With the help of the lectures and this additional reading material, you will learn:

1) Basic information about germs
   a. Types
   b. Modes of transmission
2) Importance of hand washing
   a. When to wash
   b. How to wash
3) Alternative hand hygiene options
   a. Products available
4) About additional resources

Hand hygiene to prevent the spread of disease

Keeping hands clean is one of the best ways to keep from getting sick and prevent the spread of disease.

Germs

Germ is a common term to describe a microscopic organism, or independent life form that can cause a disease. Germs are everywhere and can live for a 2 hours or more on surfaces like doorknobs, desks, and tables.

Bacteria

Bacteria are microscopic organisms composed of a single cell and lacking a defined nucleus and membrane-enclosed internal compartment. Bacteria look like balls, rods, or spirals. There are 3 types of bacteria, helpful, pathogenic (harmful, causing disease), and spoilage (deteriorates food).

Pathogenic bacteria are responsible for many foodborne illness. Examples are *Salmonella* and *Staphylococcus aureus*.

Some bacteria produce poisons called **toxins**, which also can make us sick. Botulism, a severe form of food poisoning, affects the nerves and is caused by toxins from *Clostridium botulinum* bacteria.

Virus

Viruses are smaller even than bacteria. Viruses are not cells, they are protein structures that need a living host to survive. Viruses invade the cells of a living host, such as humans, causing illness like colds, flu or foodborne illness. They are highly infectious and easily passed from person to person. Viruses can be rod-shaped, sphere-shaped, or multisided. Common examples are Hepatitis A, Norwalk virus and Rota virus.

Fungi

A fungus is actually a primitive plant. Fungi can be found in air, in soil, on plants, and in water. Thousands of different types of fungi exist on Earth. The most familiar ones to us are mushrooms, yeast, mold, and mildew. Some live in the human body, usually without causing illness. Only about half of all types of fungi cause disease in humans.

Some fungi have made our lives easier. Penicillin and other antibiotics, which kill harmful bacteria in our bodies, are made from fungi. Other fungi, like certain yeasts, also can be beneficial. For example, when a warm liquid like water and a food source are added to certain yeasts, the fungus ferments. The process of fermentation is essential for making healthy foods like some breads and cheeses.

Protozoa

Protozoa are a group of microscopic one-celled animals. Protozoa can be **parasites** or predators. In humans, protozoa usually cause disease.

Malaria is caused by a protozoan parasite. *Trichinia spialis* (pork and wild game meats) and *Giardia lamblia* (contaminated water and anything it contacts) are other examples of protozoan contaminates.

Transmission of Avian Influenza

The Food and Agriculture Organization's website (www.fao.org) reports that the avian flu virus can be transmitted through contact with poultry, and their droppings, feathers, intestines and blood. It is very important to minimize unprotected contact with poultry and wild birds. The greatest risk of infection is through the handling and slaughtering of live infected poultry.

- Do not eat sick or dead poultry
- Do not touch sick or dead birds unless wearing gloves
- Do not let children touch or play with sick or dead birds, or touch/pick up bird feathers
- Do not sell or buy birds from flocks that have come from an affected area
- Do not move sick or dead birds out of an infected area
- Do not drink unboiled/untreated water from ponds/wells or water catchment tanks or ponds where birds (poultry or wild birds) may have left droppings
- Do not swim in fresh water (such as lakes, rivers) used by wild birds

Coughing & Sneezing

Cover your mouth and nose when you sneeze or cough to limit the spread of infection through droplets in the air.

- Cough or sneeze into a tissue, then throw it away in the waste basket.
- If you do not have a tissue, cough or sneeze into your elbow or upper sleeve, *not your hands.*
- Clean your hands every time you cough or sneeze.

Refer to information below on hand hygiene.

Transmission of germs

Hands are the most common mechanism for germs to enter the body.

- Hands-to-food: Unclean hands of a person preparing or eating food can contaminate food.
- Hand-to-hand: Unclean hands in contact with another persons hands, results in sharing of germs that can then be transferred to other surfaces.
- Food-to-hands-to-food: Hand contact with a contaminated food or surface, such as raw chicken can transmit germs to the hand. The unclean hands can then transfer the germs to other foods. Cooking can kill the initial germs, but uncooked foods like salad remains contaminated.
- Nose, mouth, or eyes-to-hands-to-others: Germs that cause colds, eye infections, and other illnesses can spread to the hands by sneezing, coughing, rubbing the eyes, or blowing the nose. Hand contact with other people can spread disease. Likewise, unclean hands that touch the eyes, nose, or mouth enable germs to enter the body.
- Food-to-hands-to-infants: Infants are especially vulnerable to illness because their immune systems are not fully developed. Contact with uncooked foods like raw chicken, then handling an infant without washing your hands can transfer germs to the infant.

Insects such as mosquitoes, fleas and ticks can also be carriers of disease.

Germs can also enter the body through open cuts, abrasions, or wounds, as well as from insects or animal. Clean, treat and cover wounds immediately.

If you are sick or have flu symptoms, stay home. Keeping your distance from others may protect them from getting sick.

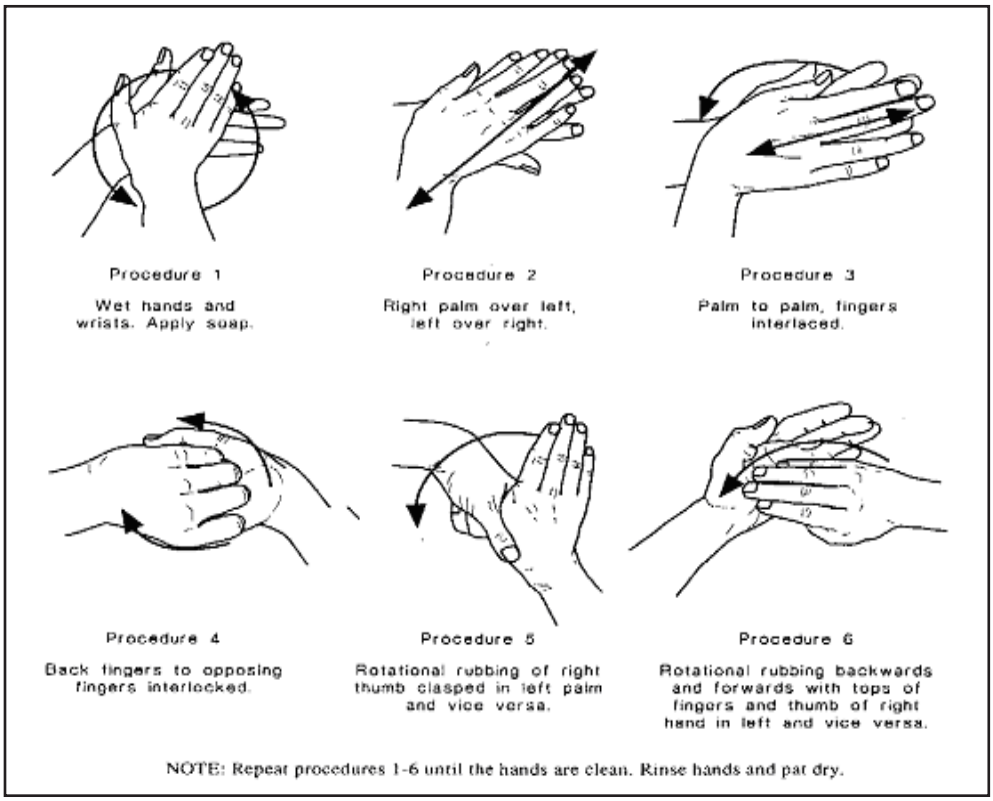
Hand Hygiene

Handwashing

According to the World Health Organization, “Hand hygiene is the primary measure to reduce infections…” Handwashing is an essential part of personal hygiene and preventing the spread of disease. Soaps are designed to clean the skin by removing dirt, oils and germs. Antibacterial soaps contain Triclocarbon and Triclosan, for added germ killing protection.

These are important times to wash your hands.

- Before and after eating, drinking, smoking or chewing tobacco products or betel nut
- After going to the bathroom
- After changing diapers or cleaning up a child who has gone to the bathroom
- Before and after tending to someone who is sick
- After blowing your nose, coughing, or sneezing
- After touching hair, face or clothing
- After handling an animal, animal parts or animal waste
- After handling garbage, cleaning products, pesticides, fertilizers, soil
- Before and after treating a cut or wound
- Anytime hands look dirty



Proper hand washing technique created by the World Health Organization (found on the internet at http://www.wpro.who.int/sars/docs/interimguidelines/part9.asp)

Follow these steps for proper handwashing:

1. Wet hand with clean water. Use warm water if available.
2. Apply liquid, foam or bar soap. Be sure the bar soap is placed in an area or container with good drainage.
3. Wash for 20 seconds, rubbing all surfaces of your hands vigorously. If available, use a nail brush to clean under and around fingernails. The soap and scrubbing physically removes the germs on your hands.
4. Rinse well with clean water.
5. Dry hands with single-use paper towels, clean cloth towel or air dryer. Keep in mind, cloth towels can hold germs, which can be transferred to the next user.
6. If possible, use the paper towel to turn off the faucet.

Other hand hygiene options

However, if soap and clean water are not available, use an alcohol or chlorine-based product to clean your hands.

Hand sanitizers ***kill*** the germs on hands that are not visibly dirty, significantly reduce the number of germs on skin and are fast acting. When using a hand sanitizer:

- Apply 1-2 squirts of product in the palm of one hand
- Rub hands together briskly, spreading product over all surfaces of hands and fingers, around and under nails, until hands are dry.

Hand wipes can also be used to clean hands. Hand wipes ***remove*** dirt from hands. Some hand wipes may contain alcohol, Benzalkonium Chloride or Benzethonium Chloride as germ killing ingredients.

Additional resources

Handwashing resources

- Clean Hands Coalition (http://www.cleanhandscoalition.org/)
- Germ City (http://www.ctahr.hawaii.edu/NEW/GermCity/tools.html)

Microbes and foodborne pathogens

- National Institute of Allergy and Infectious Diseases –National Institute of Health (http://www.niaid.nih.gov/publications/microbes.htm#a)
- Bad Bug Book (http://www.cfsan.fda.gov/~mow/intro.html)

Creating your own hand washing station

http://www.cdc.gov/safewater/publications_pages/tippy-tap.pdf

Notes . . .