SUBJECT: PRINCIPLES OF INFECTION PREVENTION AND CONTROL

The basic goal of an Infection Prevention and Control program is to *prevent* infections and eliminate the spread of microorganisms from one person to another. Patients frequently acquire infections while hospitalized, which are often referred to as healthcare associated infections. Personnel infrequently acquire infections from patients. The main reason patients, rather than personnel, are more susceptible to infection is that the patient's state of health and ability to fight infection is very low. In addition, many patients undergo invasive procedures which can allow entry of bacteria into the body.

During their hospitalization, patients become a reservoir for a variety of microorganisms that, under the right conditions, can produce infection. Spread of these microorganisms from patient to patient has frequently caused numbers of preventable infections to occur. Microorganisms are spread primarily three ways within a hospital setting: contact (direct and indirect), respiratory droplets, and airborne droplets.

***Contact* transmission** includes direct contact and indirect contact transmission. Direct contact transmission occurs when microorganisms are transferred directly from one person to another person (e.g. blood from patient directly enters a care-giver's body through a cut in the skin). Indirect contact transmission, the most common mode of transmission, involves the transfer of an infectious agent through a contaminated intermediate object or person. Hands of personnel are usually cited as the most important contributors to indirect contact transmission.

***Droplet* transmission**, technically, is a form of contact transmission. However, the mechanism of transfer of the pathogen to the host is quite distinct from direct transmission. Respiratory droplets are generated when an infected person coughs, sneezes, or talks during procedures such as suctioning, bronchoscopy, and cough induction.

***Airborne* transmission** occurs by dissemination of airborne droplet nuclei (small-particle residue of evaporated droplets, sometimes referred to as "small droplets" that contain infectious microorganisms that remain suspended in the air for long periods of time) or dust particles containing the infectious agent.

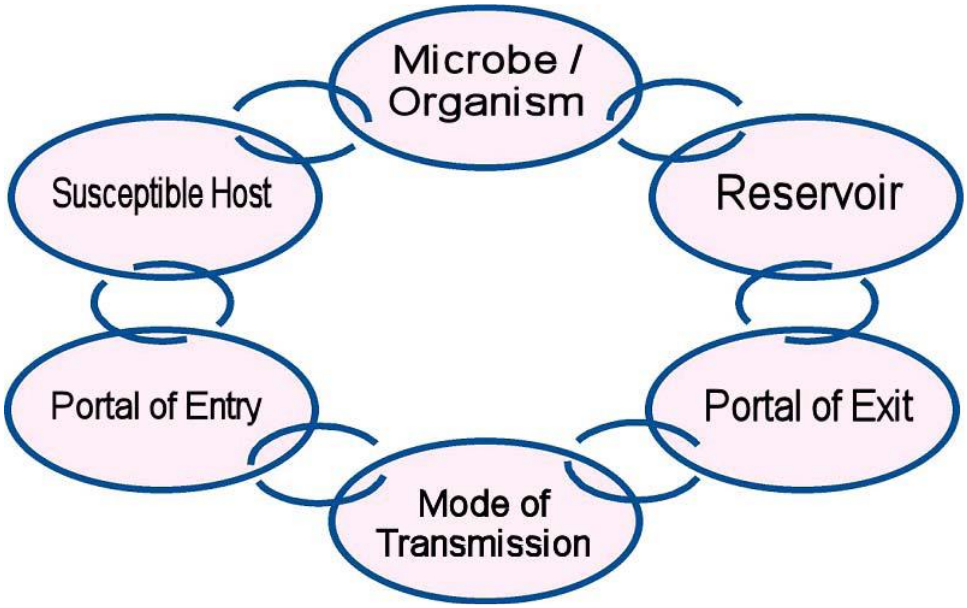
THE SPREAD OF INFECTION

The spread of infection within health care requires three elements:

- A source of infecting organisms (bacteria, viruses, fungi);
- A susceptible host;
- A route of transmission of the organism from one person / site to another

BREAKING THE CHAIN OF INFECTION

Each of these methods of transmission can frequently be eliminated with simple precautionary measures by breaking the chain of infection with measures that include, but are not limited to, proper hand hygiene, practice of standard precautions and transmission based precautions (Contact Precautions, Droplet Precautions, and Airborne Precautions) while providing care. Cleaning, disinfection, and sterilization of equipment and disposal of infectious waste are other important parts of the Infection Prevention and Control.



Source: Sutton & Merton. *Infection Control Principles. Retrieved June 17, 2009 at:* http://www.suttonandmerton.nhs.uk/ec/files/docuploads/CHAPTER%201%20(2).pdf

In the prevention of infection, some basic principles apply dependent on the route of spread of the micro-organism and include the following important measures:

1. Transmission via contact:
    a. Effective hand hygiene is the single most important measure in the prevention of the spread of infection
    b. Health care staff should wear proper personal protective equipment (PPE) whenever there is any possibility of direct contact with infected blood, body fluids or contaminated material
    c. Strict adherence to the principles of aseptic technique will minimize the likelihood of contamination during the insertion and management of invasive devices and other clinical procedures, such as wound care.

2. Transmission via inanimate objects and the environment in the health care setting:
    a. Effective environmental cleaning and good housekeeping techniques together with appropriate cleaning, disinfection and sterilization of medical equipment
    b. Appropriate segregation and disposal of healthcare waste and contaminated laundry

3. Transmission via food and drink:
    a. Adequate hand washing facilities, especially when handling or preparing food
    b. Strict adherence to food hygiene regulations
    c. Healthcare environments are subject to strict controls to minimize the risk of Legionella pneumophilia
    d. Food handlers suffering from septic conditions of the skin or gastro-intestinal infections **MUST** be excluded from work until proven to be microbiologically free from infection.

5. Transmission via airborne route:
    a. Adequate un-crowded patient placement
    b. Segregating infected patients to minimize the risk of cross-infection in single rooms preferably, and if it is not possible, cohort patients that are infected with the same organism in a room.
    c. Vaccination / immunization programs where appropriate

6. Transmission via vectors:
    - Adequate measures for pest control in food preparation areas or in the environment (such as cat population at Rancho), and in the health care setting is essential.