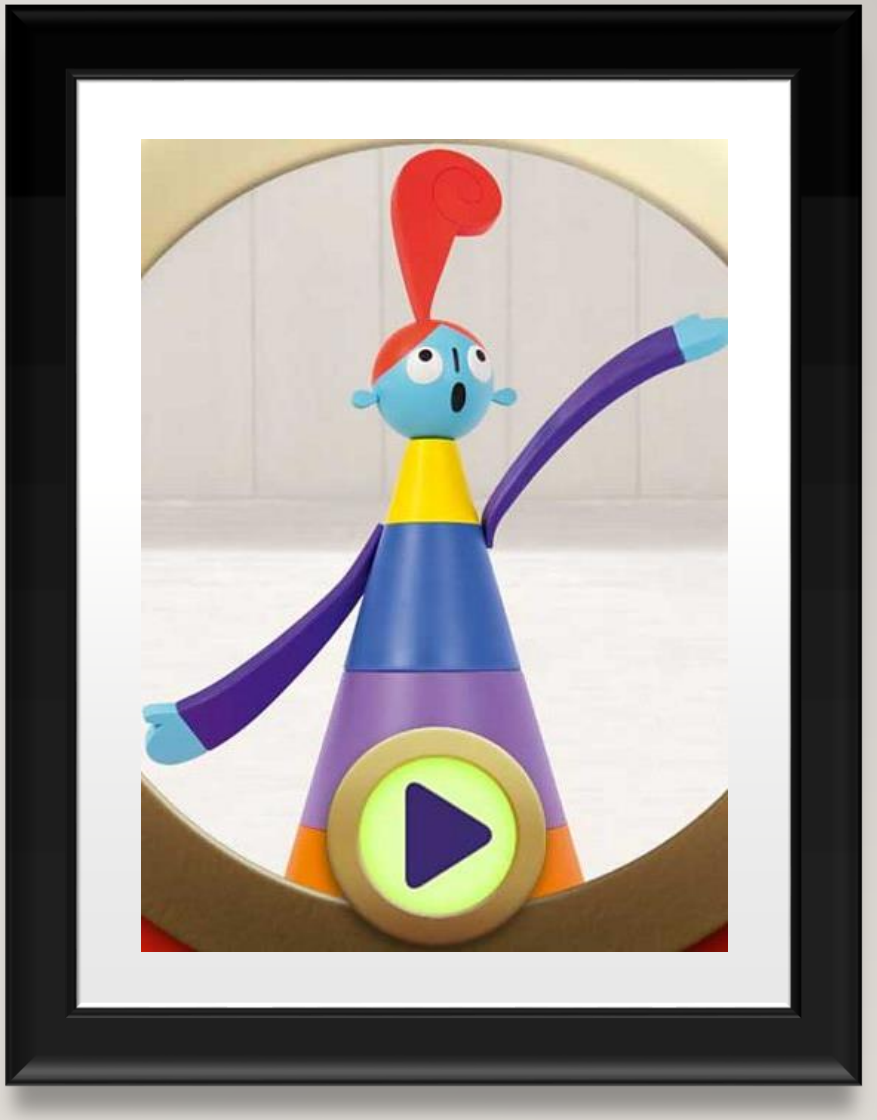
FOOD HYGIENE IN ENVIRONMENTAL SANITATION

- Safe handling, preparation, and storage of food
- Prevent contamination during **processing and selling**
- Regular inspection of **markets and vendors**
- Promote food handler **training and certification**

ROLE OF MEDICAL PROFESSIONALS

- Advocate for **clean environments**
- Educate communities on **hygiene and sanitation**
- Report and investigate **sanitation-related outbreaks**
- Collaborate with environmental and public health teams

- Environmental sanitation is essential for disease prevention and health promotion
- Requires **community participation, infrastructure, and education**
- Medical professionals play a **key role in promoting and supporting sanitation programs**



PRINCIPALS OF INFECTION CONTROL

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LEARNING OBJECTIVES

By the end of this session, students should be able to:

1. Define infection control
2. List importance of infection control in healthcare
3. Understand the chain of infection
4. Apply standard precautions and transmission-based precautions
5. Identify infection control practices in clinical settings
6. Describe how to promote safety for patients and healthcare workers

INTRODUCTION

- ***Infection control*** *is the discipline focused on* ***preventing the spread of infections*** *in healthcare and community settings through* ***standard practices, surveillance, and hygiene measures.***

- Entry and multiplication of organism results in disease
- Colonization occurs when a microorganism invades the host but does not cause infection (injury to cells)
- Patient safety issue

IMPORTANCE OF INFECTION CONTROL

- Prevents **healthcare-associated infections (HAIs)**
- Protects **patients, healthcare workers, and visitors**
- Reduces **morbidity, mortality, and costs**
- Essential for **patient safety and quality care**

CHAIN OF INFECTION

- **Infectious agent** (bacteria, virus, fungi)
- **Reservoir** (human, animal, environment)
- **Portal of exit** (blood, excretions, droplets)
- **Mode of transmission** (direct, indirect, airborne)
- **Portal of entry** (wounds, respiratory tract)
- **Susceptible host** (immunocompromised, elderly)

❑ ***Breaking any link helps prevent / control infection***

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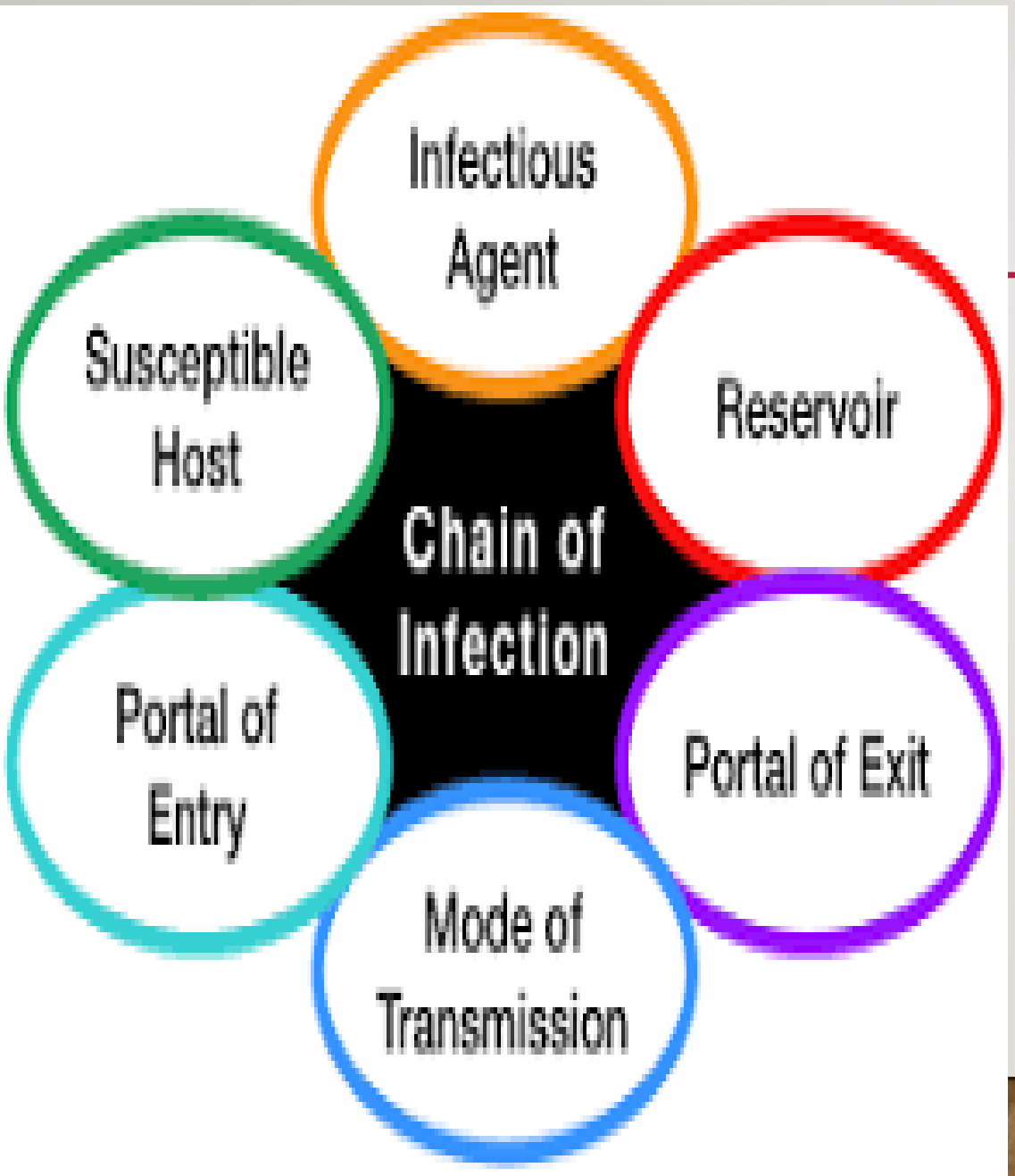
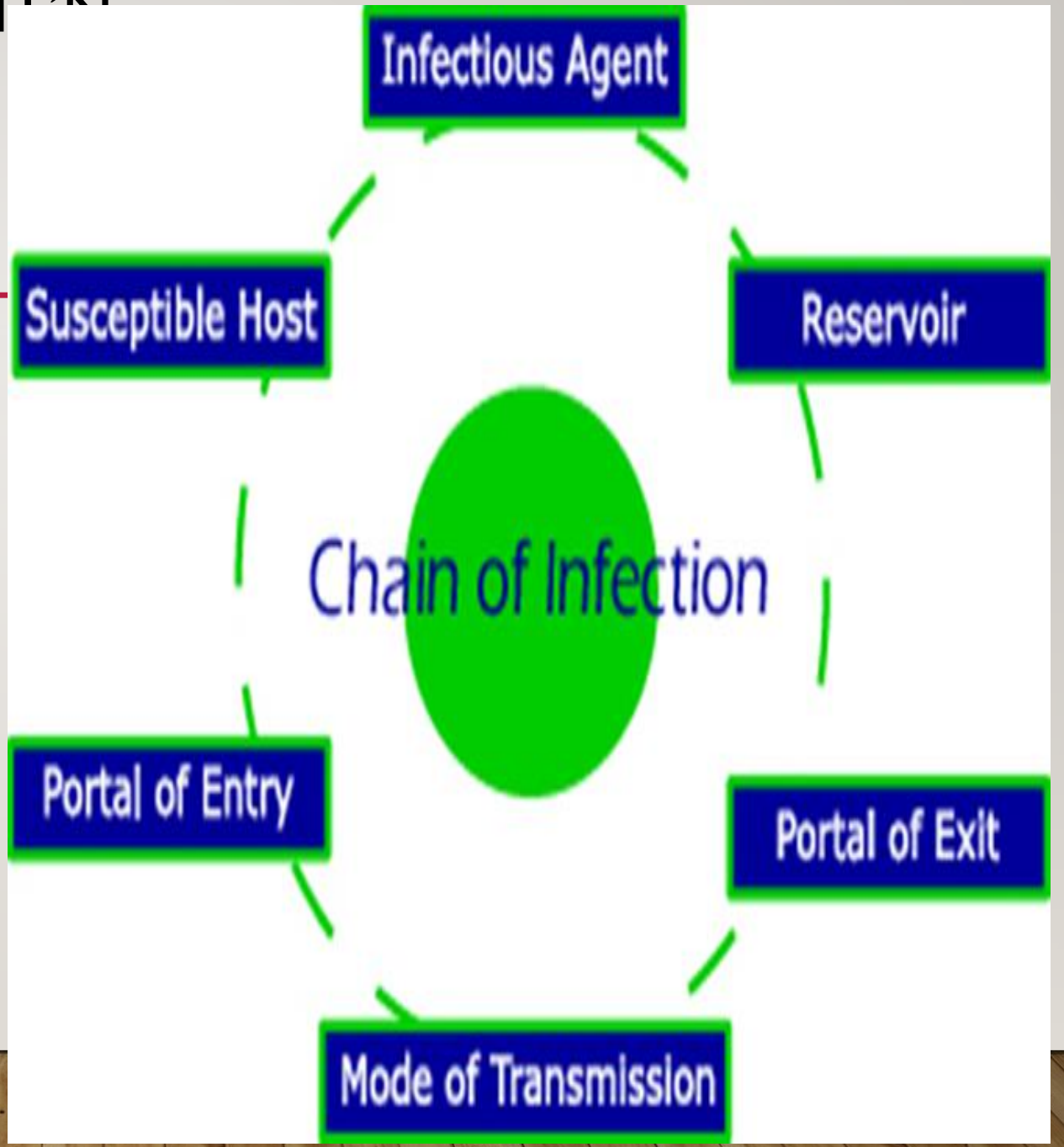

Infectious Agent
Susceptible Host
Reservoir
Chain of Infection
Portal of Entry
Portal of Exit
Mode of Transmission


Infectious Agent
Susceptible Host
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Mode of Transmission

1. INFECTIOUS AGENT/PATHOGEN

- An **infectious agent** (also called a **pathogen**) is a **microorganism** or **biological agent** that can **cause disease** in a host organism (such as a human or animal)

- Microorganisms (bacteria, viruses, fungi, protozoa



- Normal flora
- Colonization
- Virulence- how **strongly** a microorganism can cause disease.
- Susceptibility- the **likelihood of a host becoming infected** when exposed to a pathogen

2. RESERVOIR

- A **reservoir** is any **person, animal, object, or substance** in which an infectious agent **normally lives and multiplies**, and from which it can be **transmitted to a host**.
- Animate (Living) reservoirs (humans, animals, insects)
- Inanimate reservoirs (soil, water, food, medical equipment)
- Pathogens need a proper environment to survive (food, oxygen, water, temperature, pH, light)
- Carriers
- Toxins: (Exotoxins, endotoxins)





ANIMATE (LIVING) RESERVOIRS:

Type	Examples	Role
Humans	People with active infections or carriers	Spread diseases like TB, HIV, measles
Animals	Dogs (rabies), birds (avian flu), rodents	Act as **zoonotic reservoirs**
Insects	Mosquitoes (malaria, dengue), ticks	Act as vectors

INANIMATE (NON-LIVING) RESERVOIRS

Source	Examples
Soil	*Clostridium tetani* (tetanus), *Anthrax* spores
Water	*Vibrio cholerae*, *Legionella*
Food	Contaminated meat or dairy (e.g., *Salmonella*)
Medical Equipment	Catheters, ventilators (nosocomial infections)

3. PORTAL OF EXIT/ENTRY

✓A **portal of entry** is the pathway through which a pathogen enters a susceptible host.

✓A **portal of exit** is the route by which the pathogen leaves the host to infect others.

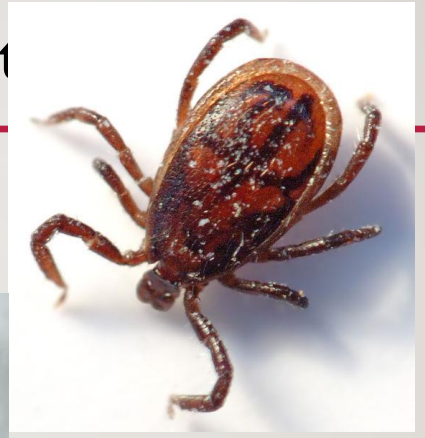
- Skin and Mucous Membranes
- Respiratory Tract
- Urinary Tract
- Gastrointestinal tract
- Reproductive Tract
- Blood

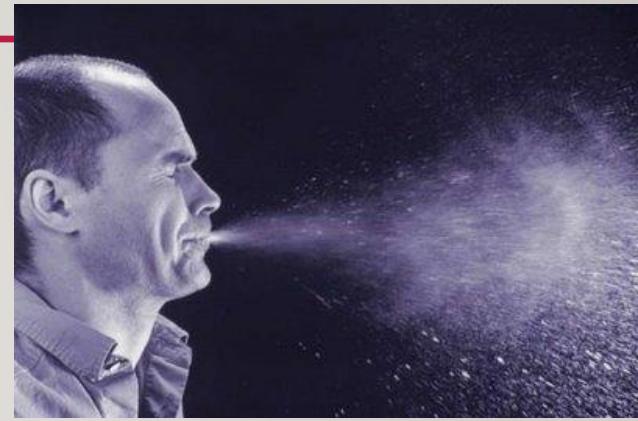
COMMON PORTALS OF ENTRY AND EXIT

Portal	Entry/Exit?	Examples
Skin and Mucous Membranes	Entry & Exit	Cuts, wounds (e.g., tetanus), insect bites (e.g., malaria), rashes (e.g., chickenpox)
Respiratory Tract	Entry & Exit	Inhalation (e.g., COVID-19, TB), sneezing/coughing releases pathogens
Urinary Tract	Entry & Exit	Catheter insertion (UTI entry), urine expels bacteria
Gastrointestinal Tract	Entry & Exit	Ingestion (e.g., cholera, typhoid), vomiting or feces as exit routes
Reproductive Tract	Entry & Exit	Sexual transmission (e.g., HIV, gonorrhea), vaginal secretions, semen
Blood	Entry & Exit	Needlesticks, transfusions, insect bites (e.g., hepatitis B/C, malaria)

4. MODES OF TRANSMISSION

- **Mode of transmission** refers to the **mechanism by which an infectious agent moves** from the **reservoir** to a **susceptible host**





- Contact (Direct & Indirect)
- Droplet
- Airborne



- Vehicles (Water, Food, Blood and body fluids, Medications/IV fluid
- Vectors (Mosquito, Tsetse fly, Sandfly)



5. SUSCEPTIBLE HOST

- A susceptible host is a person (or organism) who cannot resist an infectious agent and is therefore vulnerable to infection when exposed.
- Susceptibility / Resistance to infection

Factors which influence susceptibility

- ✓Age
- ✓Nutritional status
- ✓Chronic disease history
- ✓Trauma
- ✓Smoking
- ✓immune system

PRINCIPLES / STANDARD PRECAUTIONS OF INFECTION CONTROL

1. **Hand Hygiene**

- Most effective way to prevent transmission
- Use soap & water or alcohol-based rubs
- WHO's 5 Moments for Hand Hygiene

2. **Use of Personal Protective Equipment** (PPEs)

- Gloves, masks, gowns, goggles, face shields
- Use according to exposure risk



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3. **Aseptic Technique**

- Maintain sterility during procedures
- Prevent introduction of pathogens to sterile sites

4. Environmental Cleaning & Disinfection

- Regular cleaning, disinfection and sterilization of surfaces, beds, and equipment
- Use appropriate hospital-grade disinfectants

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5. **Safe Waste Management**

- **Color-coded bins** for segregation
- Sharps into puncture-proof containers
- Avoid overfilling (sharps containers fills up to ¾) or recapping needles

6. **Respiratory Hygiene and Cough Etiquette**

- Cover mouth/nose with elbow or tissue
- Wear masks when symptomatic
- Educate patients and visitors

7. **Isolation precautions for infectious patients**

WHO 5 MOMENTS OF HAND HYGIENE

Moment	When to Clean Hands	Purpose
1 **Before touching a patient**	Before any physical contact (e.g., taking pulse, helping to sit)	To protect the patient from germs carried on your hands
2 **Before clean/aseptic procedures**	Before handling a wound, inserting a catheter, giving IV meds	To protect the patient from harmful germs during invasive procedures
3 **After body fluid exposure risk**	After contact with blood, urine, feces, or wound dressing	To protect yourself and the healthcare environment
4 **After touching a patient**	After any direct contact (e.g., checking vitals)	To protect yourself and others from germs the patient may carry
5 **After touching patient surroundings**	After touching bed rails, charts, IV stands—even if the patient wasn't touched	To prevent transferring environmental germs to others

PROPER HAND HYGIENE PROCEDURE

Step	Procedure	Rationale
1	Wet hands with clean, running water	Prepares skin and removes visible dirt before lathering
2	Apply enough soap to cover all surfaces	Soap lifts germs and allows mechanical removal
3	Rub palms together	Cleans the main surface of hands
4	Rub back of each hand with opposite palm (fingers interlaced)	Removes germs between fingers and on hand backs

Step	Procedure	Rationale
5	Rub palms with fingers interlaced	Cleans web spaces and finger sides
6	Rub backs of fingers to opposing palms	Targets knuckle areas often missed
7	Clean thumbs using rotational rubbing	Thumbs are frequently missed but touch many surfaces
8	Rinse and dry thoroughly	Rinses off dirt and germs; drying prevents recontamination

> *If using alcohol-based hand rub (ABHR), follow same rubbing steps for at least **20–30 seconds** until dry.*

WASTE DISPOSAL AND SHARPS SAFETY

- Use **color-coded bins** for medical waste
- Dispose of sharps in Puncture-Proof / sharps containers
- Never recap used needles
- Report all needle-stick injuries immediately

COLOR-CODED BINS FOR MEDICAL WASTE

Color	Waste Type
Red	Infectious waste (e.g., blood-soaked materials)
Yellow	Pathological and pharmaceutical waste
Black	General waste (non-infectious, like wrappers)
Blue/White	Sharp objects (in puncture-proof containers)

General waste

Paper
Packaging material
Food





Infectious waste

Gauze/dressing
Used IV/ fluid lines
Used gloves
Infusion set





Pathological waste

Anatomical waste
- Teeth
- Placenta

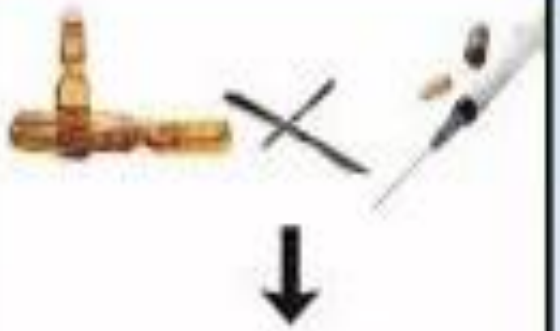
Pathological waste
- Sputum container
- Test tube containing specimen





Sharp Waste

Cannula/branula
Broken slides
Broken vial
Broken ampules
Lancet
Retractables
Scalpels
Blades
Needles
Suture needles






GENERAL
WASTE
WASTE



PREVENTION STRATEGIES TO BREAK THE CHAIN OF INFECTION

Chain Link	Control Measures
Infectious agent	Sterilization, antibiotics
Reservoir	Cleaning, disinfection
Exit/Entry	Wound care, PPE, hand hygiene
Transmission	Isolation, safe handling of equipment
Host	Immunization, good nutrition, education

PREVENTION STRATEGIES FOR DIFFERENT PORTAL OF ENTRY/EXIT

Portal	Prevention Measures
Skin	Hand hygiene, PPE, proper wound care
Respiratory Tract	Masks, cough etiquette, ventilation
Urinary Tract	Aseptic catheter insertion, hygiene
GI Tract	Safe food and water, sanitation
Reproductive Tract	Condom use, STI screening
Blood	Sterile needles, safe transfusions, vector control (e.g., mosquito nets)

ROLE OF HEALTHCARE WORKERS

- Follow protocols and encourage others
- Educate patients and families
- Stay updated with **vaccinations (e.g., Hep B, COVID-19)**
- Report **exposure incidents** promptly
- Model and promote hand hygiene
- Follow ward infection control policies
- Use PPE correctly
- Practice aseptic techniques in procedures

INFECTION CONTROL IN SPECIAL SETTINGS

- Surgical theaters – strict asepsis
- ICUs – high infection risk; close monitoring, limited access
- Isolation wards – negative pressure, PPE, limited access
- Maternity and neonatal units – hygiene for vulnerable groups



- Infection control is everyone's responsibility
- Preventing infection saves lives and resources
- Consistent application of standard and transmission-based precautions is key
- Hand hygiene, PPE, and waste management are essential practices