POLICY & PROCEDURE NUMBER: 2.1

DEPARTMENT: *Infection Control* **SUBJECT:** *The Chain of Transmission*

APPROVAL DATE: April 2004 **REVISION DATE:** April 2007: March 2016
REVIEW DATE: March 2017; November 2018

PURPOSE/POLICY:

To provide a safe environment for residents, staff, volunteers and visitors through infection prevention and control. The goal of infection prevention and control practice is to break a link in the chain to prevent the transfer of microorganisms.

The transmission of microorganisms and subsequent infection within a health care setting may be linked to a "chain", with each link in the chain representing a factor related to the spread of microorganisms. Transmission does not take place unless all six of the elements in the chain of transmission are present. By eliminating any of the six links, or "breaking the chain," transmission does not occur.

DEFINITIONS:

Organism

Organisms are everywhere in our world. They are in us, on us and throughout our environment. Many of these are important to help us live healthy lives. Some organisms may cause illnesses if the right set of circumstances occurs. Organisms may be bacteria, viruses, fungi or parasites. Not all organisms can be treated with antibiotics.

Susceptible hosts

In order for an infection to occur the person receiving the organism must be susceptible to it. People can be susceptible for a number of reasons. They may never have been exposed to the organism before (i.e. chickenpox, measles); they may have a lowered immune system (i.e. people receiving steroids, chemotherapy, elderly persons, and newborns), or it may be a particularly strong form of the organism. If a person is not susceptible, they will be resistant to the organism and be able to fight it off so that it does not cause an infection.
Physiological changes related to the normal aging process make the elderly particularly susceptible to infections. In general, the older residents have less cardiac reserve, stiffer lungs, decreased clearance mechanisms for pulmonary secretions, incomplete bladder emptying, decreased gastric acidity, and delayed skin healing. Each of these may contribute to the development of infection in the elderly resident. A decreased cough reflex combined with loss of elasticity of lung tissue may put the elderly resident at higher risk for pneumonia. A decrease in gastric mobility may place the elderly resident at higher risk for gastrointestinal infections and make it more difficult for the resident to clear the infection. In addition, many residents have chronic, underlying diseases that also predispose them to infection (e.g. diabetes, chronic lung disease).

Mode of Transmission

Organisms must travel from where they are living (the reservoir) to the susceptible host. This is called the "mode of transmission". Organisms can travel in several different ways. It is important to understand how they travel so that we can interrupt the transmission and prevent infections. The modes of transmission are contact (direct/indirect/droplet), airborne or vector.
Contact This is the most common way organisms travel. The contact may be:

a) Direct – this is when you come into direct contact with the organism (e.g. shaking hands with someone who has the organism on their hands, kissing someone with a cold sore, etc.).
b) Indirect – this is sometimes called "vehicular" transmission because another object is contaminated with the organism and it is then transferred to the susceptible host. This occurs with "food poisoning" where the prepared food has been contaminated and then is eaten by the susceptible host. Another example is equipment that has been contaminated and is not properly cleaned between residents (e.g. stethoscope, commode, mechanical lift, etc.)
c) Droplet – is a very common mode of transmission. Illnesses such as the common cold and meningitis are transmitted by droplet contact. This occurs when a person with the organism coughs or sneezes - they send thousands of droplets into the air around them. These droplets are heavier than air and fall immediately to the ground. If a susceptible host is within a metre (3 feet) they may breathe in some of these droplets. In most cases, the droplets will not get by the body's defence system but in some cases they may get past the defences and cause illness.

Airborne

Airborne transmission is similar to droplet. In this mode of transmission the droplets that are expelled into the air evaporate until they become very small. Their size allows them to remain suspended in the air currents where they remain until the air in the room has been circulated.

Vector

Vector transmission occurs when an insect or animal carries the organism and transmits it to humans. Examples of vector transmission include illnesses such as Lyme disease, Malaria, West Nile Encephalitis and Dengue fever.
Refer to the attached "Chain of Transmission" Infection Prevention and Control Fact Sheet

References Public Health Ontario website –
www.oahpp.ca

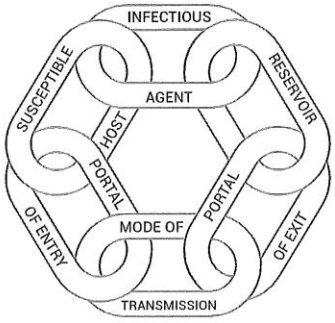
Infection Prevention and Control Fact Sheets

Chain of Transmission

Public Health Ontario | Santé publique Ontario

Did You Know?

- The Chain of Transmission is the way all infectious diseases spread
- The goal of infection prevention and control practice is to break a link in the chain to prevent the transfer of microorganisms



Links in the Chain of Transmission

Infectious agent

A microorganism that is capable of producing infection. Examples include bacteria, viruses, fungi and parasites.

Reservoir

The place where an infectious agent can live. For example, in or on humans, on objects and surfaces in the environment.

Portal of Exit

The point where the infectious agent leaves the reservoir. Examples include non-intact skin and respiratory secretions.

Mode of Transmission

How the infectious agent travels from one host to another. For example, contact, droplet and airborne routes.

Portal of Entry

The point where the infectious agent enters the new host. For example, non-intact skin, respiratory tract, GI tract, mucous membranes.

Susceptible Host

Any person who is at risk of infection. Age and immune system function can increase infection risk.

For more information on Public Health Ontario's Infection and Control programs and resources, visit www.oahpp.ca

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