

# General Information

## The Chain of Infection

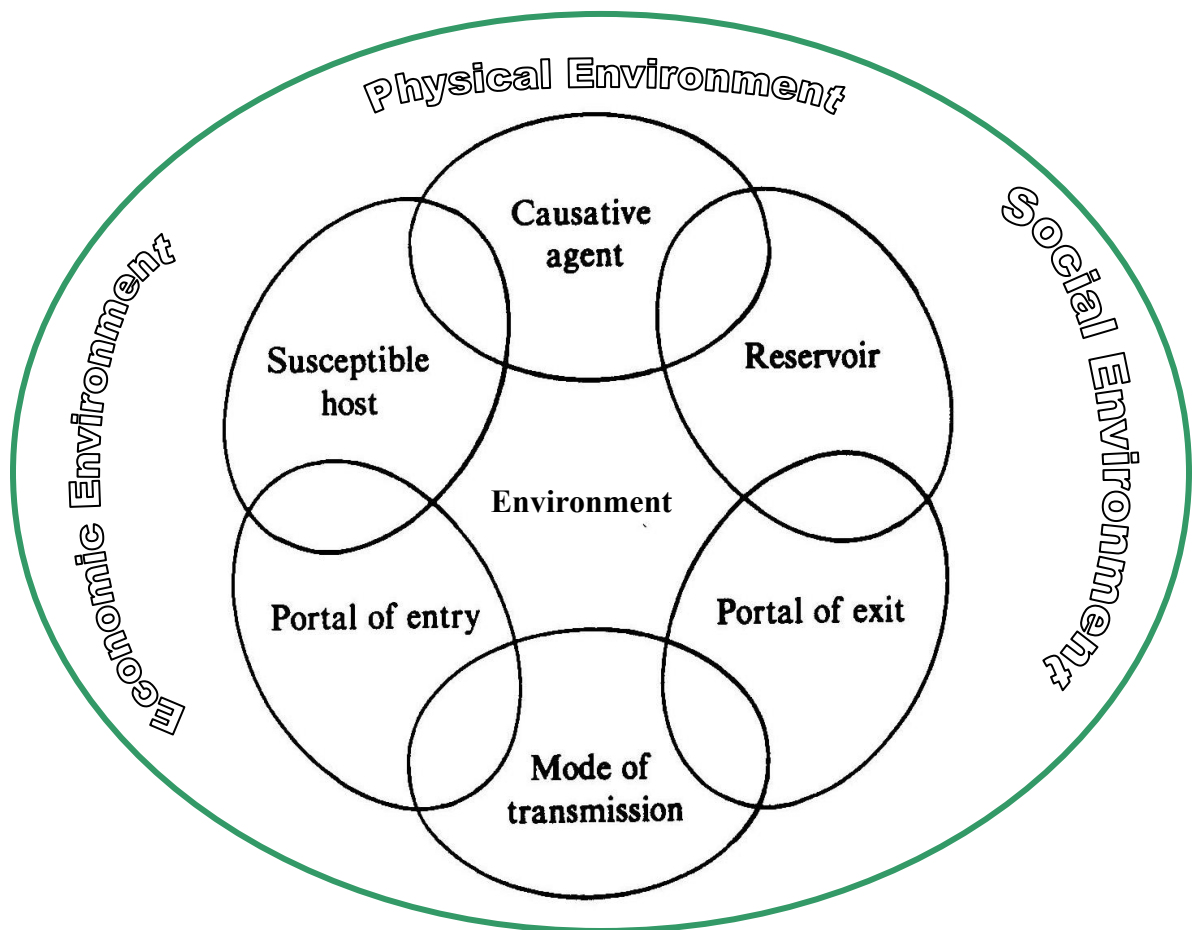
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One of the basic principles of communicable disease prevention and control is the chain of infection. An understanding of each link in the chain will assist in disease prevention. There are a number of socio-economic and environmental factors that have an impact on the spread of disease. Some of these factors include population density, level of employment, income, weather condition (e.g., temperature, humidity and sunlight), pollutants, and geology/soil type, (Brachman, 2006). These factors should be taken into consideration when investigating communicable diseases.



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Interventions designed to break the chain of infection at one (or more) of the various links can limit the spread of communicable diseases. Interventions can be targeted at any link of the chain. Some interventions will be specific for a particular causative agent while others such as protection of a water shed to prevent water borne illnesses or school health education services to address healthy lifestyle choices to prevent sexually transmitted infections and communicable diseases may have a broader impact. Information regarding risks, primary prevention and population health issues, as they pertain to the delivery of a comprehensive communicable disease control program, are key elements of an investigation. Details relating to the appropriate investigation and specific follow-up for each communicable disease are outlined within the specific disease section in this manual.

Prevention interventions are optimal from a public health perspective. Determining which link, or links, to direct interventions at depends on many variables. In some cases, elimination of the **causative agent** is not feasible due to the nature of the agent. For example, tetanus is a normal, and ubiquitous, inhabitant of soil and animal and human intestines (American Academy of Pediatrics, 2009) but immunization of a **susceptible host** can prevent tetanus. Safe food handling practices make it possible to eliminate agents responsible for food-borne illnesses. There are instances in which targeting the **reservoir** is appropriate to assist in prevention and control measures. For example, control measures for West Nile virus include eliminating or reducing mosquito breeding sites through yard and lawn maintenance, and the appropriate management of standing water sources.

When a particular agent is identified, appropriate interventions, such as infection control measures - contact, droplet and airborne precautions that target the **portal of exit, mode of transmission and portal of entry** should be implemented. For these links, successful intervention is also dependent on the individual's cooperation and compliance with personal protective measures. Examples of this include safer sex practices, isolation and exclusion of infectious individuals. Each disease section in this manual highlights the key points as they relate to prevention and control measures specific to that particular disease.



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Another key factor in disease control is identifying and reducing the risk for **susceptible hosts**. For example, an individual with pertussis in a daycare setting that includes infants <12 months requires more intense investigation and interventions because the population involves individuals who are considered more vulnerable for more severe disease. Conversely, an individual case of parvovirus in a school setting would require less intense follow-up because many contacts will already have developed immunity from natural infection.

### General Considerations for Investigation of Cases

When investigating a case, there are a number of factors that must be considered. The following questions can assist in guiding the investigation:

1. What is the source of the disease? Can it be identified?
2. Is the disease endemic in the area where it occurred? Did the person travel to an area where the disease is endemic?
3. Who else may have been exposed to the disease?
4. Is an outbreak present?
5. What is the potential impact of the disease?
6. Are there people who are more likely to develop symptoms or serious manifestations of the infection?
7. Is there a population more likely to be susceptible to the infection?
8. What interventions are available to prevent the transmission of the infection?
9. Is there a high risk for transmission to others (e.g., a highly communicable agent, common vehicles for transmission like food or water, etc.)?

Once these questions have been answered, the level of follow-up required will be more apparent. Interventions targeted at the specific disease are included in the specific disease sections.



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### Determinants of Health

When looking at communicable disease prevention and control as it pertains to the health of our communities, it is important to consider how the determinants of health may contribute to the development and transmission of communicable diseases. Interventions that are targeted at the level of primary prevention or impact on health determinants almost always have a significant impact on the health status of the population and the health of individuals. The determinants of health (Public Health Agency of Canada, 2010) include:

- income and social status;
- social support networks;
- education and literacy;
- employment/working conditions;
- social environments;
- physical environments;
- personal health practices and coping skills;
- healthy child development;
- biology and genetics;
- health services;
- gender;
- culture.

It is our social responsibility to ensure the health and well-being of all Saskatchewan citizens. Meaningful participation of specific populations in the development and implementation of policies and programs is essential to influence the decisions that affect their health. Working in collaboration with other agencies and assisting in community development strategies to address the determinants of health has a greater impact than working in isolation. It is the responsibility of society as a whole to take care of all its members.



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### References

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Brachman, Philip S. (2006, June). *Ecology of Infection*. Retrieved May, 2010 from <http://www.cdcfoundation.org/fellowships/knight/Principles%20of%20Epidemiology%20Part%20II.swf>.

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