COMMUNICABLE DISEASES NOTES

1) **INTRODUCTION TO COMMUNICABLE DISEASE**

 **Communicable disease:**  is a type of disease that is spread from one person to another through a variety of ways. **Virulence:**  is a pathogen's ability to infect or damage a host. **Incubation period:**  the period between the infection of an individual by a pathogen and the manifestation of the illness or disease it causes. **Hygiene:** conditions or practices conducive to maintaining health and preventing disease, especially through cleanliness. **Susceptibility:**  is being easily affected by something. **A etiology:**  the study of the causes of a disease **Epidemiology:**  is the study and analysis of the distribution, patterns and determinants of health and disease conditions in defined populations.

**How communicable diseases spread**

How these diseases spread depends on the specific disease or infectious agent. Some ways in which communicable diseases spread are:

1. Physical contact with an infected person, such as through touch (staphylococcus), sexual intercourse (gonorrhea, HIV), fecal/oral transmission (hepatitis A), or droplets (influenza, TB)

2. Contact with a contaminated surface or object (Norwalk virus), food (salmonella, E. coli), blood (HIV, hepatitis B), or water (cholera);

3. Bites from insects or animals capable of transmitting the disease (mosquito: malaria and yellow fever; flea: plague); and

4. Travel through the air, such as tuberculosis or measles.

2) **AETIOLOGY AND EPIDEMIOLOGY OF COMMON COMMUNICABLE DISEASES**

 **CHOLERA**

 Cholera is a bacterial disease usually spread through contaminated water. NB Cholera causes severe diarrhea and dehydration. Left untreated, cholera can be fatal in a matter of hours, even in previously healthy people. Symptoms Most people exposed to the cholera bacterium (Vibrio cholerae) don't become ill and never know they've been infected. Yet because they shed cholera bacteria in their stool for seven to 14 days, they can still infect others through contaminated water. Most symptomatic cases of cholera cause mild or moderate diarrhea that's often hard to distinguish from diarrhea caused by other problems

**Symptoms of cholera include the following**

1. **Diarrhea**. Cholera-related diarrhea comes on suddenly and may quickly cause dangerous fluid loss as much as a quart (about 1 liter) an hour. Diarrhea due to cholera often has a pale, milky appearance that resembles water in which rice has been rinsed (rice-water stool). **Nausea and vomiting.** Occurring especially in the early stages of cholera, vomiting may persist for hours at a time. **Dehydration.** Dehydration can develop within hours after the onset of cholera symptoms. Depending on how many body fluids have been lost, dehydration can range from mild to severe. A loss of 10 percent or more of total body weight indicates severe dehydration.

NB. Signs and symptoms of cholera dehydration include irritability, lethargy, sunken eyes, a dry mouth, and extreme thirst, dry and shriveled skin that's slow to bounce back when pinched into a fold, little or no urine output, low blood pressure, and an irregular heartbeat (arrhythmia). Dehydration may lead to a rapid loss of minerals in individual blood (electrolytes) that maintain the balance of fluids in individual body. Hence this is called an electrolyte imbalance

**Electrolyte imbalance**

An electrolyte imbalance can lead to serious signs and symptoms such as:

• Muscle cramps. These result from the rapid loss of salts such as sodium, chloride and potassium.

• Shock. This is one of the most serious complications of dehydration. It occurs when low blood volume causes a drop in blood pressure and a drop in the amount of oxygen in your body. If untreated, severe hypovolemic shock can cause death in a matter of minutes.

**Signs and symptoms of cholera in children**

In general, children with cholera have the same signs and symptoms adults do, but they are particularly susceptible to low blood sugar (hypoglycemia) due to fluid loss, which may cause:

• An altered state of consciousness

• Seizures

• Coma

**Causes**

A bacterium called Vibrio cholerae causes cholera infection. However, the deadly effects of the disease are the result of a potent toxin called CTX that the bacterium produces in the small intestine. CTX binds to the intestinal walls, where it interferes with the normal flow of sodium and chloride. This causes the body to secrete enormous amounts of water, leading to diarrhea and a rapid loss of fluids and salts (electrolytes).

Contaminated water supplies are the main source of cholera infection, although raw shellfish, uncooked fruits and vegetables, and other foods also can harbor V. cholerae. Cholera bacteria have two distinct life cycles — one in the environment and one in humans Cholera bacteria in the environment

Cholera bacteria occur naturally in coastal waters, where they attach to tiny crustaceans called copepods. The cholera bacteria travel with their hosts, spreading worldwide as the crustaceans follow their food source — certain types of algae and plankton that grow explosively when water temperatures rise. Algae growth is further fueled by the urea found in sewage and in agricultural runoff.

**Cholera bacteria in people**

When humans ingest cholera bacteria, they may not become sick themselves, but they still pass the bacteria in their stool. When human feces contaminate food and water supplies, both can serve as ideal breeding grounds for the cholera bacteria. Because more than a million cholera bacteria — approximately the amount individual find in a glass of contaminated water — are needed to cause illness, cholera usually isn't transmitted through casual person-to-person contact.

**Common sources of cholera**

The most common sources of cholera infection are standing water and certain types of food, including seafood, raw fruits and vegetables, and grains.

• Surface or well water. Cholera bacteria can lie dormant in water for long periods, and contaminated public wells are frequent sources of large-scale cholera outbreaks. People living in crowded conditions without adequate sanitation are especially at risk of cholera.

• Seafood. Eating raw or undercooked seafood, especially shellfish that originates from certain locations can expose you to cholera bacteria. Most recent cases of cholera occurring in the United States have been traced to seafood from the Gulf of Mexico.

• Raw fruits and vegetables. Raw, unpeeled fruits and vegetables are a frequent source of cholera infection in areas where cholera is endemic. In developing nations, uncomposted manure fertilizers or irrigation water containing raw sewage can contaminate produce in the field.

• Grains. In regions where cholera is widespread, grains such as rice and millet that are contaminated after cooking and allowed to remain at room temperature for several hours become a medium for the growth of cholera bacteria.

**Risk factors for cholera**

Everyone is susceptible to cholera, with the exception of infants who derive immunity from nursing mothers who have previously had cholera. Still, certain factors can make individual more vulnerable to the disease or more likely to experience severe signs and symptoms. Risk factors for cholera include:

• Poor sanitary conditions. Cholera is more likely to flourish in situations where a sanitary environment — including a safe water supply — is difficult to maintain. Such conditions are common to refugee camps, impoverished countries, and areas devastated by famine, war or natural disasters.

• Reduced or nonexistent stomach acid (hypochlorhydria or achlorhydria). Cholera bacteria can't survive in an acidic environment, and ordinary stomach acid often serves as a first line defense against infection. But people with low levels of stomach acid — such as children, older adults, and people who take antacids, H-2 blockers or proton pump inhibitors — lack this protection, so they're at greater risk of cholera.

• Household exposure. You're at significantly increased risk of cholera if you live with someone who has the disease.

• Type O blood. For reasons that aren't entirely clear, people with type O blood are twice as likely to develop cholera compared with people with other blood types.

• Raw or undercooked shellfish. Although large-scale cholera outbreaks no longer occur in industrialized nations, eating shellfish from waters known to harbor the bacteria greatly increases your risk

**Complications**

Cholera can quickly become fatal. In the most severe cases, the rapid loss of large amounts of fluids and electrolytes can lead to death within two to three hours. In less extreme situations, people who don't receive treatment may die of dehydration and shock hours to days after cholera symptoms first appear. NB although shock and severe dehydration are the most devastating complications of cholera, other problems can occur, such as:

• **Low blood sugar (hypoglycemia**). Dangerously low levels of blood sugar (glucose) — the body's main energy source — may occur when people become too ill to eat. Children are at greatest risk of this complication, which can cause seizures, unconsciousness and even death.

• **Low potassium levels (hypokalemia).** People with cholera lose large quantities of minerals, including potassium, in their stools. Very low potassium levels interfere with heart and nerve function and are life-threatening.

• **Kidney (renal) failure.** When the kidneys lose their filtering ability, excess amounts of fluids, some electrolytes and wastes build up in your body — a potentially life-threatening condition. In people with cholera, kidney failure often accompanies shock

**Prevention**

If individual traveling to cholera-endemic areas, they are at risk of contracting the disease is extremely low if they follow the following precautions:

• **Wash hands with soap and water frequently**, especially after using the toilet and before handling food. Rub soapy, wet hands together for at least 15 seconds before rinsing. If soap and water aren't available, use an alcohol-based hand sanitizer.

• **Drink only safe water,** including bottled water or water you've boiled or disinfected yourself. Use bottled water even to brush your teeth. Hot beverages are generally safe, as are canned or bottled drinks, but wipe the outside before you open them. Avoid adding ice to your beverages unless you made it yourself using safe water.

• **Eat food that's completely cooked and hot** Avoid street vendor food, if possible. If you do buy a meal from a street vendor, make sure it's cooked in your presence and served hot.

• **Avoid sushi,** as well as raw or improperly cooked fish and seafood of any kind.

• **Stick to fruits and vegetables that you can peel yourself,** such as bananas, oranges and avocados. Stay away from salads and fruits that can't be peeled, such as grapes and berries.

• Be wary of dairy foods, including ice cream, which is often contaminated, and unpasteurized milk.

**When to see a doctor**

The risk of cholera is slight in industrialized nations, and even in endemic areas individual not likely to become infected if they follow food safety recommendations. Still, sporadic cases of cholera occur throughout the world. If individual develop severe diarrhea after visiting an area with active cholera, they need to see a doctor.

If individual have diarrhea, especially severe diarrhea, and think they may have been exposed to cholera, seek treatment right away. Severe dehydration is a medical emergency that requires immediate care regardless of the cause.

Cholera vaccine

For adults traveling to areas affected by cholera, a vaccine is now available. The Food and Drug Administration recently approved Vaxchora, a vaccine for the prevention of cholera. It is a liquid dose taken by mouth at least 10 days before travel.**NB** A few countries offer oral vaccines as well. Contact a doctor or local office of public health for more information about the vaccines. Keep in mind that no country requires immunization against cholera as a condition for entry.

1. **TYPHOID**

Typhoid fever is caused by Salmonella typhi bacteria. Typhoid fever is rare in industrialized countries. However, it remains a serious health threat in the developing world, especially for children.

Typhoid fever spreads through contaminated food and water or through close contact with someone who's infected. Signs and symptoms usually include a high fever, headache, abdominal pain, and either constipation or diarrhea. Most people with typhoid fever feel better within a few days of starting antibiotic treatment, although a small number of them may die of complications. Vaccines against typhoid fever are available, but they're only partially effective. Vaccines usually are reserved for those who may be exposed to the disease or are traveling to areas where typhoid fever is common.

**Symptoms**

Signs and symptoms are likely to develop gradually — often appearing one to three weeks after exposure to the disease.

**Early illness**

Once signs and symptoms do appear, individual likely to experience:

• Fever that starts low and increases daily, possibly reaching as high as 104.9 F (40.5 C)

• Headache

• Weakness and fatigue

• Muscle aches

• Sweating

• Dry cough

• Loss of appetite and weight loss

• Abdominal pain

• Diarrhea or constipation

• Rash

• Extremely swollen abdomen

**Later illness**

If individual don't receive treatment, they may:

• Become delirious

• Lie motionless and exhausted with your eyes half-closed in what's known as the typhoid state

**NB** In addition, life-threatening complications often develop at this time. In some people, signs and symptoms may return up to two weeks after the fever has subsided.

**Causes**

Typhoid fever is caused by virulent bacteria called Salmonella typhi. Although they're related, Salmonella typhi and the bacteria responsible for salmonellosis, another serious intestinal infection.

**Fecal-oral transmission route**

The bacteria that cause typhoid fever spread through contaminated food or water and occasionally through direct contact with someone who is infected. In developing nations, where typhoid fever is established (endemic), most cases result from contaminated drinking water and poor sanitation. The majority of people in industrialized countries pick up typhoid bacteria while traveling and spread it to others through the fecal-oral route.

This means that Salmonella typhi is passed in the feces and sometimes in the urine of infected people. You can contract the infection if you eat food handled by someone with typhoid fever who hasn't washed carefully after using the toilet. You can also become infected by drinking water contaminated with the bacteria

**Typhoid carriers**

Even after treatment with antibiotics, a small number of people who recover from typhoid fever continue to harbor the bacteria in their intestinal tracts or gallbladders, often for years. These people, called chronic carriers, shed the bacteria in their feces and are capable of infecting others, although they no longer have signs or symptoms of the disease themselves.

**Risk factors**

Typhoid fever remains a serious worldwide threat — especially in the developing world — affecting an estimated 26 million or more people each year. The disease is established (endemic) in India, Southeast Asia, Africa, South America and many other areas.

Worldwide, children are at greatest risk of getting the disease, although they generally have milder symptoms than adults do.

If individual live in a country where typhoid fever is rare, they are at increased risk if they:

• Work in or travel to areas where typhoid fever is established (endemic)

• Work as a clinical microbiologist handling Salmonella typhi bacteria

• Have close contact with someone who is infected or has recently been infected with typhoid fever

• Drink water contaminated by sewage that contains Salmonella typhi

**Complications**

Intestinal bleeding or holes

The most serious complications of typhoid fever — intestinal bleeding or holes (perforations) in the intestine — may develop in the third week of illness. A perforated intestine occurs when your small intestine or large bowel develops a hole, causing intestinal contents to leak into your abdominal cavity and triggering signs and symptoms such as severe abdominal pain, nausea, vomiting and bloodstream infection (sepsis). This life-threatening complication requires immediate medical care.

Other, less common complications

Other possible complications include:

• Inflammation of the heart muscle (myocarditis)

• Inflammation of the lining of the heart and valves (endocarditis)

• Pneumonia

• Inflammation of the pancreas (pancreatitis)

• Kidney or bladder infections

• Infection and inflammation of the membranes and fluid surrounding your brain and spinal cord (meningitis)

• Psychiatric problems, such as delirium, hallucinations and paranoid psychosis

NB With prompt treatment, nearly all people in industrialized nations recover from typhoid fever. Without treatment, some people may not survive complications of the disease.

**Prevention**

In many developing nations, the public health goals that can help prevent and control typhoid fever — safe drinking water, improved sanitation and adequate medical care — may be difficult to achieve. For these reason, some experts believe that vaccinating high-risk populations is the best way to control typhoid fever. A vaccine is recommended if you live in or you're traveling to areas where the risk of getting typhoid fever is high.

**Vaccines**

Two vaccines are available.

• One is injected in a single dose at least one week before travel.

• One is given orally in four capsules, with one capsule to be taken every other day.

**NB** Neither vaccine is 100 percent effective, nor do both require repeat immunizations, as vaccine effectiveness diminishes over time.Because the vaccine won't provide complete protection, follow the following guidelines when traveling to high-risk areas:

• Wash your hands. Frequent hand-washing in hot, soapy water is the best way to control infection. Wash before eating or preparing food and after using the toilet. Carry an alcohol-based hand sanitizer for times when water isn't available.

• Avoid drinking untreated water. Contaminated drinking water is a particular problem in areas where typhoid fever is endemic. For that reason, drink only bottled water or canned or bottled carbonated beverages, wine and beer. Carbonated bottled water is safer than uncarbonated bottled water is. Ask for drinks without ice. Use bottled water to brush your teeth, and try not to swallow water in the shower.

• Avoid raw fruits and vegetables. Because raw produce may have been washed in unsafe water, avoid fruits and vegetables that you can't peel, especially lettuce. To be absolutely safe, you may want to avoid raw foods entirely.

• Choose hot foods. Avoid food that's stored or served at room temperature. Steaming hot foods are best. And although there's no guarantee that meals served at the finest restaurants are safe, it's best to avoid food from street vendors — it's more likely to be contaminated.

**Prevent infecting others**

If individual recovering from typhoid fever, these measures can help keep others safe:

• Take antibiotics. Follow your doctor's instructions for taking your antibiotics, and be sure to finish the entire prescription.

• Wash your hands often. This is the single most important thing you can do to keep from spreading the infection to others. Use hot, soapy water and scrub thoroughly for at least 30 seconds, especially before eating and after using the toilet.

• Avoid handling food. Avoid preparing food for others until your doctor says you're no longer contagious. If you work in the food service industry or a health care facility, you won't be allowed to return to work until tests show that you're no longer shedding typhoid bacteria.

When to see a doctor

• See a doctor immediately if you suspect you have typhoid fever. Find out in advance about medical care in the areas you are to visit.

• If you develop signs and symptoms after you return home, consider consulting a doctor who focuses on international travel medicine or infectious diseases. A specialist may be able to recognize and treat your illness more quickly than can a doctor who isn't familiar with these areas

1. **DYSENTERY**

Dysentery is an intestinal infection that causes severe diarrhea with blood. NB In some cases, mucus may be found in the stool. This usually lasts for 3 to 7 days

**Symptoms**

Signs and symptoms associated with diarrhea may include:

• Loose, watery stools

• Abdominal cramps

• Abdominal pain

• Fever

• Blood in the stool

• Mucus in the stool

• Bloating

• Nausea

• Urgent need to have a bowel movement

**Causes**

A number of diseases and conditions can cause diarrhea, including

 • **Viruses.** Viruses that can cause diarrhea include Norwalk virus, cytomegalovirus and viral hepatitis. Rotavirus is a common cause of acute childhood diarrhea.

• **Bacteria and parasites**. Contaminated food or water can transmit bacteria and parasites to your body. When traveling in developing countries, diarrhea caused by bacteria and parasites is often called traveler's diarrhea. Clostridium difficile is another type of bacteria that can cause serious infections that cause diarrhea, and it can occur after a course of antibiotics or during a hospitalization.

• **Medications.** Many medications, such as antibiotics, can cause diarrhea. Antibiotics destroy both good and bad bacteria, which can disturb the natural balance of bacteria in your intestines. Other drugs that cause diarrhea are cancer drugs and antacids with magnesium.

• **Lactose intolerance.** Lactose is a sugar found in milk and other dairy products. People who have difficulty digesting lactose have diarrhea after eating dairy products. Lactose intolerance can increase with age because levels of the enzyme that helps digest lactose drop after childhood.

• **Fructose.** Fructose is a sugar found naturally in fruits and honey. It's sometimes added as a sweetener to certain beverages. In people who have trouble digesting fructose, it can lead to diarrhea.

• **Artificial sweeteners**. Sorbitol is artificial sweeteners found in chewing gum and other sugar-free products — can cause diarrhea in some otherwise healthy people.

• **Surgery.** Abdominal or gallbladder removal surgeries can sometimes cause diarrhea.

• Other digestive disorders. Chronic diarrhea has a number of other causes, such as Crohn's disease, ulcerative colitis, celiac disease, microscopic colitis and irritable bowel syndrome.

**Complications**

Diarrhea can cause dehydration, which can be life-threatening if untreated. Dehydration is particularly dangerous in children, older adults and those with weakened immune systems.

If individual have signs of serious dehydration, seek medical help.

Indications of dehydration in adults

These include:

• Excessive thirst

• Dry mouth or skin

• Little or no urination

• Weakness, dizziness or lightheadedness

• Fatigue

• Dark-colored urine

Indications of dehydration in infants and young children

These include:

• Not having a wet diaper in three or more hours

• Dry mouth and tongue

• Fever above 102 F (39 C)

• Crying without tears

• Drowsiness, unresponsiveness or irritability

• Sunken appearance to the abdomen, eyes or cheeks

**Prevention**

Preventing viral diarrhea

Wash your hands to prevent the spread of viral diarrhea. To ensure adequate hand-washing:

• Wash frequently. Wash your hands before and after preparing food. Wash your hands after handling uncooked meat, using the toilet, changing diapers, sneezing, coughing and blowing your nose.

• Lather with soap for at least 20 seconds. After putting soap on your hands, rub your hands together for at least 20 seconds.

• Use hand sanitizer when washing isn't possible. Use an alcohol-based hand sanitizer when you can't get to a sink. Apply the hand sanitizer as you would hand lotion, making sure to cover the fronts and backs of both hands. Use a product that contains at least 60 percent alcohol

**Vaccination**

Individual can help protect infant from rotavirus, the most common cause of viral diarrhea in children, with one of two approved vaccines. Ask baby's doctor about having the baby vaccinated.

**Preventing traveler's diarrhea**

Diarrhea commonly affects people who travel to countries where there's inadequate sanitation and contaminated food. To reduce the risk:

• Watch what you eat. Eat hot, well-cooked foods. Avoid raw fruits and vegetables unless you can peel them yourself. Also avoid raw or undercooked meats and dairy foods.

• Watch what you drink. Drink bottled water, soda, beer or wine served in its original container. Avoid tap water and ice cubes. Use bottled water even for brushing your teeth. Keep your mouth closed while you shower.

Beverages made with boiled water, such as coffee and tea, are probably safe. Remember that alcohol and caffeine can aggravate diarrhea and worsen dehydration.

• Ask the doctor about antibiotics. If you're traveling to a developing country for an extended time, ask your doctor about antibiotics before you go, especially if you have a weakened immune system.

• Check for travel warnings. The Centers for Disease Control and Prevention maintains a travelers' health website where disease warnings are posted for various countries. If you're planning to travel outside of the United States, check there for warnings and tips for reducing your risk.

**When to see a doctor**

If you're an adult, see your doctor if:

• Your diarrhea persists beyond a few days

• You become dehydrated

• You have severe abdominal or rectal pain

• You have bloody or black stools

• You have a fever above 102 F (39 C)

In children, particularly young children, diarrhea can quickly lead to dehydration. Call the doctor if a child's diarrhea doesn't improve within 24 hours or if the baby:

• Becomes dehydrated

• Has a fever above 102 F (39 C)

• Has bloody or black stools

**HELMINTHIASIS**

Helminthiasis is any macro parasitic disease of humans and animals in which a part of the body is infected with parasitic worms, called helminthes. These parasites are broadly classified into tapeworms, flukes, and roundworms. They often live in the gastrointestinal tract of their hosts, but may also burrow into other organs, where they induce physiological damages. They remain the major cause of wildlife diseases and economic crisis in livestock industry, and human socio-economic problems in developing countries

**Tapeworm** Is an infection which is caused by ingesting food or water contaminated with tapeworm eggs or larvae. If individual ingest certain tapeworm eggs, they can migrate outside the body intestines and form larval cysts in body tissues and organs (invasive infection). If individual ingest tapeworm larvae, however, they develop into adult tapeworms in the intestines (intestinal infection).

An adult tapeworm consists of a head, neck and chain of segments called proglottids. When you have an intestinal tapeworm infection, the tapeworm head adheres to the intestinal wall, and the proglottids grow and produce eggs. Adult tapeworms can live for up to 30 years in a host.

**NB**. Intestinal tapeworm infections are usually mild, with only one or two adult tapeworms. But invasive larval infections can cause serious complications

**Symptoms**

Many people with intestinal tapeworm infection don't have symptoms. If individual do have problems from the infection, the symptoms will depend on the type of tapeworm they have and its location. Invasive tapeworm infection symptoms vary depending on where the larvae have migrated.

**Intestinal infection**

Signs and symptoms of intestinal infection include:

1. Nausea
2. Weakness
3. Loss of appetite
4. Abdominal pain
5. Diarrhea
6. Dizziness
7. Salt craving
8. Weight loss and inadequate absorption of nutrients from food

 **Invasive infection**

If tapeworm larvae have migrated out of your intestines and formed cysts in other tissues, they can eventually cause organ and tissue damage, resulting in:

* Headaches
* Cystic masses or lumps
* Allergic reactions to the larvae
* Neurological signs and symptoms, including seizures

**Causes**

A tapeworm infection starts after ingestion of tapeworm eggs or larvae.

**Ingestion of eggs**. If you eat food or drink water contaminated with feces from a person or animal with tapeworm, you ingest microscopic tapeworm eggs. For example, a pig infected with tapeworm will pass tapeworm eggs in its feces, which gets into the soil. If this same soil comes in contact with a food or water source, it becomes contaminated. You can then be infected when you eat or drink something from the contaminated source.

**NB**. Once inside your intestines, the eggs develop into larvae. At this stage, the larvae become mobile. If they migrate out of your intestines, they form cysts in other tissues, such as your lungs, central nervous system or liver.

**Ingestion of larvae cysts in meat or muscle tissue.** When an animal has a tapeworm infection, it has tapeworm larvae in its muscle tissue. If you eat raw or undercooked meat from an infected animal, you ingest the larvae, which then develop into adult tapeworms in your intestines.

**NB.** Adult tapeworms can measure more than 80 feet (25 meters) long and can survive as long as 30 years in a host. Some tapeworms attach themselves to the walls of the intestines, where they cause irritation or mild inflammation, while others may pass through to your stool and exit your body

**Risk factors**

Factors that may put you at greater risk of tapeworm infection include:

1. **Poor hygiene.** Infrequent washing and bathing increases the risk of accidental transfer of contaminated matter to your mouth.
2. **Exposure to livestock.** This is especially problematic in areas where human and animal feces are not disposed of properly.
3. **Traveling to developing countries**. Infection occurs more frequently in areas with poor sanitation practices.
4. **Eating raw or undercooked meats.** Improper cooking may fail to kill tapeworm eggs and larvae contained in contaminated pork or beef.
5. **Living in endemic areas.** In certain parts of the world, exposure to tapeworm eggs is more likely. For instance, individual risk of coming into contact with eggs of the pork tapeworm is greater in areas of Latin America, China, sub-Saharan Africa or Southeast Asia where free-range pigs may be more common.

**Complications**

Intestinal tapeworm infections usually don't cause complications. If complications do occur, they may include:

* Digestive blockage. If tapeworms grow large enough, they can block individual appendix, leading to infection (appendicitis); your bile ducts, which carry bile from your liver and gallbladder to your intestine; or your pancreatic duct, which carries digestive fluids from your pancreas to your intestine.
* Brain and central nervous system impairment. This especially dangerous complication of invasive pork tapeworm infection can result in headaches and visual impairment, as well as seizures, meningitis, hydrocephalus or dementia. Death can occur in severe cases of infection.
* Organ function disruption. When larvae migrate to the liver, lungs or other organs, they become cysts. Over time, these cysts grow, sometimes large enough to crowd the functioning parts of the organ or reduce its blood supply. Tapeworm cysts sometimes rupture, releasing more larvae, which can move to other organs and form additional cysts.

**NB**. A ruptured or leaking cyst can cause an allergy-like reaction, with itching, hives, swelling and difficulty breathing. Surgery or organ transplantation may be needed in severe cases.

**Prevention**

To prevent tapeworm infection:

* Wash your hands with soap and water before eating or handling food and after using the toilet.
* When traveling in areas where tapeworm is more common, wash and cook all fruits and vegetables with safe water before eating. If water might not be safe, be sure to boil it for at least a minute and then let it cool off before using it.
* Eliminate livestock exposure to tapeworm eggs by properly disposing of animal and human feces.
* Thoroughly cook meat at temperatures of at least 145 F (63 C) to kill tapeworm eggs or larvae.
* Freeze meat for as long as seven to 10 days and fish for at least 24 hours in a freezer with a temperature of -31 F (-35C) to kill tapeworm eggs and larvae.
* Avoid eating raw or undercooked pork, beef and fish.
* Promptly treat dogs infected with tapeworm