

# Human Parasites in Relation to Contaminated Food and Drinking Water

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## ABSTRACT

The parasites are organisms that derive the nourishment and protection from other living organisms known as hosts. They may be transmitted from animals to humans, from humans to humans, or from humans to animals. Several parasites have emerged as significant causes of foodborne diseases. The Parasites live and reproduce within the tissues and organs of infected human and animal hosts, and are often excreted in feces. These parasites are transmitted from one host to another by different ways. They may be transmitted from host to host through consumption of contaminated food and drinking water, or by putting things into human mouth that has touched with the stool of an infected person or animal. The parasites are of different types and range in size from tiny, single-celled, microscopic parasites are protozoa to larger, multi-cellular worms are helminthes that may be seen without a microscope. The size ranges from one to two  $\mu\text{m}$  or micrometers to two meters or more long.

**Keywords:** Protozoa, Humans, Parasites, Host, Contaminated Food, Drinking Water

## Introduction

The Humans parasites includes the *Giardia duodenalis* or intestinalis, the *Cryptosporidium parvum*, the *Cyclospora cayetanensis*, the *Toxoplasma gondii*, the *Trichinella spiralis*, the *Taenia saginata*, the *Taenia solium* (Tapeworms). Some common parasites are *Giardia duodenalis*, *Cryptosporidium parvum*, *Cyclospora cayetanensis*, *Toxoplasma gondii*, *Trichinella spiralis*, *Taenia saginata* (beef tapeworm), and *Taenia solium* (pork tapeworm). The *Giardia duodenalis* protozoa, the cause of human giardiasis, is a one-celled, microscopic parasite that can live in the intestines of animals and people [1-6]. The *Giardia duodenalis* protozoa is found in every region throughout the world and has become recognized as one of the most common causes of waterborne and occasionally foodborne diseases [7-12].

## The Giardia Protozoa in Humans

People get giardiasis by the following ways, as the Giardiasis is frequently associated with drinking contaminated water, but some people might get infected by consuming the uncooked meat also contaminated with The *Giardia duodenalis* protozoa cysts, the infective stage of the organism. By putting things into mouth that has touched contaminated surfaces or the stool of human or animal with giardiasis [13-18].

## The Clinical Signs of Human Giardiasis

In the humans causes Diarrhea, abdominal cramps, gas, and nausea are the most common clinical signs. Chronic infection

might lead to dehydration and severe weight loss. Some cases may be without clinical signs. The clinical signs will usually appear one to two weeks after ingestion of a *Giardia duodenalis* protozoa cyst. They may last two to six weeks in otherwise healthy [19-25].

## The Humans at Risk for Contracting Giardiasis

Those at risk include Day care providers and children attending daycare centers; International travelers or traveler's diarrhea; Hikers, campers, or persons who may drink from the untreated or contaminated water supplies, including while swimming in lakes or rivers; and the Young children, the pregnant women, older adults, and the persons with weakened immune systems, including those with HIV/AIDS infection, cancer, diabetes, kidney disease, and the transplant patients, or those individuals undergoing chemotherapy [26-32].

## The Methods of Human Giardiasis Prevention

You must wash your hands before handling foods and consumption, and after you going to the bathroom, changing diapers, and handling animals. Make sure infected individuals wash their hands frequently to reduce the spread of infection. Drink water only from treated municipal water supplies. When hiking, camping, or traveling to the countries in the world where the water supply may be unsafe to drink, either avoid drinking the water or boil it for one minute to kill the *Giardia duodenalis* parasite. The Drinking bottled beverages may be a safe alternative. Avoid swallowing the drinking water while swimming. You must not swim in the community pools if child has giardiasis. Always cook food to a safe internal temperature.

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You must drink the pasteurized milk, the juices, or the cider. Peoples must wash, peel, or cook the raw fruits and the vegetables before consumption. Do not use the untreated manure to fertilize the fruits and the vegetables. Watering the untreated manure may spread the *Giardia duodenalis* organism [39-45].

### **The Cryptosporidium Parvum in Humans**

The *Cryptosporidium parvum* protozoa, cause of the disease cryptosporidiosis (KRIP-toe-spo-RID-e-O-sis) also called “Crypto”, is a one-celled, microscopic shelled parasite and a significant cause of waterborne and foodborne diseases worldwide. The *Cryptosporidium parvum* protozoa are found in the intestines of several herd animals including cows, sheep, goats, deer, and elk. The diseases could be intestinal, tracheal, or pulmonary affections [46-51].

### **The Humans get Cryptosporidiosis**

The *Cryptosporidium parvum* protozoa may be found in soil, food, drinking water or surfaces that have been contaminated with feces from infected humans or animals. The Peoples get cryptosporidiosis by consuming food or drinking water contaminated with The *Cryptosporidium parvum* protozoa oocysts the infective stage of the parasite. The *Cryptosporidium parvum* protozoa oocysts are the environmentally resistant stage of the organism and are shed in the feces of a host, I. e. human or animal. By putting anything into the mouth that has touched the stool of a person or animal with the cryptosporidiosis. The clinical signs of the human intestinal cryptosporidiosis. The clinical signs include watery diarrhea, stomach cramps, upset stomach, and slight fever. Some cases may be without clinical signs. The human clinical signs appear two to ten days after ingestion of *Cryptosporidium parvum* oocysts. The diseases usually goes away without medical treatment in three to four days [58-63].

### **The Humans Contracting Cryptosporidiosis**

Those at risk include: The day care providers and the children attending daycare centers; The young children, the pregnant women, older adults, and the persons with weakened immune systems, including those humans with HIV/AIDS infection, cancer, diabetes, kidney disease, and the transplant patients, or those individuals undergoing chemotherapy treatment. International travelers known as traveler’s diarrhea; and Hikers, campers, or the persons who may drink from untreated water supplies [5-12].

### **The Methods of Humans Cryptosporidiosis Prevention**

Wash The hands before handling foods and consumption, and after going to the bathroom, changing diapers, and handling animals. Drink water only from treated municipal water supplies. When hiking, camping, or traveling to countries in the world where the water supply may be unsafe to drink, either avoid drinking the water or boil it for one minute to kill the parasite. Drinking the bottled beverages can be a safe alternative. Avoid swallowing water while swimming. Avoid swimming in community swimming pools if the child has cryptosporidiosis. Drink only the pasteurized milk, juices, or cider. Wash, peel, or cook the raw fruits and vegetables before consumption. Avoid using the untreated manure to fertilize fruits and vegetables. Watering the untreated manure may spread the organism [21-27].

### **The Toxoplasma Gondii in Humans**

The *Toxoplasma gondii* protozoa, cause of toxoplasmosis (TOX-o-plaz-MO-sis), is a single-celled, microscopic parasite found throughout the world. *Toxoplasma gondii* protozoon is the third leading cause of death from foodborne disease. The *Toxoplasma gondii* protozoa may only carry out their reproductive cycle within members of the cat family. In this parasite-host relationship, the cat is the definitive host. The infective stage (oocyst) develops in the gut of the cat. The oocysts of *Toxoplasma gondii* protozoa are then shed into the environment with the cat feces [30-36].

### **The Humans Can Get Toxoplasmosis**

The Peoples get toxoplasmosis the following ways, by consuming foods, such as raw or undercooked meat, especially pork, lamb, or wild game or drinking untreated water as from rivers or ponds that may contain the *Toxoplasma gondii* protozoa parasite. The fecal-oral: Touching the hands to the mouth after gardening, handling the cats, cleaning a cat’s litter box, or anything that has come into contact with the cat feces. The pregnant women-to-fetus as if women are pregnant when first infected with *Toxoplasma gondii*. Through the organ transplants or the blood transfusions, although these modes are rare [41-47].

### **The Clinical Signs of Human Toxoplasmosis**

The human Toxoplasmosis is relatively harmless to most people, although some may develop “flu-like” clinical signs such as swollen lymph glands and/or muscle aches and pains. In otherwise healthy individuals, the human toxoplasmosis is usually mild and goes away without medical treatment. The dormant non-infective *Toxoplasma gondii* protozoa parasites may remain in the infected individual for the life. An unborn child may contract the *Toxoplasma gondii* protozoa parasite congenitally resulting in severe outcomes including miscarriage or stillbirth. The persons with weakened immune systems such as those with HIV/AIDS infection, organ transplant recipients, the individuals undergoing chemotherapy, and infants may develop severe toxoplasmosis. The severe human toxoplasmosis may result in damage to the eyes or brain. The infants becoming infected before birth may be born retarded or with other mental or physical problems [52-57].

### **The Incubation Period of Human Toxoplasmosis**

The time that of human toxoplasmosis clinical signs appear varies, but generally human toxoplasmosis clinical signs will appear one week to one month after consuming the *Toxoplasma gondii* protozoa parasite. The infants infected while still in the womb may show no clinical signs at birth, but develop clinical signs of toxoplasmosis later in the life. The duration of the human toxoplasmosis depends on the health and the immune status of the host. The persons with the weakened immune systems may experience toxoplasmosis of long duration, The possibly resulting in death [33-38].

### **The Humans at Risk for Contracting Severe Toxoplasmosis**

The humans at risk include, those persons with weakened immune systems including those with HIV/AIDS infection, the organ transplant recipients, or those individuals undergoing chemotherapy. The infants born to women are who become infected with *Toxoplasma gondii* shortly before becoming pregnant or during the pregnancy. Those women’s exposed to *Toxoplasma gondii* longer than six months before becoming pregnant rarely transmit toxoplasmosis to their infants [57-63].

### The Methods of Human Toxoplasmosis Prevention

If the women's are pregnant or planning to become pregnant, or if the pregnant women have a weakened immune system, the pregnant women should discuss the women risk of contracting toxoplasmosis with the health care provider. The wear clean latex gloves when handling the raw meat, or have someone who is healthy, and is not pregnant, handle the meat for the women. Cook all raw beef, pork, lamb and veal steaks, chops, and roasts to a minimum internal temperature of 145 °F as measured with a food thermometer before removing meat from the heat source. For the meat safety and quality, allow the meat to rest for at least three minutes before the carving or the consuming. For reasons of personal preference, the consumers may choose to cook the meat to higher temperatures. Cook all raw ground beef, pork, lamb, and veal to an internal temperature of 160 °F as measured with a food thermometer. Cook all poultry to a safe minimum internal temperature of 165 °F as measured with a food thermometer [44-51].

### Taenia saginata/Taenia solium (Tapeworms)

The *Taenia saginata* or beef tapeworm and *Taenia solium* or pork tapeworm are parasitic worms or helminthes. The human taeniasis is the name of the intestinal infection caused by the adult-stage tapeworms called beef or pork tapeworms. The Cysticercosis is the name of the tissue, other than intestinal infection caused by the larval-stage of the pork tapeworm only. The humans are the definitive hosts of both parasites. This means that the reproductive cycle, and thus eggs production by the parasites, occurs only within humans. The parasite eggs are passed in the human feces and they may be shed into the environment for as long as the worms remain in the intestines for as long as thirty years [55-61]. In addition, the parasite eggs may remain viable in the environment for several months. These diseases are more prevalent in the underdeveloped countries in the world where good sanitation practices may be substandard and in the world areas where the pork and the beef are consumed the raw or undercooked. They are relatively uncommon in some countries in the world, although travelers and immigrants are occasionally infected. The Humans get Taeniasis, the Peoples get Taeniasis by consuming the raw or undercooked infected beef or pork. [57-63].

### The Clinical Signs of Humans Taeniasis

The Most cases of infection with adult worms are without clinical signs. Some persons may experience abdominal pain, weight loss, digestive disturbances, and possible intestinal obstruction. Irritation of the peri-anal region may occur, caused by the worms or the worm segments exiting the anus of the infected persons. The *Taenia saginata* or beef tapeworm infections appear within ten to fourteen weeks. The *Taenia solium* or pork tapeworm infections appear within eight to twelve weeks [41-46]. The human taeniasis may be lasts several years without the medical treatment. The Humans at risk for contracting taeniasis are anyone consuming the infected beef or pork either raw or undercooked. The persons with the weakened immune systems including those with HIV/AIDS infection, the organ transplant recipients, or those individuals undergoing chemotherapy may be at a greater risk for the infection [50-56].

### The Methods of Humans Taeniasis Prevention

You must cook the raw beef and pork steaks, chops, and the roasts to a minimum internal temperature of 145 °F as measured

with a food thermometer before removing the meat from the heat source. For the meat safety and the meat quality, allow the meat to rest for at least three minutes before carving or consuming of the meat. For reasons of the personal preference, the consumers may choose to cook the meat to higher temperatures [55-61].

### Conclusion

Improving the meat inspection and prevention of food animal's infection at the abattoir. Treatment of infected persons and using of modern method as ELISA for diagnosis of infected animals. Vaccination of animals against parasites and thorough cooking of meat.

### Conflicts of Interest

The author declare no conflicts of interest

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