

Types and Methods of Disease Transmission

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EDITORIAL

Transmission must occur for an infection to spread regardless of the reservoir. Transmission must first take place from the reservoir to the individual. The individual must then either directly or indirectly transmit the infectious agent to other susceptible individuals. Pathogenic microorganisms use a variety of transmission methods. Contact transmission can take the form of direct or indirect contact. Person-to-person transmission is a type of direct contact transmission. Physical contact between two individuals, such as touching, kissing, sexual intercourse, or droplet sprays, is used to spread the agent.

Vertical, horizontal, or droplet transmissions are the three types of direct contact. Vertical direct contact transmission occurs when pathogens are transmitted from mother to child during pregnancy, birth, or breastfeeding; it is known as vertical direct contact transmission. Horizontal direct contact transmission refers to several types of direct contact transmission. Mucous membrane contact is often required for pathogen entry into a new host, yet skin-to-skin contact can lead to mucous membrane contact if the new host contacts a mucous membrane later. Contact transmission may also be site-specific; for example, some diseases can be transmitted by sexual contact but not by other forms of contact. When a person coughs or sneezes, little droplets of mucus are released that might contain pathogens. This results in direct droplet transmission, which is the spread of a disease from one host to another at a distance of one meter or less. Droplets can spread a wide range of infections, including influenza and some types of pneumonia.

Airborne transmission refers to transmission over a distance of more than one meter. Indirect contact transmission occurs when germs from an infected human or reservoir contaminate inanimate things called fomites. When a fresh susceptible host later contacts the fomite and passes the contaminated material to a susceptible portal of entry, transmission occurs indirectly. Fomites can also include non-sterilized items used in therapeutic settings, such as syringes, needles, catheters, and surgical

equipment. Indirect transmission of pathogens via such fomites is a major source of healthcare-associated illnesses.

The term vehicle transmission refers to the transmission of pathogens through vehicles such as water, food, and air. Waterborne disease transmission occurs when water is contaminated due to poor sanitation practices. In many parts of the world, waterborne disease is still a major issue. According to the World Health Organization (WHO), polluted drinking water causes more than 500,000 deaths per year. Hantavirus can be found in mouse faeces, urine, and saliva, but as these materials dry, they can breakdown into microscopic particles that can become airborne when disturbed, causing a serious and possibly fatal respiratory infection. Although short-distance droplet transmission is referred to as contact transmission, longer-distance droplet transmission through the air is referred to as vehicle transmission. Fine mucus droplets produced by coughs or sneezes, unlike bigger particles that drop quickly out of the air column, can stay suspended for long periods of time and travel great distances. Droplets desiccate quickly under certain conditions, forming a droplet nucleus capable of transferring infections; air temperature and humidity can affect the efficacy of airborne transmission.

Vector Transmission refers to diseases can also be spread via a mechanical or biological vector, which is an animal that transmits the disease from one host to another. A mechanical vector, an animal that transports a virus from one host to another without becoming infected, aids mechanical transmission. When a disease reproduces within a biological vector that transmits the pathogen from one host to another, this is known as biological transmission. Biological transmission is primarily carried out by arthropods. The pathogen is transmitted by most arthropod vectors biting the host and causing a wound that serves as a portal of entry. To enhance transmission through the bite, the pathogen may complete part of its reproductive cycle in the arthropod's gut or salivary glands. Mosquitoes, which carry malaria and other diseases, and lice, which transmit typhus, are examples of biological insect vectors. Arachnids, especially ticks, which spread Lyme disease and other

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infections, and mites, which transmit scrub typhus and rickettsial pox, are examples of additional arthropod vectors. Biological transmission complicates the pathogen's biology and transmission because it requires survival and reproduction within a parasitized vector. There are also important non-

arthropod vectors of disease, including mammals and birds. Various species of mammals can transmit rabies to humans, usually by means of a bite that transmits the rabies virus. Chickens and other domestic poultry can transmit avian influenza to humans.