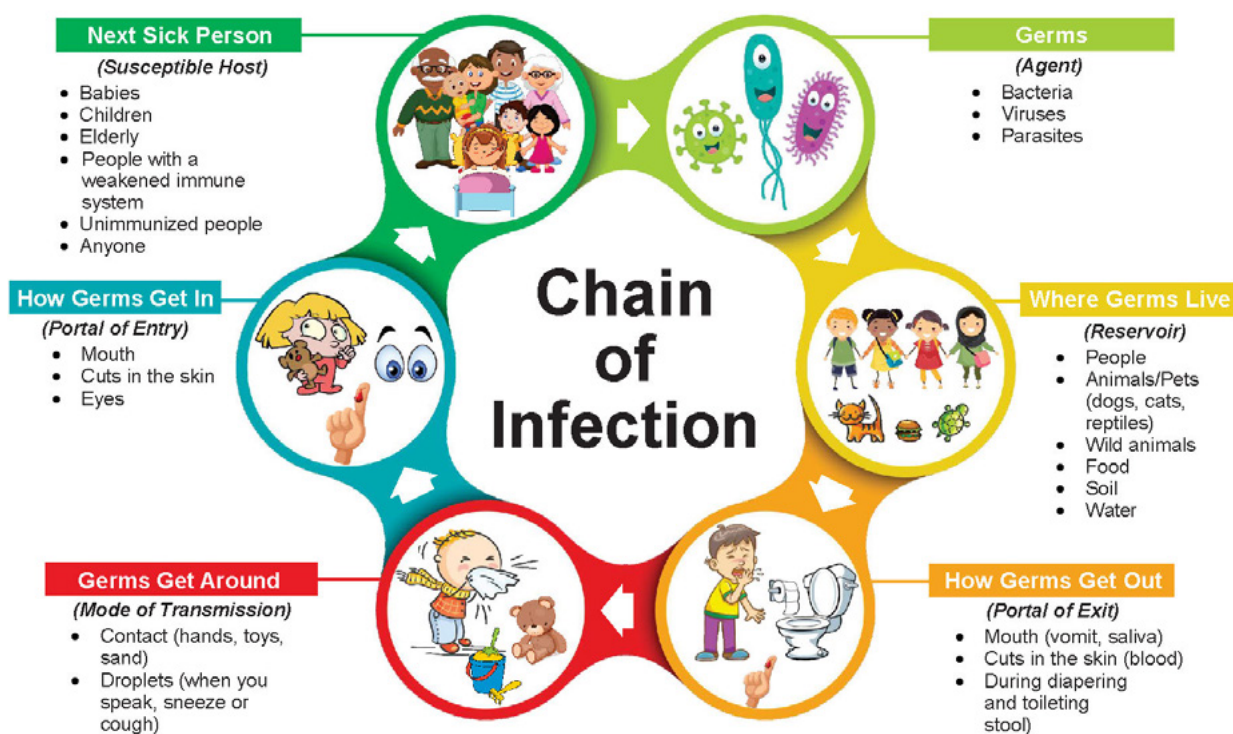


How Germs Are Spread (Chain of Infection)

Understanding what causes infection and disease is the first step in being able to prevent and control its spread. An infection occurs when a disease-causing organism (germ) enters the body and starts to multiply. This often results in signs and symptoms of infection, but this is not always the case. Sometimes a person can have an infection without showing any symptoms or signs of the infection.

For an infection to occur, a series of events need to take place, often referred to as the “chain of infection.” Breaking any one of the six links in the chain of infection will prevent infection from occurring. The six links are as follows:



Chain of Infection: Reproduced with permission from Ottawa Public Health. All rights reserved. www.ottawapublichealth.ca/en/professionals-and-partners/chain-of-infection.aspx.

1 Germs (Infectious Agent): The germ(s) that may cause disease (e.g., bacteria, viruses, fungi, parasites).

2 Where Germs Live (Reservoir): The reservoir where germs live depends on the kind of germ. Reservoirs can include people, animals, food, soil, water, and surfaces. People and animals can be reservoirs of germs without being sick.

3 How Germs Get Out (Portal of Exit): Germs can leave the body or environment through the mouth (e.g., vomit, saliva, sneezing, coughing), blood (e.g., cuts in the skin), or during diapering and toileting (e.g., urine and stool).

4 How Germs Get Around (Mode of Transmission): Routes of transmission are described below. The routes of transmission vary with the germs involved. For most germs, transmission occurs by one route (e.g., direct contact–rotavirus). However, some germs can be transmitted by more than one route (e.g., droplet and contact-RSV or COVID-19).

- a. **Contact Transmission:** Transmission can occur when there is direct physical contact or when there is transmission by a contaminated item. Hands can be contaminated by contact with the infected person/item or when the contaminated object is in the same area as the person who might be exposed. There are two types of contact transmission:
 - i. **Direct Contact:** This is the most common mode of transmission and can occur where there is skin-to-skin contact between two individuals (e.g., children, students, and staff).
 - ii. **Indirect Contact:** Transmission can occur when hands pick up germs from contaminated surfaces or equipment, such as toys, books, or gym equipment.
- b. **Droplet Transmission:** Germs can spread through droplets produced when coughing or sneezing without covering one's mouth and nose. The droplets travel a short distance (within approximately two metres) through the air, and can either be breathed in or land in a person's nose, mouth, or eyes, which can cause an infection. Droplets may also settle on surfaces, which could contaminate the environment and may contribute to contact transmission.
- c. **Airborne Transmission:** This occurs when particles (i.e., aerosols with tiny particles that are smaller than droplets) remain suspended in the air for extended periods of time, increasing the probability of inhalation. This is an uncommon form of transmission in a child care facility or school.

Continuum of Droplet to Airborne Transmission: Particles of different sizes are released from the respiratory tract during coughing, sneezing, talking, or singing. The size of these particles and the distance they are released depends on the force of the coughing, sneezing, talking, or singing. Large particles (droplets) will fall quickly (in a few seconds) to the ground. However, smaller particles may remain in the air for a longer time (e.g., minutes or hours). The particles that remain in the air can be carried by air currents over a distance, including beyond the room, and are considered airborne.

- a. **Common Vehicle:** Multiple people can be infected from a single contaminated source, such as food or water in the water play table.
- b. **Vector-Borne Transmission:** This is transmission by insect. This is a rare form of transmission in a child care facility or school.

5 How Germs Get In (Portal of Entry): Germs travel to the next person through the eyes, nose, mouth, cuts in the skin, and inhalation.

6 Next Sick Person (Susceptible Host): An individual must be susceptible (vulnerable or at risk to infection) to germs in order for the infection to occur.