

**TABLE 103-2** HELMINTHIC INFECTIONS

HELMINTH	SETTING	VECTORS	DIAGNOSIS	TREATMENT
ENDEMIC IN THE UNITED STATES				
Pinworm (enterobiasis)	Ubiquitous	Human	Direct examination for ova	Mebendazole, albendazole
<i>Ascaris lumbricoides</i>	Southeast	Human	Stool examination for ova	Mebendazole, albendazole
<i>Trichuris trichiura</i>	Southeast	Human	Stool examination for ova	Mebendazole, albendazole
Hookworm	Southeast	Human	Stool examination for ova	Mebendazole, albendazole
COMMON IN TRAVELERS AND IMMIGRANTS				
<i>Strongyloides stercoralis</i>	Developing world	Human	Stool examination for larvae	Thiabendazole, ivermectin
<i>Schistosoma</i> species	Developing world	Snails	Stool or urine examination for ova	Praziquantel
<i>Wuchereria</i> and <i>Brugia</i> species	Asia, some parts of Africa	Mosquitoes	Nocturnal blood examination	Ivermectin
<i>Onchocerca volvulus</i>	Africa, South and Central America	Black flies	Biopsy	Ivermectin
<i>Loa loa</i>	Africa	Tabanid flies	Blood examination, clinical setting	Diethylcarbamazine or ivermectin
<i>Clonorchis sinensis</i>	Asia	Undercooked fish and snails	Stool examination for ova, radiology	Praziquantel
<i>Echinococcus</i> species	Worldwide	Canines and livestock	Radiology, serology, biopsy	Surgery, supportive therapy
<i>Taenia solium</i> (cysticercosis)	Developing world	Humans, pigs	Radiology, serology	Surgery, albendazole
<i>T. solium</i> , <i>Taenia saginata</i> , <i>Diphyllobothrium latum</i> (tapeworms)	Worldwide	Pigs, bovine, fish	Stool examination for ova or proglottids	Praziquantel

but should be considered in immigrants from these areas. Frequently, the patient remembers a chancre at the site of the insect bite (E-Fig. 103-2). The diagnosis is made by microscopic examination of blood, lymph, or cerebrospinal fluid for the parasite (E-Figs. 103-3 and 103-4). Treatment varies by species and is highly toxic. Consultation with an expert in infectious disease or tropical medicine is recommended.

American Trypanosomiasis

American trypanosomiasis, or Chagas' disease, is caused by *Trypanosoma cruzi* and is endemic in Central and South America. Transmitted by contact with feces of reduviid bugs (kissing bugs) (E-Fig. 103-5), it can also be acquired through blood transfusion or organ transplantation from an infected individual. The risk to travelers is extremely low but increases with prolonged stays in poor-quality housing. The presentation has an acute phase of 3 months followed by a chronic infection for life. The classic acute presentation involves swelling and erythema of the eyelid and ocular tissue at the entry site of infection, known as the Romana sign. However, most individuals are asymptomatic throughout the infection and are identified only at the time of blood donation. Between 20% and 30% of individuals develop manifestations of chronic infection decades later that can include cardiomegaly and heart failure, megaesophagus, or megacolon.

Diagnosis in the acute phase is by microscopic examination of peripheral blood (E-Fig. 103-6). In the chronic phase, various serologic analyses are available to aid in diagnosis. Treatment is recommended early because it may prevent chronic manifestations. In the United States, antitrypanosomal drugs are available through the CDC in consultation with an expert in the field. For most chronic manifestations, however, treatment is supportive.

HELMINTHIC INFECTIONS

Infestation by nematodes, or roundworms, is the most common parasitic infection in the world. The intestinal nematodes *Ascaris* and *Trichuris* are the two most prevalent types. Other important

helminths include *Strongyloides*, *Enterobius*, schistosomes, and tapeworms (see later discussion). Although most helminths are found worldwide, they disproportionately affect the developing world and pose potential risk to travelers to those areas (Table 103-2).

Helminthic Infections Common in the United States

Pinworm

Enterobiasis is common in the United States and worldwide. Children are predominantly infected, and transmission is by the fecal-oral route. The clinical presentation is perianal pruritus. Diagnosis is made by the tape test, in which transparent tape is applied to the perianal skin overnight and then examined microscopically for ova on the tape. Treatment is with mebendazole.

Roundworm

Ascaris lumbricoides is found worldwide, including in the United States, but mostly affects people in the developing world. Although affected individuals are usually asymptomatic, some develop pulmonary infiltrates during the migration phase of the worm or obstruction of the biliary, pancreatic, or intestinal tract. These manifestations usually occur in the setting of high worm burden. Diagnosis is by stool examination for ova and parasites (E-Fig. 103-7). Treatment is with mebendazole.

Whipworm

Trichuris trichiura are called whipworms because of their characteristic shape in the adult form. Like *Ascaris*, this is an intestinal nematode that infects mostly children. It is usually asymptomatic except in the setting of heavy worm burden, which can lead to rectal prolapse and bloody diarrhea among children in the developing world. Diagnosis is made by stool examination for ova and parasites or by endoscopy revealing colitis and the presence of adult worms. The treatment of choice is mebendazole.