

3. Chain of Infection

Certain conditions must be met in order for a microbe or infectious disease to be spread from person to person. This process, called the chain of infection, can only occur when all six links in the chain are intact. By breaking this chain at any of the links, the spread of infection is stopped.

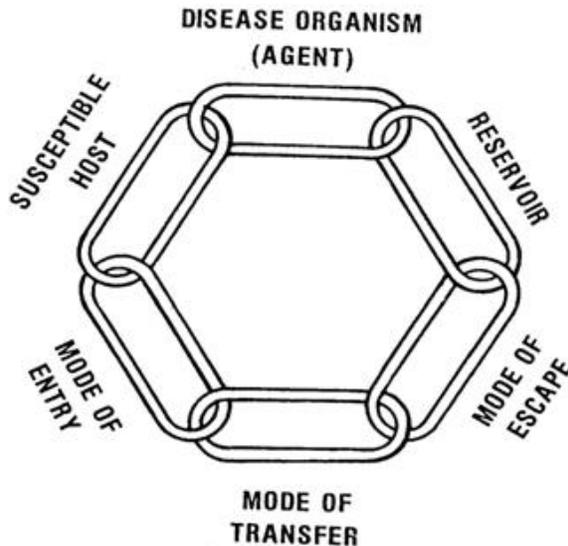


Diagram: The chain of infection

Links in the chain

- **Disease Microorganisms (Agent).** These are the pathogens that cause communicable diseases. Most commonly these are bacteria, virus, fungi or parasites.
- **Reservoir.** The reservoir (source) is a host which allows the pathogen to live, and possibly grow, and multiply. Humans, animals and the environment can all be reservoirs for microorganisms. Sometimes a person may have a disease but is not symptomatic or ill. This type of person is a carrier and she/he may be referred to as 'colonized'. Examples of reservoirs are standing water, a person with a common cold or syphilis, or a dog with rabies.
- **Mode of Escape.** This refers to the route by which the infectious microorganisms escape or leave the reservoir. For example, pathogens that cause respiratory diseases usually escape through the respiratory tract (coughing and sneezing).



Modes of Escape	Breaking the Link
<p>Respiratory Tract. Microorganisms leave the body of the infected person by means of droplets exhaled as a spray when coughing, sneezing, talking, singing or just breathing. Microorganisms also escape through nose and throat secretions.</p>	<ul style="list-style-type: none"> • Wear a mask • Do not talk directly into patient's face • Stay home if you are sick • Practice good cough etiquette (cover your coughs and sneezes) • Perform good hand hygiene
<p>Gastrointestinal Tract. Microorganisms that leave the body of the infected person by means of body secretions (e.g. stool and vomit). For example hepatitis A virus is shed in the stool of the infected person.</p>	<ul style="list-style-type: none"> • Handle and dispose of body secretions properly • Use personal protective equipment • Perform good housekeeping • Perform good hand hygiene
<p>Skin. Microorganisms that leave the body of the infected person by wound drainage or through skin lesions.</p>	<ul style="list-style-type: none"> • Dispose of wound dressings properly • Use personal protective equipment (PPE) • Perform good hand hygiene
<p>Blood. Infection may occur when someone's blood gets into another person's system.</p>	<ul style="list-style-type: none"> • Safe handling of sharps • Use gloves for procedures where there is risk of exposure to blood • Use care in obtaining, transporting and processing specimens • Perform good hand hygiene

• **Mode of Transmission.** Since microorganisms cannot travel on their own, they require a vehicle to carry them to other persons and places. See more detail in Section 4: Modes of Transmission.

• **Mode of Entry.** The path for the microorganism to get into a new host (the reverse of the portal of exit). The mode of entry refers to the method by which the pathogens enters the person.



Pathogens enter the body by:

- inhalation (e.g. respiratory tract)
- ingestion (e.g. GI tract)
- absorption (e.g. mucous membranes of eyes)
- break in skin (e.g. needle stick, cut)
- introduction by medical procedures (e.g. catheters)

Modes of Entry	Breaking the Link
<p>Respiratory Tract. Small particles that result from evaporation of droplets from the respiratory tract of infected persons remain suspended in the air of poorly ventilated spaces for periods of time. The infectious microorganisms can be inhaled by a well person who may then become infected with the disease.</p>	<ul style="list-style-type: none"> • Wear a mask/respirator • Maintain good ventilation • Isolate those with respiratory symptoms • Good respiratory hygiene/etiquette practices • Perform good hand hygiene
<p>Gastrointestinal Tract. Pathogenic microorganisms enter the body of a new host when food or water contaminated by feces is ingested (fecal/oral route).</p>	<ul style="list-style-type: none"> • Dispose of body excretions carefully • Careful food handling • Perform good housekeeping • Wear appropriate personal protective equipment • Perform good hand hygiene
<p>Mucous membranes. Absorption of microorganisms through exposed eyes, nose and mouth.</p>	<ul style="list-style-type: none"> • Protect eyes, nose and mouth with face shield during procedures likely to generate splashes or sprays • Carry out good housekeeping • Perform good hand hygiene
<p>Skin. Microorganisms enter the body when a person comes into contact with wound drainage or skin secretions.</p>	<ul style="list-style-type: none"> • Dispose of wound dressings carefully and properly • Wear personal protective equipment • Maintain healthy intact skin • Perform good hand hygiene



- **Susceptible Host.** The future host is the person who is next exposed to the pathogen. The microorganism may spread to another person but does not develop into an infection if the person's immune system can fight it off. They may however become a 'carrier' without symptoms, able to then be the next 'mode of transmission' to another 'susceptible host'. Once the host is infected, he/she may become a reservoir for future transmission of the disease.

Susceptible hosts abound in health care settings, as those accessing the health care system often have compromised immune systems. This may be due to other illnesses processes, treatments or medications. This ineffective immune system leaves them vulnerable to infectious agents that may be in the health care environment.

Susceptible Hosts	Control
<ul style="list-style-type: none"> • Children who are very young • People who are very old • People on inadequate diets • People who are chronically ill • People receiving medical therapy such as chemotherapy or high doses of steroids • People who are already ill • People with open wounds 	<ul style="list-style-type: none"> • Separate high risk individuals from persons with known or potential infections • Provide nutritional supplements to persons on inadequate diets • Vaccinate against vaccine preventable diseases • Maintain proper sanitation of air and environment • Diagnose and treat underlying disease

Opportunities to break the chain of infection

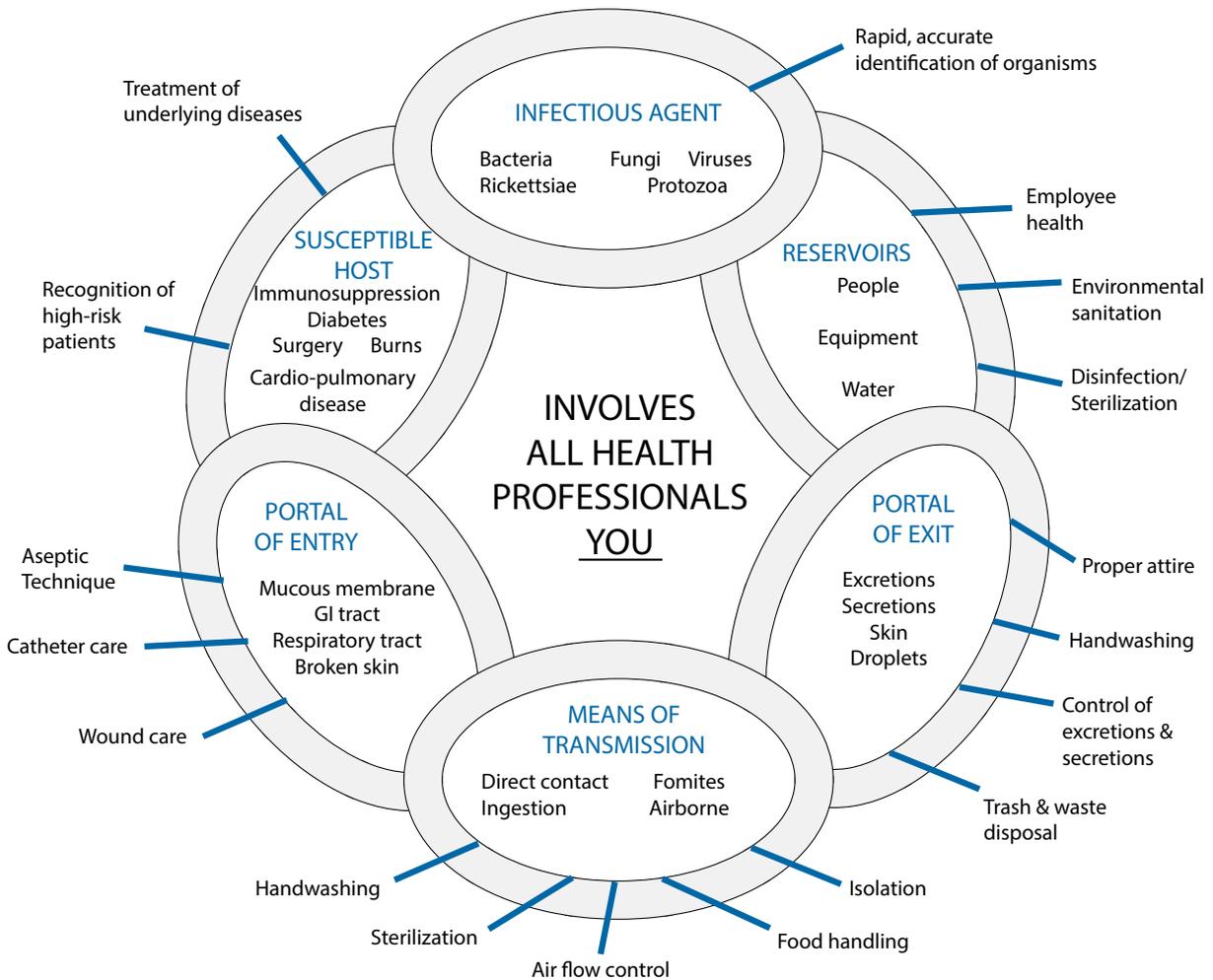
Transmission may be interrupted when:

- the infectious agent is eliminated, inactivated or cannot exit the reservoir
- the portals of exit are contained through safe infection control practices
- the transmission between objects or people does not occur due to barriers and safe infection control practices
- the portals of entry are protected
- other persons receiving health care are not susceptible.



Diagram: Breaking the Chain of Infection

If the chain is not broken the infectious organism is able to go on to develop disease in another person.



There are many opportunities to stop the spread of infection.



