

0724A: Introduction to Infectious Diseases

Introduction

Infections caused by germs are a major safety and health hazard. Some infections are minor and cause short illnesses. Other infections are serious and can cause death. Germs do not discriminate and everyone is at risk for an infection including you and your family. Some groups are considered more vulnerable such as infants, individuals with chronic conditions and the aging population.

You or other people may be infected with a disease such as the flu and be contagious (able to spread the virus) before symptoms appear. Some viruses can be spread for 24–72 hours after the symptoms go away.

Caregivers and medical professionals have an important role in protecting patients, residents, visitors, their family members and themselves from infections. This introduction to infectious diseases and infection control will provide you with a better understanding of infectious diseases and ways to prevent the spread of infections.

Infection basics

Germs are small (micro) plants or animals (organisms) that can be seen only with a microscope. Germs are everywhere: in the air, food, soil, and water, and in the mouth, nose, respiratory tract, stomach, intestines and skin of humans and animals.

Some germs cause infections (pathogens) and are harmful. Nonpathogens are germs that usually do not cause an infection.



You can prevent the spread of diseases by routinely practicing hand hygiene.



There are three types of germs:

1. Bacteria — microscopic, one cell, plant life that multiplies rapidly. Bacteria can cause infection in any part of the body.

Most bacterial infections can be treated by antibiotics. However, with overuse and misuse of antibiotics there are some common infections that no longer respond to some or all antibiotics.

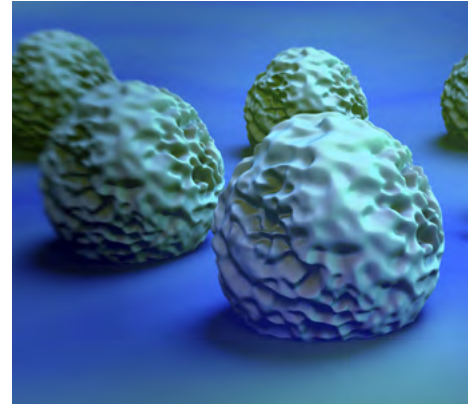
Infections that do not respond to some antibiotics are called drug resistant infections. For example *Staphylococcus aureus* (staph infection) may be resistant to methicillin and not respond to routine treatment. This is better known as MRSA (methicillin-resistant *Staphylococcus aureus*).

If an infection is resistant to more than one antibiotic designed to treat a specific type of infection it is called a multi-drug resistant organism (infection.) Some forms of *Staphylococcus aureus* are now multi-drug resistant.

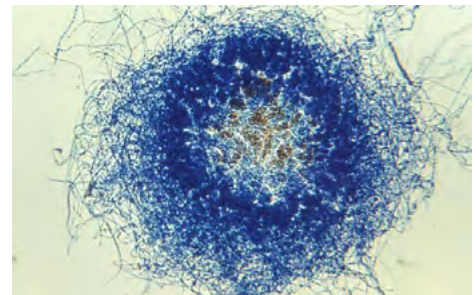
2. Fungi — plants that live on other plants or animals. Mushrooms, yeasts and molds are common fungi. In humans, fungi can infect the mouth, vagina, skin, feet and other body areas. Some fungal infections can be difficult to treat such as fungal infections in the nail bed.

3. Viruses — very small microscopic organisms that grow in living cells. They cause many diseases such as the common cold, herpes, diarrhea, norovirus, tuberculosis (TB), hepatitis, and human immunodeficiency virus (HIV) that can cause acquired immunodeficiency syndrome (AIDs).

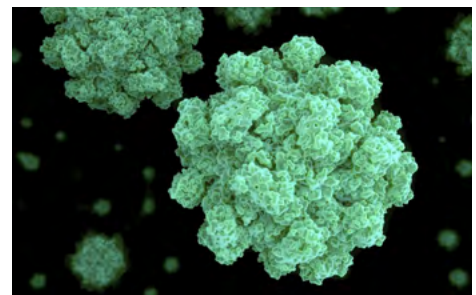
Viruses, such as the common cold, cannot be treated with antibiotics. Some antiviral drugs have been developed to treat viral infections such as the flu, tuberculosis and HIV. Viruses can also become antiviral resistant such as tuberculosis and HIV.



MRSA is a staph infection that has become resistant to the antibiotic methicillin.



Phoma sp. fungal organism. Fungal infections are difficult to treat.



Norovirus causes severe vomiting, diarrhea or both.

Germs

Germs require an environment (host) to live and grow. People, plants, animals, soil, food and water are common places where germs grow. Germs must get water, oxygen and nourishment from their host. A warm, dark environment is also needed. Most germs grow best at body temperature and are destroyed by high heat and ultraviolet light.

Germs are normally found in most human organs, e.g., the lungs, the intestines and on the skin. These germs are called nonpathogens (normal flora) when contained within their own body systems. When a nonpathogen is transmitted from one system to another it becomes a pathogen.

For example, *Escherichia coli* (*E. coli*) is normally found in the large intestine. Feces (bowel movements) contain *E. coli*. Wiping from front to back prevents *E. coli* from entering the urinary system, which can cause an infection.

Additionally, when we do not wash our hands after going to the bathroom, or if proper hand washing technique is not used, *E. coli* can spread to anything those hands touch, e.g., door handles, food, etc. This is one example of how infections can be spread to other people.

Infections

An infection is a disease resulting from the invasion and growth of germs in the body. A *local infection* is in a body part. A *systemic infection* involves the whole body.

Pathogens do not always cause infection. Developing an infection depends on the following conditions being present:

- The *source* is a germ. The germ must have an environment where it can grow and multiply. Humans and animals are common environments for germs.

Although there may not be any signs or symptoms of infection, humans and animals may be carriers and can pass germs to others without having an active infection themselves.



Open wounds require the use of gloves when changing dressings. Always wash your hands before putting gloves on and after removing.



E. coli – infections from *E. coli* typically are caused when someone handling food has not washed their hands properly. When handling food you must use soap and water.

- Where the germ leaves the host environment is called the *exit point*. *Exit points* include the respiratory, gastrointestinal, urinary and reproductive tracts; breaks in the skin, the blood and body fluid secretions.

When a germ leaves the host, it must be transmitted to another host. Methods of transmission can be, but are not limited to:

- Through contaminated food, water, animals, personal care items;
- By direct contact with blood and body fluids, wound dressings or contaminated surfaces; or
- “Droplets” in the air from coughing or sneezing.

The germ must enter the body through an *entry point*. Points of entry and exit are the same. A *susceptible host* (a person at risk for infection) is needed for germs to grow and multiply.

Open wounds such as cuts, burns, dry cracked hands, surgical incisions, etc., can provide entry points for germs. Other ways germs can enter into the body is through mucous membrane such as ears, eyes, nose, mouth, urethra (a tube connecting the urinary bladder to the genitals) or stomas. Stomas are artificial openings for the purposes of helping someone breathe (trach), eliminating body waste or fluids (such as a colostomy) or for providing nutrition or fluids (feeding tubes).

The human body can protect itself from infection. A person’s ability to resist infection is affected by their age, nutritional status, stress, fatigue, general health, medications and the presence of disease or injury. Vaccinations also help to protect the body from certain infections.

Remember, an infection is a disease resulting from the invasion and growth of germs in the body. The body takes steps to fight off an infection when it occurs. Some signs and symptoms of infection are:

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| • Diarrhea; | • Loss of energy; | • Rash; |
| • Discharge or drainage from the infected area; | • Nausea; | • Redness and swelling of a body part; |
| • Fast breathing or fast heart beat; | • Pain or tenderness (can be specific to the infected area or generalized for systemic infections); | • Sores on mucus membranes; and |
| • Fever; | | • Vomiting. |
| • Loss of appetite; | | |



Droplets from a sneeze or a cough is an example of an exit point.

Provided by CDC



Cuts and abrasions on the skin are examples of an entry point for infectious organisms.

People differ in their responses to infection. Not all people will experience all of these symptoms and some will experience these in varying degrees. Care providers need to know their resident's baseline health status and be able to recognize any of these signs and symptoms.

Infection control

Infection control is the process of reducing or preventing the spread of germs. Since germs are everywhere, certain practices are necessary. Infection control practices can prevent or reduce the spread from one person or place to another.

There are many types of infection control practices routinely used to prevent the spread of germs such as water and waste treatment, food handling requirements, personal hygiene and immunizations. You can prevent the spread of germs by adopting the following practices.

Wash hands with soap and water after:

- Urinating or having a bowel movement;
- Changing tampons or sanitary pads and when changing your child's diapers;
- Coughing, sneezing or blowing your nose; and
- If hands are visibly soiled or greasy.

Wash hands with soap and water or use hand sanitizers before AND after:

- Providing care to others; and
- Before and after handling, preparing or eating food.

Wash hands with soap and water or use hand sanitizers AND use gloves when:

- Potential contact with another person's blood, body fluids, secretions or excretions. This includes saliva, vomit, urine, feces, diarrhea, vaginal discharge, mucus, semen, wound drainage, pus and respiratory secretions; and
- Changing adult incontinence pads or underwear, soiled linens or other incontinent products.



When you are sick, stay home until you no longer have a fever without taking a fever reducer such as acetaminophen, or have symptoms for 24 hours.



When handling food you must use soap and water. You must also wash your hands with soap and water after handling raw meat, poultry, fish or seafood.

When using gloves you must use soap and water or hand sanitizer before putting on the gloves and after removing the gloves.

Infection control and medication administration:

- Dispose of all sharps such as needles in a proper sharps approved container; and
- Personal items CANNOT be shared such as pill boxes, pill cutters/ crushers, CBG monitors, lancet holders, inhalers or inhaler spacers, syringes and medication syringes (used for liquid medications), etc., and must be labeled with the person's name.

Other infection control practices:

- Provide all persons with their own toothbrush, drinking glass, towels, wash cloths and other personal care items;
- Properly dispose of any contaminated disposable (one-time use) products such as tissues, dressings, gloves, gowns, masks, catheters, etc.
- Cover your nose and mouth with your elbow when coughing or sneezing (vampire style);
- Use a tissue when blowing your nose;
- Bathe regularly and wash your hair;
- Brush teeth in the morning and at bedtime daily;
- Proper food storage and preparation;
- Wash fruits and raw vegetable before eating or preparing them;
- Wash cooking and eating utensils with soap and hot water after use. Don't forget cutting boards, counters and anything touched by raw meat;
- Routinely clean all surfaces and when contaminated; and
- Clean resident care equipment before and after use.

Standard precautions

Standard precautions are specific infection control practices that protect anyone who is providing care to others (including health care workers) from exposure to infectious diseases and prevents the transmission of infectious disease to others.



Sharps are hazardous materials cannot be disposed of in the garbage and must be stored securely.

Standard precaution guidelines are developed by the Centers for Disease Control (CDC) and apply to all care regardless of suspected or confirmed infection status of the individual. What does that mean? Even if you believe someone does not have an infection you must follow standard precautions.

The Occupational Safety and Health Administration (OSHA) uses the term “universal precautions,” however, it uses the same tools and practices as standard precautions.

Standard precautions include:

- Hand hygiene;
- Respiratory hygiene;
- Use of personal protective equipment (PPE);
- Safe injection practices; and
- Safe handling of contaminated equipment or surfaces.

Hand hygiene and respiratory hygiene (also known as respiratory etiquette)

Proper hand hygiene and respiratory hygiene must be routinely used at work, home and play.

Contact precautions

Applies to any situation when a caregiver may come into contact with:

- Blood;
- All body fluids – secretions and excretions – except sweat, regardless of whether they contain visible blood;
- Broken skin (open sores, cuts, etc.); and
- Mucus membranes.



Hand washing is the single most important tool for reducing or preventing the spread of infections.



Use the vampire style when coughing or sneezing.

Personal protective equipment (PPE) — tools used to comply with contact and transmission precautions

To comply with standard precautions, the following practices are expected:

Gloves — must be worn when contact with blood, all body fluids, secretions and excretions (except sweat) regardless of whether there is visible blood and when in contact with broken skin or mucous membranes.

Hands must be washed before putting gloves on and after gloves are removed. Hands and other skin surfaces must be washed immediately and thoroughly if contaminated with body fluids or blood.

Caregivers who have open cuts, sores or dermatitis on their hands must wear gloves for all client contact or be removed from client contact until the hands are healed.

Gowns — must be worn during procedures or situations when you anticipate exposure to body fluids, blood, draining wounds or mucus membranes.

Mask and protective eyewear — must be worn during procedures likely to generate droplets of body fluids or blood such as when the person is coughing excessively or has severe vomiting and requires assistance.

Transmission precautions (also known as enhanced precautions)

Transmission precautions are used in situations when an infectious disease is suspected or diagnosed. Additionally, transmission precautions must be used when an individual is diagnosed with a drug resistant or multidrug resistant infection.



Gloves — when using gloves you must always wash your hands before putting on and immediately after removing.



Gown — when using gowns they must be removed and disposed of immediately after use.



Mask — must be worn properly, as directed, and disposed of immediately after use.

Transmission precautions use the same tools (gloves, gowns, masks, etc.) as standard precautions but may require the use of them even if direct care is not being provided. For example; chicken pox would require the caregiver to put on gloves when entering the room even if direct care is not provided. Additionally, in some situations an individual may need to be isolated from others such as chicken pox or a multidrug resistant *Clostridium difficile* (*C.diff*).

There are three categories of transmission precautions:

- Airborne precautions;
- Droplet precautions; and
- Contact precautions.

Summary

Health care providers, which includes caregivers, are at an increased risk of transmitting infections. However, these risks can be greatly minimized or prevented by understanding simple infection control concepts. It is your responsibility to routinely use infection control practices, including standard precautions, to assure you do not become ill or transmit infections to your family, friends, and those person's you are responsible for providing care.

Just for fun, check out three videos produced by Florida Department of Health campaign on reducing transmission of infectious organisms: www.5thguy.com. These videos, all less than a minute and a half, address three key infection control measures: hand washing, covering coughs and staying home when sick.

Resources

Oregon county health departments:

<https://public.health.oregon.gov/ProviderPartnerResources/LocalHealthDepartmentResources/Pages/lhd.aspx>

Hand washing (1:02 minutes):

www.5thguy.com/handwashing.htm

Covering your cough (0:40 minutes):

www.5thguy.com/coveringcoughs.htm



Goggles or eye wear should be used if there is a risk of spray or splashing of any body fluids.

Keeping Sick at Home (1:04 minutes):

www.5thguy.com/sickathome.htm

Six Tips to Help Prevent the Spread of Norovirus (4:09 minutes, podcast):

www2c.cdc.gov/podcasts/player.asp?f=8629629

Safe Injection Practice: www.oneandonlycampaign.org

Training credit

You will need to take and pass a test to receive training credit (a certificate) for this course. You can find out how to order the test here: <http://www.oregon.gov/DHS/SENIORS-DISABILITIES/PROVIDERS-PARTNERS/Pages/afh-training.aspx>.

Sources for this module's information

Centers for Disease Control (CDC). Handwashing: Clean Hands Save Lives. Available at www.cdc.gov/handwashing/

Centers for Disease Control (CDC). Respiratory Hygiene/Cough Etiquette in Healthcare Settings. Available at www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm

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You can get this document in large print, braille or a format you prefer. Contact the Safety, Oversight and Quality Unit at 1-800-282-9092.

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