

Schistosomiasis

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Introduction

Schistosomiasis, or bilharzia, is caused by worms (termed flukes) that have a complex life cycle involving freshwater snails as hosts. Several species exist, of which the most prevalent are *S. mansoni*, *S. japonicum*, and *S. haematobium*. Schistosomiasis is present world-wide, but occurs most frequently in sub-Saharan Africa, Brazil, southern China, and the Philippines.

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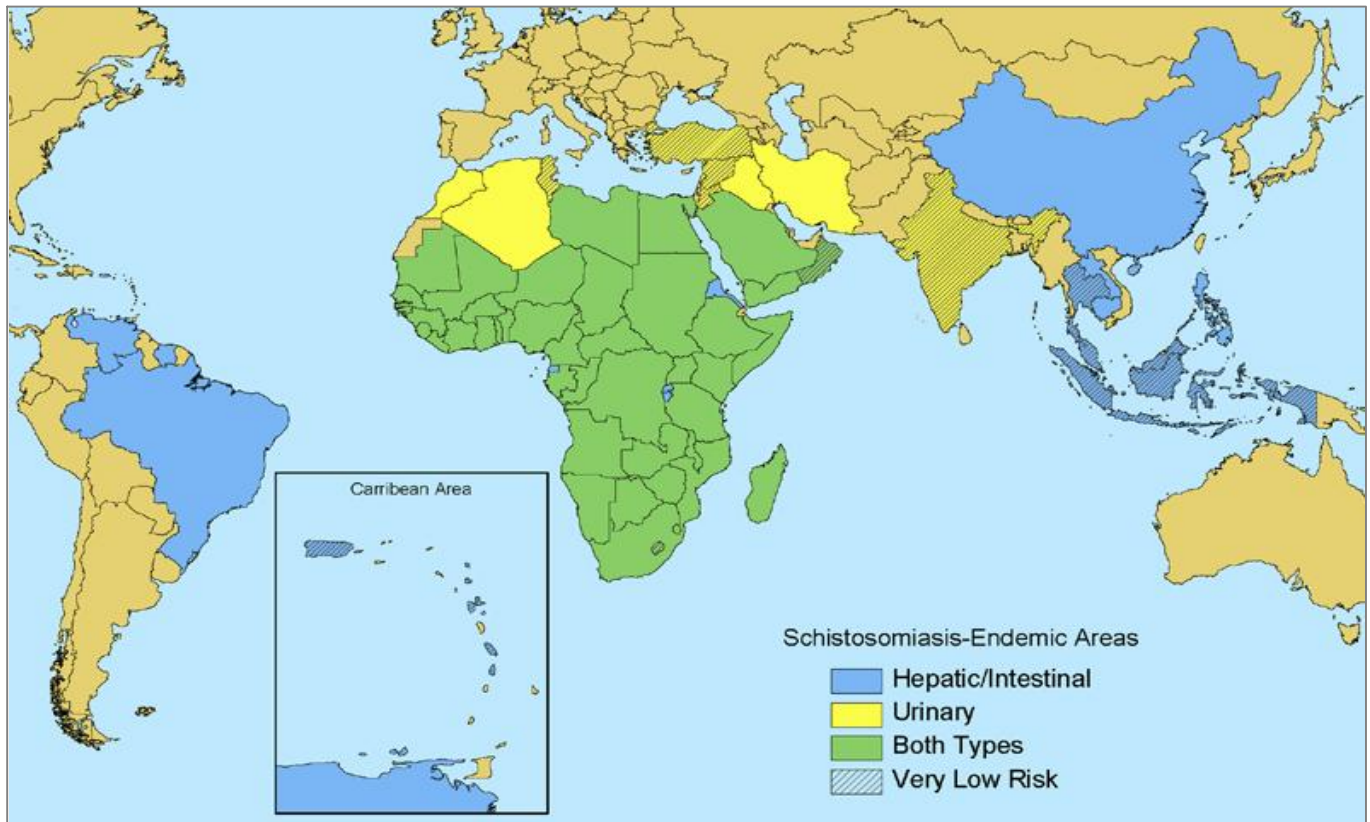
Epidemiology

Global epidemiology

Schistosomiasis is one of the most widespread of all parasitic infections of man. The World Health Organization (WHO) estimated that schistosomiasis and soil transmitted helminths represent more than 40% of the global disease burden caused by all tropical diseases, excluding malaria [1].

Schistosomiasis is the most common parasite transmitted through contact with fresh water. It is endemic in more than 70 low income countries where it occurs in rural areas and the fringes of cities. Over 650 million people globally are at risk of infection, with more than 200 million people infected. Of these, 120 million are estimated to have symptoms, with 20 million people experiencing serious consequences. The economic effects and health implications of schistosomiasis are extensive. Higher disease rates occur in children [2] with infection frequently found in those under 14 years in many risk areas [3].

Figure 1: Global distribution of schistosomiasis (Map courtesy of US Centers for Disease Control and Prevention [8])



S. mansoni, *S. haematobium*, and *S. japonicum* are the species of schistosoma that cause the majority of human disease; they predominate in different areas of the world. Other species causing human infection are *S. intercalatum*, *S. mekongi*, *S. malayensis*, and *S. mattheei*, but these occur in limited foci.

S. mansoni (hepatic/intestinal) is distributed throughout sub-Saharan Africa and the Middle East, but is also found in some Caribbean islands, Brazil, Venezuela and the coast of Suriname (Figure 1). *S. haematobium* (urinary) is a risk in more than 50 African countries (and is most prevalent in east Africa, particularly Lake Malawi), the islands of Madagascar and Mauritius, and the Middle East. It is also known to occur in a few small areas of India. *S. japonicum* (hepatic/intestinal) is found in east and South East Asia and the western Pacific, predominantly in China, Indonesia and the Philippines. *S. intercalatum* (hepatic/intestinal) is found in jungle areas of central and western Africa.

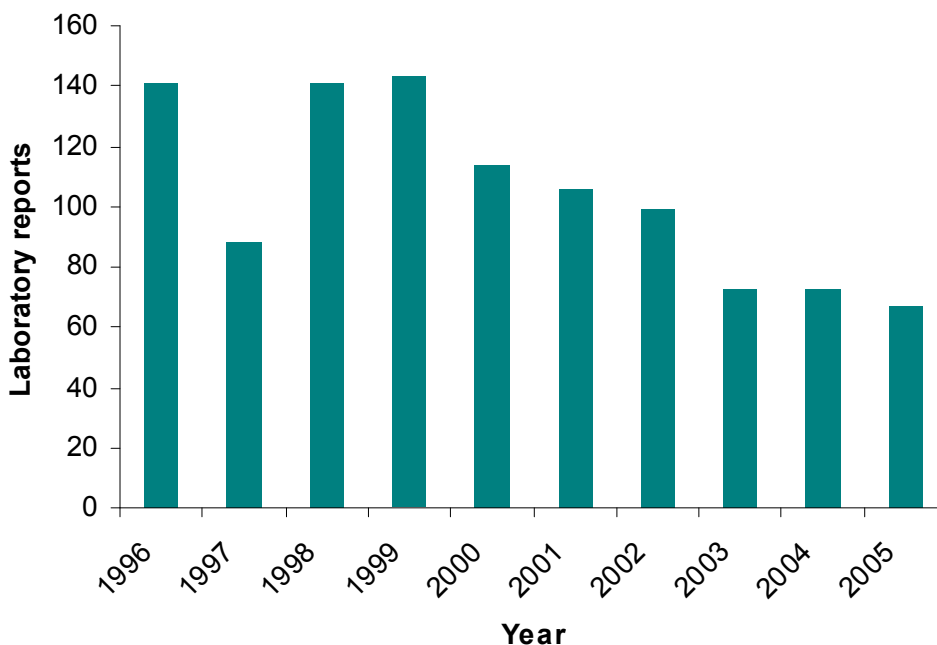
A major factor associated with the intensification of schistosomiasis is water development projects, particularly man-made lakes and irrigation schemes, which can lead to shifts in snail vector populations [4]. Population movement has also extended the range of the disease in some areas. Rural-urban migration, forced

displacement and the rise of eco-tourism have all contributed to the increase in schistosomiasis [3].

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Schistosomiasis in UK travellers

Figure 2: Laboratory reports of schistosomiasis, England, Wales, and Northern Ireland: 1996 - 2005



Data source: Health Protection Agency

Cases of schistosomiasis reported in England, Wales, and Northern Ireland have been decreasing since 1999 (Figure 2), the reason for which is unclear. *S. haematobium* has been the most identified organism in cases in England, Wales and Northern Ireland in recent years. Between 2003 and 2005, of 213 cases reported in total, 116 (54%) were due to *S. haematobium*, 43 (20%) to *S. mansoni* and the remainder had no species stated [5].

Table: Laboratory reports of schistosomiasis by country of travel, England, Wales, and Northern Ireland: 2003–2005

Country	2003-2005
Africa unspecified	3
Africa, Asia	1
Burundi	1
Congo	1
Côte d'Ivoire	1
Egypt	2
Eritrea, Sudan	1
Ethiopia	1
Ghana	5
India	1
Kenya	2
Lake Malawi	1
Lake Victoria	1
Madagascar	2
Malawi	12
Mali	1
Nigeria	3
Rwanda	2
Sierra Leone	2
Somalia	1
Sudan	2
Uganda	3
Zambia	2
Zimbabwe	12
Country not stated	150
Total	213

Data source: Health Protection Agency

Schistosomiasis is not found in the UK, so all cases are acquired abroad. However, the travel history in UK travellers is consistently under reported and only about a third of reports state country of travel (see table above). Nearly all cases stating country of travel had visited sub-Saharan or southern Africa. From 2003 to 2005 Malawi and Zimbabwe were the most reported countries of travel [5].

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Risk for travellers

Travellers are at risk of schistosomiasis if they wade or swim in fresh water in endemic areas. Although schistosomiasis is found throughout tropical regions, schistosomiasis in travellers is acquired almost exclusively in Africa. The absence of cases in travellers to other endemic areas may be because schistosomiasis is often a focal disease and is not found in locations frequented by travellers to South America and the Far East [6]. Outbreaks have occurred in adventure travellers on African river trips as well as expatriate groups. Swimming in Lake Malawi is an important risk factor for travellers [7].

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Transmission

Schistosoma eggs are excreted in human faeces (*S. mansoni* and *S. japonicum*) or urine (*S. haematobium*), the eggs hatch in fresh water and the larvae, known as miracidia, infect snails. Another larval form of *Schistosoma*, termed cercariae, emerge from the snails. They are free swimming and are capable of penetrating the skin of a human host. Once they have penetrated skin, the cercariae undergo development and migrate to the liver and then via the venous system to the capillaries of the bowel (*S. mansoni* and *S. japonicum*) or bladder (*S. haematobium*) where mature worms mate and begin to produce eggs. The eggs are then passed into the environment via the faeces or urine.

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Signs and symptoms

Initial contact with cercariae can cause an itchy, papular rash, known as "swimmers itch."

Once infection has been established, clinical manifestations can occur within 2-3 weeks of exposure, but many infections are asymptomatic.

The symptomatic, acute phase of illness is known as Katayama fever and presents with fever, malaise, urticaria and eosinophilia [6]. Other symptoms can include cough, diarrhoea, weight loss, haematuria, headaches, joint and muscle pain, and enlargement of the liver and spleen.

Chronic infection with *S. mansoni* and *S. japonicum* causes periportal liver fibrosis and portal hypertension with ascites and oesophageal varices. Long term infection with *S. haematobium* is associated with bladder scarring, renal obstruction, chronic urinary infection, and possibly bladder carcinoma.

Diagnosis can be made by finding schistosome eggs on microscopic examination of stool or urine, by finding eggs on rectal biopsy, or with serology detecting antibodies to schistosomal antigens or the antigens themselves.

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Treatment

Patients should be referred to an infectious diseases or tropical medicine specialist for treatment. The drug of choice for all species of schistosomiasis is praziquantel [2, 8].

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Prevention

There is no vaccine available for schistosomiasis and no drug chemoprophylaxis. Travellers should be advised to avoid swimming and wading in rivers and lakes or other freshwater contact in endemic countries. This includes popular destinations such as Lake Malawi. Topical application of insect repellent before exposure to water, or towel drying after accidental exposure to schistosomiasis are not reliable in preventing infection. Chlorination kills schistosomes; therefore there should be no risk in well maintained swimming pools. Schistosomiasis cannot be contracted through sea water. Cercariae also die after 48 hours in standing water or following heating water to 50°C for five minutes. Filtering water with fine mesh filters may also eliminate the parasite [8].

Schistosomiasis in travellers is commonly asymptomatic. Therefore those who swam or bathed in fresh water in endemic areas may have been exposed to the infection and should be advised to undergo screening tests with a tropical medicine specialist [9].

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