

MODES OF TRANSMISSION Diseases can be transmitted directly or indirectly. When a water supply is contaminated with sewage because of leaky pipes, the contamination can be either periodic, causing multiple exposures as a result of changing pressures in the water supply system that may cause intermittent contamination, or continuous, in which a constant leak leads to persistent contamination.

1. Direct a. Person-to-person contact 2. Indirect a. Common vehicle ? Single exposure ? (2) Multiple exposures ? (3) Continuous exposure b. Vector such as the mosquito Droplet dispersal it demonstrates the potential for an individual to infect large number of people in a brief period of time. The clinical and epidemiologic characteristics in many infectious and noninfectious conditions often relate to the site of the exposure to an organism or to an environmental substance and to its portal of entry into the body. Once a certain proportion of people in the community are immune, the likelihood is small that an infected person will encounter a susceptible person to whom he can transmit the infection; more of his encounters will be with people who are immune. The presence of a large proportion of immune persons in the population lessens the likelihood that a person with the disease will come into contact with a susceptible individual. Different organisms spread in different ways, and the potential of a given organism for spreading and producing outbreaks depends on the characteristics of the organism, such as its rate of growth and the route by which it is transmitted from one person to another. When we carry out immunization programs, it may not be necessary to achieve 100% immunization rates to immunize the population successfully. Third, in a foodborne outbreak, cases rarely occur in persons who acquire the disease from a primary case. Two points should be made in this regard: First, the skin is not the exclusive portal of entry for many of these agents, and infections can be acquired through more than one route.

HERD IMMUNITY Herd immunity may be defined as the resistance of a group of people to an attack by a disease to which a large proportion of the members of the group are immune. We can achieve highly effective protection by immunizing a large part of the population; the remaining part will be protected because of herd immunity. If we have a reservoir in which the organism can exist outside the human host, herd immunity will not operate because other means of transmission are available. The CDC's Vessel Sanitation Program monitors outbreaks on cruise ships and works to prevent and control transmission of illness aboard these ships. It may reflect the time needed for the organism to replicate sufficiently until it reaches the critical mass needed for clinical disease to result. Agents that often enter through the skin include streptococci or staphylococci and fungi such as tinea (ringworm).

Factors That May Be Associated with Increased Risk of Human Disease Host Characteristics o Age. IMMUNITY AND SUSCEPTIBILITY The amount of disease in a population depends on a balance between the number of people in that population who are susceptible, and therefore at risk for the disease, and the number of people who are not susceptible, or immune, and therefore not at risk. The disease agent must be restricted to a single host species within which transmission occurs, and that transmission must be relatively direct from one member of the host species to another. The epidemiologic picture that is manifested depends on whether the exposure is single, multiple, or continuous.

Incubation Period The incubation period is defined as the interval from receipt of infection to the time of onset of clinical illness. The skin is another important portal of entry for infectious agents, primarily through scratch or injury. If immunity is only partial, we will not build up a large subpopulation of immune people in the

community. If an outbreak occurs in the group of people who have eaten the food, it is called a common-vehicle exposure, because all the cases that developed were in persons exposed to the food in question. First, such outbreaks are explosive, that is, there is a sudden and rapid increase in the number of cases of a disease in a population. In the United States, the leading cause of foodborne-related illness is contamination with norovirus (from the Norwalk virus family). It probably also relates to the site in the body at which the organism replicates— whether it replicates superficially, near the skin surface, or deeper in the body. The dose of the infectious agent received at the time of infection may also influence the length of the incubation period. The same routes also serve as points of entry for noninfectious disease-causing agents.

Environmental Factors:

- o Temperature. They may be immune because they have had the disease previously or because they have been immunized. If a large percentage of the population is immune, the entire population is likely to be protected, not just those who are immune. Why does herd immunity occur? In addition, infections must induce solid immunity.

DISEASE OUTBREAKS

Let us assume that a food becomes contaminated with a microorganism. With a large dose, the incubation period may be shorter.

Previous diseases. Types of Agents and Examples:

- o Biologic.
 - o Bacteria, viruses.
 - o Trauma, radiation, fire.
 - o Nutritional Lack, excess.

Why is the concept of herd immunity so important? For herd immunity to exist, certain conditions must be met. We will focus on the single-exposure, common-vehicle outbreak because the issues discussed are most clearly seen in this type of outbreak. What are the characteristics of such an outbreak? Second, the cases are limited to people who share the common exposure. If you become infected today, the disease with which you are infected may not develop for a number of days or weeks. Why doesn't disease develop immediately at the time of infection? For example, environmental substance.

- o Sex.
- o Customs.
- o Occupation.
- o Genetic profile.
- o Marital status.
- o Immune status.
- o Chemical.
- o Humidity.
- o Altitude.
- o Crowding.
- o Housing.
- o Radiation.
- o Air pollution.

They also may be not susceptible on a genetic basis. It happens because disease spreads from one person to another in any community. During this time, the incubation period, you feel completely well and show no signs of the disease. What accounts for the incubation period?

- o Race.
- o Religion.
- o Family background.
- o Poison, alcohol, smoke.
- o Physical.
- o Neighborhood.
- o Water.
- o Milk.
- o Food.
- o Noise.