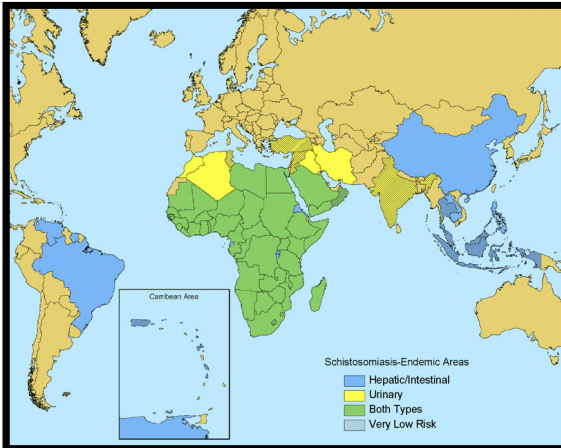




Just the Facts...

Schistosomiasis

Schistosomiasis, also referred to as Bilharzia, Bilharziasis and Snail Fever, is a parasitic disease that affects over 200 million people worldwide, resulting in 15,000 deaths annually. It was named after Dr. Theodor Bilharz, a German physician who first described the parasites which cause the disease in 1851. Parasitic flatworms (blood flukes) of the genus *Schistosoma* and their eggs are the cause of illness. Humans become infected when they come in contact with water sources, mainly freshwater, in which snails carrying larval schistosomes are living. The best prevention is to avoid areas of freshwater in endemic countries and to drink water that has either been boiled or filtered.



Distribution. Urinary Schistosomiasis is found mainly in Africa and the Middle East. Intestinal or Hepatic Schistosomiasis is more widespread and occurs in the Caribbean, South America, Africa, the Middle East, Southeastern Asia and Malaysia.

including China, East Asia, the Philippines and Malaysia. *S. mansoni* is found in Africa, the Caribbean, and South America and *S. mekongi* can be found in Laos and Cambodia. Swimmer's Itch, a non-disease form of schistosomiasis in humans, is marked by a short-lived, itchy rash. It is caused by certain other species of schistosomes that are found in both fresh and saltwater areas worldwide. In the United States, Swimmer's Itch is common along the Atlantic, Gulf, and Pacific coasts and in the lakes of northern Michigan, Wisconsin and Minnesota.

Q. How do you get schistosomiasis?

A. The most common way of getting schistosomiasis is by skin contact with infested waters in which snails carrying larval schistosomes are living. Freshwater snails in the genera *Biomphalaria*, *Bulinus*, *Oncomelania* and *Tricula* are the intermediate hosts for the larval schistosomes. Larvae develop into adults inside mammals. Humans are the primary host for *S. haematobium*, *S. intercalatum* and *S. mansoni*. Cattle, water buffalos, pigs, dogs, cats and wild rodents are normally hosts for *S. japonicum*. Dogs serve as the primary hosts for *S. mekongi*. Birds and aquatic mammals like muskrats and beavers are the primary hosts for the schistosomes that cause Swimmer's Itch.

Q. What are schistosomes and how do they cause schistosomiasis?

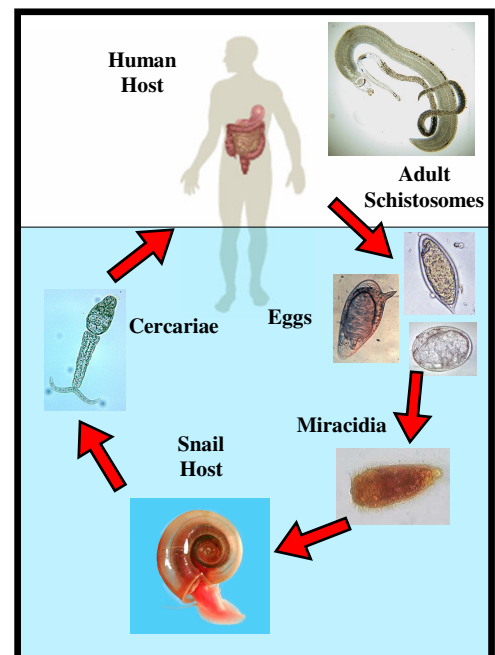
A. Schistosomes, blood flukes and trematode flatworms are all names that refer to the parasites of the genus *Schistosoma* that are found infesting humans. Infection occurs when free-swimming larvae, called cercariae, penetrate human skin. After skin penetration, the larvae transform and are carried by the blood to the veins surrounding the lungs, liver, intestines or the bladder where they mature into adult schistosomes. Adults mate and produce spiny eggs that can become lodged in veins and tissues causing organ damage and chronic illness. Infected humans excrete eggs into fresh water, through feces or urine. Once in the water, the eggs hatch releasing a different type of larvae, called miracidia, which infect aquatic snails. The miracidia go through a transformation inside the snails into cercariae, which swim out into freshwater to infect humans and start the cycle over. Larval schistosomes that penetrate the skin to cause Swimmer's Itch die once they get underneath the skin and do not mature into adults.

Q. What is schistosomiasis?

A. Schistosomiasis is a parasitic disease that is widespread among the poor populations in less developed countries. Infection is predominant in endemic countries in school age children, fishermen, farmers, irrigation workers and others using infested water for their domestic or recreational purposes. Adult schistosomes live in a mammal or human host using freshwater snails as intermediate hosts. The schistosomes develop into adults in the blood vessels surrounding the urinary or intestinal tracts. Adults release eggs which can circulate and become lodged in the veins and other organs causing painful inflammation and chronic illness.

Q. Where is schistosomiasis found?

A. Schistosomiasis affects over 200 million people around the world, with more than 80% of infected people living in sub-Saharan Africa. Urinary schistosomiasis, caused primarily by *Schistosoma haematobium*, is found throughout Africa and the Middle East. Four species of schistosomes cause Intestinal schistosomiasis. *S. intercalatum* is confined to the countries within the rainforest belt of Africa. *S. japonicum* is restricted to the Pacific region



Life Cycle. Infection occurs when free-swimming larvae, called cercariae, penetrate the skin. It takes about a month for the larvae to develop into adult schistosomes and release eggs into the body. The eggs may become lodged in body tissues causing damage and inflammation. Eggs are released into freshwater through urine or feces. The eggs hatch immediately into another larval stage of the parasite, called miracidia, which infect fresh water snails. The miracidia remain in the snails for about six weeks before they change into infectious cercariae.



Signs. Individuals may develop itchy skin or a rash within 48 hours after coming in contact with infested waters, indicating where larval schistosome parasites, cercariae, have penetrated the skin.

Q. What are the signs and symptoms of schistosomiasis?

A. Within hours after coming in contact with infested waters, you may develop acute signs and symptoms such as itchy skin or a rash where larval forms of the parasites, cercariae, have penetrated. Fever, chills, cough, fatigue and muscle aches can begin within 1-2 months of infection, known as Katayama Fever, when adult schistosomes begin releasing eggs into the body. Some individuals may not exhibit symptoms at this early phase of infection, which means the disease can progress untreated to the development of late and potentially life threatening chronic stages. There are two main types of chronic infection:

- **Urinary Schistosomiasis** (infection with *S. haematobium*) causes damage to various tissues, particularly the bladder and liver. Adult schistosomes live around the blood vessels of the bladder and release eggs that can become lodged in these tissues thereby causing pain and inflammation. Urination becomes painful and is accompanied by progressive damage to the kidneys which may result in blood in the urine. Cancer of the bladder is common in advanced cases.

- **Intestinal (Hepatic) Schistosomiasis** (infection with *S. intercalatum*, *S. japonicum*, *S. mansoni*, *S. mekongi*) causes damage and enlargement to the liver, spleen and intestine. The adult schistosomes reside in the blood vessels lining the intestine and release eggs that can become lodged in the veins and the walls of the intestine. Lesions can form and hypertension of the abdominal blood vessels may occur. Bleeding from these vessels leads to blood in stools and can be fatal, especially in children.

Q. What should I do if I think I have schistosomiasis?

A. Contact your local preventive medicine personnel or your primary care physician about getting tested. A confirmed case is the microscopic identification of eggs in stool or urine.

Q. How is schistosomiasis treated?

A. Schistosomiasis is readily treated using the drug praziquantel. Praziquantel is safe and highly effective in curing an infected patient, but does not prevent re-infection and is thus not an optimum treatment for people living in endemic areas. Currently, there are no vaccines available for schistosomiasis.

Q. What are the long term control solutions for schistosomiasis?

A. Chemical control of snails is generally expensive and difficult to sustain. Limiting human contact with infested waters, practicing proper sewage sanitation and incorporating proper environmental designs to prevent the establishment of snail vectors offers long-term control of schistosomiasis.

Q. What can I do to prevent myself from getting schistosomiasis?

- A. Schistosomiasis can be prevented by following these precautions when traveling through countries where the disease occurs:
- Consider all waters found in endemic areas as suspect and avoid them.
 - Wear personal protection for the extremities, like waterproof boots and gloves if you have to enter aquatic habitats in endemic areas. The use of sunscreens or insect repellents will not prevent the infective free-swimming larvae from penetrating human skin.
 - Drink safe water. Because there is no way to make sure that water coming directly from canals, lakes, rivers, streams or springs is safe, you should either boil or filter water before drinking it. Boiling water for at least a minute is recommended and will kill any harmful parasites, bacteria, or viruses present. Iodine treatment alone will not guarantee that water is safe and free of all parasites.
 - Water for bathing, showering and washing clothes should be heated for 5 minutes at 150° F, treated with chlorine, or held in a storage tank for 48-72 hours before use.



Snail Habitat. Snails that harbor larval schistosomes can be found in a variety of aquatic habitats in endemic areas. Avoid entering these habitats as much as possible. Use personal protection like waterproof boots and gloves if you have to enter these areas.

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