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DRUGS FOR PARASITIC INFECTIONS

Parasitic infections are found throughout the world. With increasing travel, immigration, use of immunosuppressive drugs and the spread of AIDS, physicians anywhere may see infections caused by previously unfamiliar parasites. The table below lists first-choice and alternative drugs for most parasitic infections. The brand names and manufacturers of the drugs are listed on page 12.

Infection		Drug	Adult dosage	Pediatric dosage
Acanthamoeba keratitis				
Drug of choice:		See footnote 1		
AMEBIASIS *(Entamoeba histolytica)*				
asymptomatic				
Drug of choice:		Iodoquinol	650 mg tid x 20d	30-40 mg/kg/d (max. 2g) in 3 doses x 20d
	OR	Paromomycin	25-35 mg/kg/d in 3 doses x 7d	25-35 mg/kg/d in 3 doses x 7d
Alternative:		Diloxanide furoate[2]*	500 mg tid x 10d	20 mg/kg/d in 3 doses x 10d
mild to moderate intestinal disease[3]				
Drug of choice:[4]		Metronidazole	500-750 mg tid x 7-10d	35-50 mg/kg/d in 3 doses x 7-10d
	OR	Tinidazole[5]	2 g once daily x 3d	50 mg/kg/d (max. 2g) in 1 dose x 3d
severe intestinal and extraintestinal disease[3]				
Drug of choice:		Metronidazole	750 mg tid x 7-10d	35-50 mg/kg/d in 3 doses x 7-10d
	OR	Tinidazole[5]	2 g once daily x 5d	50 mg/kg/d (max. 2 g) x 5d
AMEBIC MENINGOENCEPHALITIS, primary and granulomatous				
Naegleria				
Drug of choice:		Amphotericin B[6,7]	1.5 mg/kg/d in 2 doses x 3d, then 1 mg/kg/d x 6d	1.5 mg/kg/d in 2 doses x 3d, then 1 mg/kg/d x 6d
Acanthamoeba				
Drug of choice:		See footnote 8		

* Availability problems. See table on page 12.

1. For treatment of keratitis caused by *Acanthamoeba*, concurrent topical use of 0.1% propamidine isethionate *(Brolene)* plus neomycin-polymyxin B-gramicidin ophthalmic solution has been successful (SL Hargrave et al, Ophthalmology 1999; 106:952). In some European countries, propamidine is not available and hexamidine *(Desmodine)* has been used (DV Seal, Eye 2003; 17:893). In addition, 0.02% topical polyhexamethylene biguanide (PHMB) and/or chlorhexadine has been used successfully in a large number of patients (G Tabin et al, Cornea 2001; 20:757; YS Wysenbeek et al, Cornea 2000; 19:464). PHMB is available from Leiter's Park Avenue Pharmacy, San Jose, CA (800-292-6773; www.leiterrx.com). The combination of chlorhexadine, natamycin (pimaricin) and debridement also has been successful (K Kitagawa et al, Jpn J Ophthalmol 2003; 47:616).
2. The drug is not available commercially, but as a service can be compounded by Panorama Compounding Pharmacy, 6744 Balboa Blvd, Van Nuys, CA 91406 (800-247-9767) or Medical Center Pharmacy, New Haven, CT (203-688-6816).
3. Treatment should be followed by a course of iodoquinol or paromomycin in the dosage used to treat asymptomatic amebiasis.
4. Nitazoxanide is FDA-approved as a pediatric oral suspension for treatment of *Cryptosporidium* in immunocompetent children <12 years old and for *Giardia* (Medical Letter 2003; 45:29). It may also be effective for mild to moderate amebiasis (E Diaz et al, Am J Trop Med Hyg 2003; 68:384). Nitazoxanide is available in 500-mg tablets and an oral suspension; it should be taken with food.
5. A nitro-imidazole similar to metronidazole, tinidazole was recently approved by the FDA and appears to be as effective and better tolerated than metronidazole. It should be taken with food to minimize GI adverse effects. For children and patients unable to take tablets, a pharmacist may crush the tablets and mix them with cherry syrup (*Humco*, and others). The syrup suspension is good for 7 days at room temperature and must be shaken before use. Ornidazole, a similar drug, is also used outside the US.
6. *Naegleria* infection has been treated successfully with intravenous and intrathecal use of both amphotericin B and miconazole plus rifampin and with amphotericin B, rifampin and ornidazole (J Seidel et al, N Engl J Med 1982; 306:346; R Jain et al, Neurol India 2002; 50:470). Other reports of successful therapy are less well documented.
7. An approved drug, but considered investigational for this condition by the FDA.
8. Strains of *Acanthamoeba* isolated from fatal granulomatous amebic encephalitis are usually susceptible *in vitro* to pentamidine, ketoconazole, flucytosine and (less so) to amphotericin B. Chronic *Acanthamoeba* meningitis has been successfully treated in 2 children with a combination of oral trimethoprim/sulfamethoxazole, rifampin and ketoconazole (T Singhal et al, Pediatr Infect Dis J 2001; 20:623) and in an AIDS patient with fluconazole, sulfadiazine and pyrimethamine combined with surgical resection of the CNS lesion (M Seijo Martinez et al, J Clin Microbiol 2000; 38:3892). Disseminated cutaneous infection in an immunocompromised patient has been treated successfully with IV pentamidine isethionate, topical chlorhexidine and 2% ketoconazole cream, followed by oral itraconazole (CA Slater et al, N Engl J Med 1994; 331:85).

Infection		Drug	Adult dosage	Pediatric dosage
AMEBIC MENINGOENCEPHALITIS (continued)				
Balamuthia mandrillaris				
Drug of choice:		See footnote 9		
Sappinia diploidea				
Drug of choice:		See footnote 10		
ANCYLOSTOMA caninum (Eosinophilic enterocolitis)				
Drug of choice:		Albendazole[7]	400 mg once	400 mg once
	OR	Mebendazole	100 mg bid x 3d	100 mg bid x 3d
	OR	Pyrantel pamoate[7]	11 mg/kg (max. 1g) x 3d	11 mg/kg (max. 1g) x 3d
	OR	Endoscopic removal		
Ancylostoma duodenale, see HOOKWORM				
ANGIOSTRONGYLIASIS *(Angiostrongylus cantonensis, Angiostrongylus costaricensis)*				
Drug of choice:		See footnote 11		
ANISAKIASIS (*Anisakis* spp.)				
Treatment of choice:[12]		Surgical or endoscopic removal		
ASCARIASIS (*Ascaris lumbricoides,* roundworm)				
Drug of choice:		Albendazole[7]	400 mg once	400 mg once
	OR	Mebendazole	100 mg bid x 3d or 500 mg once	100 mg bid x 3d or 500 mg once
	OR	Ivermectin[7]	150-200 mcg/kg once	150-200 mcg/kg once
BABESIOSIS *(Babesia microti)*				
Drugs of choice:[13]		Clindamycin[7]	1.2 g bid IV or 600 mg tid PO x 7-10d	20-40 mg/kg/d PO in 3 doses x 7-10d
		plus quinine[7]	650 mg tid PO x 7-10d	25 mg/kg/d PO in 3 doses x 7-10d
	OR	Atovaquone[7]	750 mg bid x 7-10d	20 mg/kg bid x 7-10d
		plus azithromycin[7]	600 mg daily x 7-10d	12 mg/kg daily x 7-10d
Balamuthia mandrillaris, see AMEBIC MENINGOENCEPHALITIS, PRIMARY				
BALANTIDIASIS *(Balantidium coli)*				
Drug of choice:		Tetracycline[7, 14]	500 mg qid x 10d	40 mg/kg/d (max. 2 g) in 4 doses x 10d
Alternatives:		Metronidazole[7]	750 mg tid x 5d	35-50 mg/kg/d in 3 doses x 5d
		Iodoquinol[7]	650 mg tid x 20d	40 mg/kg/d in 3 doses x 20d
BAYLISASCARIASIS *(Baylisascaris procyonis)*				
Drug of choice:		See footnote 15		
BLASTOCYSTIS hominis infection				
Drug of choice:		See footnote 16		
CAPILLARIASIS *(Capillaria philippinensis)*				
Drug of choice:		Mebendazole[7]	200 mg bid x 20d	200 mg bid x 20d
Alternatives:		Albendazole[7]	400 mg daily x 10d	400 mg daily x 10d
Chagas' disease, see TRYPANOSOMIASIS				
Clonorchis sinensis, see FLUKE infection				

* Availability problems. See table on page 12.

9. A free-living leptomyxid ameba that causes subacute to fatal granulomatous CNS disease. Several cases of *Balamuthia* encephalitis have been successfully treated with flucytosine, pentamidine, fluconazole and sulfadiazine plus either azithromycin or clarithromycin (phenothiazines were also used) combined with surgical resection of the CNS lesion (TR Deetz et al, Clin Infect Dis 2003; 37:1304; S Jung et al, Arch Pathol Lab Med 2004; 128:466).
10. A free-living ameba not previously known to be pathogenic to humans. It has been successfully treated with azithromycin, IV pentamidine, itraconazole and flucytosine combined with surgical resection of the CNS lesion (BB Gelman et al, J Neuropathol Exp Neurol 2003; 62:990).
11. Most patients have a self-limited course and recover completely. Analgesics, corticosteroids and careful removal of CSF at frequent intervals can relieve symptoms from increased intracranial pressure (V Lo Re III and SJ Gluckman, Am J Med 2003; 114:217). No antihelminthic drug is proven to be effective and some patients have worsened with therapy (TJ Slom et al, N Engl J Med 2002; 346:668). In one report, however, mebendazole and a corticosteroid appeared to shorten the course of infection (H-C Tsai et al, Am J Med 2001; 111:109).
12. A Repiso Ortega et al, Gastroenterol Hepatol 2003; 26:341. Successful treatment of a patient with *Anisakiasis* with albendazole has been reported (DA Moore et al, Lancet 2002; 360:54).
13. Exchange transfusion has been used in severely ill patients and those with high (>10%) parasitemia (JC Hatcher et al, Clin Infect Dis 2001; 32:1117). In patients who were not severely ill, combination therapy with atovaquone and azithromycin was as effective as clindamycin and quinine and may have been better tolerated (PJ Krause et al, N Engl J Med 2000; 343:1454).
14. Use of tetracyclines is contraindicated in pregnancy and in children <8 years old.
15. No drugs have been demonstrated to be effective. Albendazole 25 mg/kg/d x 20d started as soon as possible (up to 3d after possible infection) might prevent clinical disease and is recommended for children with known exposure (ingestion of racoon stool or contaminated soil) (MMWR Morb Mortal Wkly Rep 2002; 50:1153; PJ Gavin and ST Shulman, Pediatr Infect Dis 2003; 22:651). Mebendazole, thiabendazole, levamisole or ivermectin could be tried if albendazole were not available. Steroid therapy may be helpful, especially in eye and CNS infections. Ocular baylisascariasis has been treated successfully using laser photocoagulation therapy to destroy the intraretinal larvae.
16. Clinical significance of these organisms is controversial; metronidazole 750 mg tid x 10d, iodoquinol 650 mg tid x 20d or trimethoprim-sulfamethoxazole 1 DS tab bid x 7d have been reported to be effective (DJ Stenzel and PFL Borenam, Clin Microbiol Rev 1996; 9:563; UZ Ok et al, Am J Gastroenterol 1999; 94:3245). Metronidazole resistance may be common (K Haresh et al, Trop Med Int Health 1999; 4:274). Nitazoxanide has been effective in children (E Diaz et al, Am J Trop Med Hyg 2003; 68:384).

Infection		Drug	Adult dosage	Pediatric dosage
CRYPTOSPORIDIOSIS *(Cryptosporidium)*				
Non-HIV infected				
Drug of choice:		Nitazoxanide[4]	500 mg bid x 3d[7]	1-3yrs: 100 mg bid x 3d 4-11yrs: 200 mg bid x 3d
HIV infected				
Drug of choice:		See footnote 17		
CUTANEOUS LARVA MIGRANS (creeping eruption, dog and cat hookworm)				
Drug of choice:[18]		Albendazole[7]	400 mg daily x 3d	400 mg daily x 3d
	OR	Ivermectin[7]	200 mcg/kg daily x 1-2d	200 mcg/kg daily x 1-2d
Alternative:		Thiabendazole	Topically	Topically
CYCLOSPORIASIS *(Cyclospora cayetanensis)*				
Drug of choice:[19]		Trimethoprim-sulfamethoxazole[7]	TMP 160 mg/SMX 800 mg (1 DS tab) bid x 7-10d	TMP 5 mg/kg, SMX 25 mg/kg bid x 7-10d
CYSTICERCOSIS, see TAPEWORM infection				
DIENTAMOEBA fragilis infection[20]				
Drug of choice:		Iodoquinol	650 mg tid x 20d	30-40 mg/kg/d (max. 2g) in 3 doses x 20d
	OR	Paromomycin[7]	25-35 mg/kg/d in 3 doses x 7d	25-35 mg/kg/d in 3 doses x 7d
	OR	Tetracycline[7,14]	500 mg qid x 10d	40 mg/kg/d (max. 2g) in 4 doses x 10d
	OR	Metronidazole	500-750 mg tid x 10d	20-40 mg/kg/d in 3 doses x 10d
Diphyllobothrium latum, see TAPEWORM infection				
DRACUNCULUS medinensis (guinea worm) infection				
Drug of choice:		See footnote 21		
Echinococcus, see TAPEWORM infection				
Entamoeba histolytica, see AMEBIASIS				
ENTEROBIUS *vermicularis* (pinworm) infection				
Drug of choice:[22]		Pyrantel pamoate	11 mg/kg base once (max. 1 g); repeat in 2wks	11 mg/kg base once (max. 1 g); repeat in 2wks
	OR	Mebendazole	100 mg once; repeat in 2wks	100 mg once; repeat in 2wks
	OR	Albendazole[7]	400 mg once; repeat in 2wks	400 mg once; repeat in 2wks
Fasciola hepatica, see FLUKE infection				
FILARIASIS[23]				
Wuchereria bancrofti, Brugia malayi, Brugia timori				
Drug of choice:[24]		Diethylcarbamazine*	6 mg/kg in 3 doses x 14d[25]	6 mg/kg in 3 doses x 14d[25]
Loa loa				
Drug of choice:[26]		Diethylcarbamazine*	6 mg/kg in 3 doses x 14d[25]	6 mg/kg in 3 doses x 14d[25]

* Availability problems. See table on page 12.

17. Nitazoxanide has not consistently been shown to be superior to placebo in HIV-infected patients (B Amadi et al, Lancet 2002; 360:1375). A small randomized, double-blind trial in symptomatic HIV-infected patients who were not receiving HAART found paromomycin similar to placebo (RG Hewitt et al, Clin Infect Dis 2000; 31:1084).
18. G Albanese et al, Int J Dermatol 2001; 40:67.
19. HIV-infected patients may need higher dosage and long-term maintenance (A Kansouzidou et al, J Trav Med 2004; 11:61).
20. A Norberg et al, Clin Microbiol Infect 2003; 9:65.
21. Treatment of choice is slow extraction of worm combined with wound care (C Greenaway, CMAJ 2004; 170:495). 10 days' treatment with metronidazole 250 mg tid in adults and 25 mg/kg/d in 3 doses in children is not curative, but decreases inflammation and facilitates removal of the worm. Mebendazole 400-800 mg/d x 6d has been reported to kill the worm directly.
22. Since all family members are usually infected, treatment of the entire household is recommended.
23. Antihistamines or corticosteroids may be required to decrease allergic reactions due to disintegration of microfilariae from treatment of filarial infections, especially those caused by *Loa loa*. Endosymbiotic *Wolbachia* bacteria may have a role in filarial development and host response, and may represent a new target for therapy. Treatment with doxycycline 100 or 200 mg/d x 4-6wks in lymphatic filariasis and onchocerciasis has resulted in substantial loss of *Wolbachia* with subsequent block of microfilariae production and absence of microfilaria when followed for 24 months after treatment (A Hoerauf et al, Med Microbiol Immunol 2003; 192:211; A Hoerauf et al, BMJ 2003; 326:207).
24. Most symptoms caused by adult worm. Single dose combination of albendazole (400 mg) with either ivermectin (200 mcg/kg) or diethylcarbamazine 6 mg/kg is effective for reduction or suppression of *W. bancrofti* microfilaria but does not kill the adult forms (D Addiss et al, Cochrane Database Syst Rev 2004; CD003753).
25. For patients with microfilaria in the blood, Medical Letter consultants would start with a lower dosage and scale up: d1: 50 mg; d2: 50 mg tid; d3: 100 mg tid; d4-14: 6 mg/kg in 3 doses (for *Loa Loa* d4-14: 9 mg/kg in 3 doses). Multi-dose regimens have been shown to provide more rapid reduction in microfilaria than single-dose diethylcarbamazine, but microfilaria levels are similar 6-12mos after treatment (LD Andrade et al, Trans R Soc Trop Med Hyg 1995; 89:319; PE Simonsen et al, Am J Trop Med Hyg 1995; 53:267). A single dose of 6 mg/kg is used in endemic areas for mass treatment (J Figueredo-Silva et al, Trans R Soc Trop Med Hyg 1996; 90:192; J Noroes et al, Trans R Soc Trop Med Hyg 1997; 91:78).
26. In heavy infections with *Loa loa*, rapid killing of microfilariae can provoke an encephalopathy. Apheresis has been reported to be effective in lowering microfilarial counts in patients heavily infected with *Loa loa* (EA Ottesen, Infect Dis Clin North Am 1993; 7:619). Albendazole or ivermectin have also been used to reduce microfilaremia; albendazole is preferred because of its slower onset of action and lower risk of encephalopathy (AD Klion et al, J Infect Dis 1993; 168:202; M Kombila et al, Am J Trop Med Hyg 1998; 58:458). Albendazole may be useful for treatment of loiasis when diethylcarbamazine is ineffective or cannot be used, but repeated courses may be necessary (AD Klion et al, Clin Infect Dis 1999; 29:680). Diethylcarbamazine, 300 mg once/wk, has been recommended for prevention of loiasis (TB Nutman et al, N Engl J Med 1988; 319:752).

Infection	Drug	Adult dosage	Pediatric dosage
FILARIASIS (continued)[23]			
Mansonella ozzardi			
Drug of choice:	See footnote 27		
Mansonella perstans			
Drug of choice:	Albendazole[7]	400 mg bid x 10d	400 mg bid x 10d
OR	Mebendazole[7]	100 mg bid x 30d	100 mg bid x 30d
Mansonella streptocerca			
Drug of choice:[28]	Diethylcarbamazine*	6 mg/kg/d x 14d	6 mg/kg/d x 14d
	Ivermectin[7]	150 mcg/kg once	150 mcg/kg once
Tropical Pulmonary Eosinophilia (TPE)[29]			
Drug of choice:	Diethylcarbamazine*	6 mg/kg/d in 3 doses x 12-21d	6 mg/kg/d in 3 doses x 12-21d
Onchocerca volvulus (River blindness)			
Drug of choice:	Ivermectin[30]	150 mcg/kg once, repeated every 6-12mos until asymptomatic	150 mcg/kg once, repeated every 6-12mos until asymptomatic
FLUKE, hermaphroditic, infection			
Clonorchis sinensis (Chinese liver fluke)			
Drug of choice:	Praziquantel	75 mg/kg/d in 3 doses x 1d	75 mg/kg/d in 3 doses x 1d
OR	Albendazole[7]	10 mg/kg x 7d	10 mg/kg x 7d
Fasciola hepatica (sheep liver fluke)			
Drug of choice:[31]	Triclabendazole*	10 mg/kg once or twice[32]	10 mg/kg once or twice[32]
Alternative:	Bithionol*	30-50 mg/kg on alternate days x 10-15 doses	30-50 mg/kg on alternate days x 10-15 doses
Fasciolopsis buski, Heterophyes heterophyes, Metagonimus yokogawai (intestinal flukes)			
Drug of choice:	Praziquantel[7]	75 mg/kg/d in 3 doses x 1d	75 mg/kg/d in 3 doses x 1d
Metorchis conjunctus (North American liver fluke)[33]			
Drug of choice:	Praziquantel[7]	75 mg/kg/d in 3 doses x 1d	75 mg/kg/d in 3 doses x 1d
Nanophyetus salmincola			
Drug of choice:	Praziquantel[7]	60 mg/kg/d in 3 doses x 1d	60 mg/kg/d in 3 doses x 1d
Opisthorchis viverrini (Southeast Asian liver fluke)			
Drug of choice:	Praziquantel	75 mg/kg/d in 3 doses x 1d	75 mg/kg/d in 3 doses x 1d
Paragonimus westermani (lung fluke)			
Drug of choice:	Praziquantel[7]	75 mg/kg/d in 3 doses x 2d	75 mg/kg/d in 3 doses x 2d
Alternative:[34]	Bithionol*	30-50 mg/kg on alternate days x 10-15 doses	30-50 mg/kg on alternate days x 10-15 doses
GIARDIASIS *(Giardia duodenalis)*			
Drug of choice:	Metronidazole[7]	250 mg tid x 5d	15 mg/kg/d in 3 doses x 5d
	Nitazoxanide[4]	500 mg bid x 3d	1-3yrs: 100 mg q12h x 3d 4-11yrs: 200 mg q12h x 3d
	Tinidazole[5]	2 g once	50 mg/kg once (max. 2 g)
Alternatives:[35]	Paromomycin[7,36]	25-35 mg/kg/d in 3 doses x 7d	25-35 mg/kg/d in 3 doses x 7d
	Furazolidone	100 mg qid x 7-10d	6 mg/kg/d in 4 doses x 7-10d
	Quinacrine[2]	100 mg tid x 5d	2 mg/kg tid x 5d (max. 300 mg/d)
GNATHOSTOMIASIS *(Gnathostoma spinigerum)*			
Treatment of choice:[37]	Albendazole[7]	400 mg bid x 21d	400 mg bid x 21d
OR	Ivermectin[7]	200 mcg/kg/d x 2d	200 mcg/kg/d x 2d
±	Surgical removal		
GONGYLONEMIASIS *(Gongylonema sp.)*[38]			
Treatment of choice:	Surgical removal		
OR	Albendazole[7]	10 mg/kg/d x 3d	10 mg/kg/d x 3d

* Availability problems. See table on page 12.

27. Diethylcarbamazine has no effect. Ivermectin 200 mcg/kg once, has been effective.
28. Diethylcarbamazine is potentially curative due to activity against both adult worms and microfilariae. Ivermectin is only active against microfilariae.
29. Relapse occurs and can be treated with diethylcarbamazine.
30. Annual treatment with ivermectin, 150 mcg/kg, can prevent blindness due to ocular onchocerciasis (D Mabey et al, Ophthalmology 1996; 103:1001). Diethylcarbamazine should not be used for treatment of this disease.
31. Unlike infections with other flukes, *Fasciola hepatica* infections may not respond to praziquantel. Triclabendazole (*Egaten* - Novartis) may be safe and effective but data are limited (CS Graham et al, Clin Infect Dis 2001; 33:1). It is available from Victoria Pharmacy, Zurich, Switzerland (www.pharmaworld.com; 41-1-211-24-32) and should be given with food for better absorption. A single study has found that nitazoxanide has limited efficacy for treating fascioliasis in adults and children (L Favennec et al, Aliment Pharmacol Ther 2003; 17:265).
32. J Richter et al, Curr Treat Option Infect Dis 2002; 4:313.
33. JD MacLean et al, Lancet 1996; 347:154.
34. Triclabendazole may be effective in a dosage of 5 mg/kg once/d x 3d or 10 mg/kg bid x 1d (M Calvopiña et al, Trans R Soc Trop Med Hyg 1998; 92:566). See footnote 31 for availability.
35. Albendazole 400 mg daily x 5d alone or in combination with metronidazole may also be effective (A Hall and Q Nahar, Trans R Soc Trop Med Hyg 1993; 87:84; AK Dutta et al, Indian J Pediatr 1994; 61:689; B Cacopardo et al, Clin Ter 1995; 146:761). Combination treatment with standard doses of metronidazole and quinacrine given for 3wks has been effective for a small number of refractory infections (TE Nash et al, Clin Infect Dis 2001; 33:22). In one study, nitazoxanide was used successfully in high doses to treat a case of *Giardia* resistant to metronidazole and albendazole (P Abboud et al, Clin Infect Dis 2001; 32:1792).
36. Not absorbed; may be useful for treatment of giardiasis in pregnancy.
37. M de Gorgolas et al, J Travel Med 2003; 10:358. All patients should be treated with a medication regardless of whether surgery is attempted.
38. ML Eberhard and C Busillo, Am J Trop Med Hyg 1999; 61:51; ME Wilson et al, Clin Infect Dis 2001; 32:1378.

Infection		Drug	Adult dosage	Pediatric dosage
HOOKWORM infection *(Ancylostoma duodenale, Necator americanus)*				
Drug of choice:		Albendazole[7]	400 mg once	400 mg once
	OR	Mebendazole	100 mg bid x 3d or 500 mg once	100 mg bid x 3d or 500 mg once
	OR	Pyrantel pamoate[7]	11 mg/kg (max. 1g) x 3d	11 mg/kg (max. 1g) x 3d
Hydatid cyst, see TAPEWORM infection				
Hymenolepis nana, see TAPEWORM infection				
ISOSPORIASIS *(Isospora belli)*				
Drug of choice:[39]		Trimethoprim-sulfamethoxazole[7]	TMP 160 mg/SMX 800 mg (1 DS tab) bid x 10d	TMP 5 mg/kg, SMX 25 mg/kg bid x 10d
LEISHMANIA infection				
Visceral[40]				
Drugs of choice:		Sodium stibo-gluconate*	20 mg Sb/kg/d IV or IM x 28d[41]	20 mg Sb/kg/d IV or IM x 28d[41]
	OR	Meglumine antimonate*	20 mg Sb/kg/d IV or IM x 28d[41]	20 mg Sb/kg/d IV or IM x 28d[41]
	OR	Amphotericin B[7]	0.5-1 mg/kg IV daily or every second day for up to 8wks	0.5-1 mg/kg IV daily or every second day for up to 8wks
	OR	Liposomal amphotericin B[42]	3 mg/kg/d IV (d 1-5) and 3 mg/kg/d d 14 and 21[43]	3 mg/kg/d IV (d 1-5) and 3 mg/kg/d d 14 and 21[43]
Alternative:[44]		Pentamidine[7]	4 mg/kg IV or IM daily or every second day for 15-30 doses	4 mg/kg IV or IM daily or every second day for 15-30 doses
Cutaneous[45]				
Drugs of choice:		Sodium stibo-gluconate*	20 mg Sb/kg/d IV or IM x 20d[41]	20 mg Sb/kg/d IV or IM x 20d[41]
	OR	Meglumine antimonate*	20 mg Sb/kg/d IV or IM x 20d[41]	20 mg Sb/kg/d IV or IM x 20d[41]
Alternatives:[46]		Pentamidine[7]	2-3 mg/kg IV or IM daily or every second day x 4-7 doses[47]	2-3 mg/kg IV or IM daily or every second day x 4-7 doses[47]
	OR	Paromomycin[7,48]	Topically 2x/d x 10-20d	Topically 2x/d x 10-20d
Mucosal[49]				
Drugs of choice:		Sodium stibo-gluconate*	20 mg Sb/kg/d IV or IM x 28d[41]	20 mg Sb/kg/d IV or IM x 28d[41]
	OR	Meglumine antimonate*	20 mg Sb/kg/d IV or IM x 28d[41]	20 mg Sb/kg/d IV or IM x 28d[41]
	OR	Amphotericin B[7]	0.5-1 mg/kg IV daily or every second day for up to 8wks	0.5-1 mg/kg IV daily or every second day for up to 8wks

* Availability problems. See table on page 12.

39. In immunocompetent patients usually a self-limited illness. Immunosuppressed patients may need higher doses, longer duration (TMP/SMX qid x 10d, followed by bid x 3wks) and long-term maintenance. In sulfonamide-sensitive patients, pyrimethamine 50-75 mg daily in divided doses (plus leucovorin 10-25 mg/d) has been effective.
40. Visceral infection is most commonly due to the Old World species *L. donovani* (kala-azar) and *L. infantum* and the New World species *L. chagasi*. Treatment duration may vary based on symptoms, host immune status, species and area of the world where infection was acquired.
41. May be repeated or continued; a longer duration may be needed for some patients (BL Herwaldt, Lancet 1999; 354:1191).
42. Three lipid formulations of amphotericin B have been used for treatment of visceral leishmaniasis. Largely based on clinical trials in patients infected with *L. infantum*, the FDA approved liposomal amphotericin B *(AmBisome)* for treatment of visceral leishmaniasis (A Meyerhoff, Clin Infect Dis 1999; 28:42). Amphotericin B lipid complex *(Abelcet)* and amphotericin B cholesteryl sulfate *(Amphotec)* have also been used with good results but are considered investigational for this condition by the FDA.
43. The FDA-approved dosage regimen for immunocompromised patients (e.g., HIV infected) is 4 mg/kg/d (d 1-5) and 4 mg/kg/d on d 10, 17, 24, 31 and 38. The relapse rate is high; maintenance therapy may be indicated, but there is no consensus as to dosage or duration.
44. For treatment of kala-azar in adults in India, oral miltefosine 100 mg/d (~2.5 mg/kg/d) for 3-4wks was 97% effective after 6mos (TK Jha et al, N Engl J Med 1999; 341:1795; H Sangraula et al, J Assoc Physicians India 2003; 51:686). Gastrointestinal adverse effects are common, and the drug is contraindicated in pregnancy. The dose of miltefosine in an open-label trial in children in India was 2.5 mg/kg/d x 28d (SK Bhattacharya et al, Clin Infect Dis 2004; 38:217). Miltefosine *(Impavido)* is available from the manufacturer (Zentaris – Frankfurt, Germany at Impavido@zentaris.de).
45. Cutaneous infection is most commonly due to the Old World species *L. major* and *L. tropica* and the New World species *L. mexicana, L. (Viannia) braziliensis* and others. Treatment duration may vary based on symptoms, host immune status, species and area of the world where infection was acquired.
46. In a placebo-controlled trial in patients ≥12 years old, oral miltefosine was effective for the treatment of cutaneous leishmaniasis due to *L.(V.) panamensis* in Colombia but not *L.(V.) braziliensis* in Guatemala at a dosage of about 2.5 mg/kg/d for 28d. "Motion sickness," nausea, headache and increased creatinine were the most frequent adverse effects (J Soto et al, Clin Infect Dis 2004; 38:1266). See footnote 44 regarding miltefosine availability. For treatment of *L. major* cutaneous lesions, a study in Saudi Arabia found that oral fluconazole, 200 mg once/d x 6wks, appeared to speed healing (AA Alrajhi et al, N Engl J Med 2002; 346:891).
47. At this dosage pentamidine has been effective against leishmaniasis in Colombia where the likely organism was *L. (V.) panamensis* (J Soto-Mancipe et al, Clin Infect Dis 1993; 16:417; J Soto et al, Am J Trop Med Hyg 1994; 50:107); its effect against other species is not well established.
48. Topical paromomycin should be used only in geographic regions where cutaneous leishmaniasis species have low potential for mucosal spread. A formulation of 15% paromomycin/12% methylbenzethonium chloride *(Leshcutan)* in soft white paraffin for topical use has been reported to be partially effective in some patients against cutaneous leishmaniasis due to *L. major* in Israel and against *L. mexicana* and *L. (V.) braziliensis* in Guatemala, where mucosal spread is very rare (BA Arana et al, Am J Trop Med Hyg 2001; 65:466). The methylbenzethonium is irritating to the skin; lesions may worsen before they improve.
49. Mucosal infection is most commonly due to the New World species *L. (V.) braziliensis, L. (V.) panamensis*, or *L. (V.) guyanensis*. Treatment duration may vary based on symptoms, host immune status, species and area of the world where infection was acquired.

Infection		Drug	Adult dosage	Pediatric dosage
LICE infestation *(Pediculus humanus, P. capitis, Phthirus pubis)*[50]				
Drug of choice:		0.5% Malathion[51]	Topically	Topically
	OR	1% Permethrin[52]	Topically	Topically
Alternative:		Pyrethrins with piperonyl butoxide[52]	Topically	Topically
	OR	Ivermectin[7, 53]	200 mcg/kg x 3, d 1, 2 and 10	200 mcg/kg x 3, d 1, 2 and 10
Loa loa, see FILARIASIS				
MALARIA, Treatment of *(Plasmodium falciparum, P. ovale, P. vivax, and P. malariae)*				
P. falciparum[54] acquired in areas of **chloroquine-resistance**				
ORAL[55]				
Drugs of choice:		Atovaquone/ proguanil[56]	2 adult tabs bid[58] or 4 adult tabs once daily x 3d	<5kg: not indicated 5-8kg: 2 peds tabs once/d x 3d 9-10kg: 3 peds tabs once/d x 3d 11-20kg: 1 adult tab once/d x 3d 21-30kg: 2 adult tabs once/d x 3d 31-40kg: 3 adult tabs once/d x 3d >40kg: 4 adult tabs once/d x 3d
	OR	Quinine sulfate	650 mg q8h x 3-7d[57]	30 mg/kg/d in 3 doses x 3-7d[57]
		plus		
		doxycycline[7,14]	100 mg bid x 7d	4 mg/kg/d in 2 doses x 7d
		or plus		
		tetracycline[7,14]	250 mg qid x 7d	6.25 mg/kg qid x 7d
		or plus		
		clindamycin[7,59]	20 mg/kg/d in 3 doses x 7d[60]	20 mg/kg/d in 3 doses x 7d
Alternatives:		Mefloquine[61]	750 mg followed 12 hrs later by 500 mg	15 mg/kg followed 12 hrs later by 10 mg/kg
		Artesunate[62]*	4 mg/kg/d x 3d	4 mg/kg/d x 3d
		plus		
		mefloquine[61]	750 mg followed 12 hrs later by 500 mg	15 mg/kg followed 12 hrs later by 10 mg/kg

* Availability problems. See table on page 12.

50. For infestation of eyelashes with *P. pubis* lice, use petrolatum; TMP/SMX has also been used (TL Meinking, Curr Probl Dermatol 1996; 24:157). For pubic lice, treat with 5% permethrin or ivermectin as for scabies (see page 9). TMP/SMX has also been effective together with permethrin for head lice (RB Hipolito et al, Pediatrics 2001; 107:E30).
51. KS Yoon et al, Arch Dermatol 2003; 139:994.
52. A second application is recommended one week later to kill hatching progeny. Some lice are resistant to pyrethrins and permethrin (TL Meinking et al, Arch Dermatol 2002; 138:220).
53. Ivermectin is effective against adult lice but has no effect on nits (KN Jones and JC English III, Clin Infect Dis 2003; 36:1355).
54. Chloroquine-resistant *P. falciparum* occurs in all malarious areas except Central America west of the Panama Canal Zone, Mexico, Haiti, the Dominican Republic, and most of the Middle East (chloroquine resistance has been reported in Yemen, Oman, Saudi Arabia and Iran). For treatment of multiple-drug-resistant *P. falciparum* in Southeast Asia, especially Thailand, where resistance to mefloquine is frequent, atovaquone/proguanil, artesunate plus mefloquine or artemether plus mefloquine may be used (JC Luxemburger et al, Trans R Soc Trop Med Hyg 1994; 88:213; J Karbwang et al, Trans R Soc Trop Med Hyg 1995; 89:296).
55. Uncomplicated or mild malaria may be treated with oral drugs.
56. Atovaquone plus proguanil is available as a fixed-dose combination tablet: adult tablets (*Malarone*; 250 mg atovaquone/100 mg proguanil) and pediatric tablets (*Malarone Pediatric*; 62.5 mg atovaquone/25 mg proguanil). To enhance absorption, it should be taken with food or a milky drink. Atovaquone/proguanil should not be given to pregnant women or patients with severe renal impairment (creatinine clearance <30mL/min). There have been several isolated reports of resistance in *P. falciparum* in Africa (E Schwartz et al, Clin Infect Dis 2003; 37:450; A Farnert et al, BMJ 2003; 326:628).
57. In Southeast Asia, relative resistance to quinine has increased and treatment should be continued for 7d.
58. Although approved for once daily dosing, Medical Letter consultants usually divide the dose in two to decrease nausea and vomiting.
59. For use in pregnancy.
60. B Lell and PG Kremsner, Antimicrob Agents Chemother 2002; 46:2315.
61. At this dosage, adverse effects including nausea, vomiting, diarrhea, dizziness, disturbed sense of balance, toxic psychosis and seizures can occur. Mefloquine should not be used for treatment of malaria in pregnancy unless there is no other treatment option because of increased risk for stillbirth (F Nosten et al, Clin Infect Dis 1999; 28:808). It should be avoided for treatment of malaria in persons with active depression or with a history of psychosis or seizures and should be used with caution in persons with psychiatric illness. Mefloquine can be given to patients taking β-blockers if they do not have an underlying arrhythmia; it should not be used in patients with conduction abnormalities. Mefloquine should not be given together with quinine, quinidine or halofantrine, and caution is required in using quinine, quinidine or halofantrine to treat patients with malaria who have taken mefloquine for prophylaxis. Resistance to mefloquine has been reported in some areas, such as the Thailand-Myanmar and Thailand-Cambodia borders and in the Amazon basin, where 25 mg/kg should be used. In the US, a 250-mg tablet of mefloquine contains 228 mg mefloquine base. Outside the US, each 275-mg tablet contains 250 mg base.
62. F Nosten et al, Lancet 2000; 356:297; M van Vugt, Clin Infect Dis 2002; 35:1498.

Infection		Drug	Adult dosage	Pediatric dosage
MALARIA, Treatment of (continued)				
P. vivax[63] acquired in areas of **chloroquine-resistance**				
ORAL[55]				
Drug of choice:		Quinine sulfate	650 mg q8h x 3-7d[57]	30 mg/kg/d in 3 doses x 3-7d[57]
		plus		
		doxycycline[7,14]	100 mg bid x 7d	4 mg/kg/d in 2 doses x 7d
	OR	Mefloquine[61]	750 mg followed 12 hrs later by 500 mg	15 mg/kg followed 12 hrs later by 10 mg/kg
Alternatives:		Chloroquine	25 mg base/kg in 3 doses over 48 hrs	25 mg base/kg in 3 doses over 48 hrs
		plus		
		primaquine[64]	30 mg base daily x 14d	0.6 mg/kg/d x 14d
All *Plasmodium* except **Chloroquine-resistant *P. falciparum*[54]** and **Chloroquine-resistant *P. vivax*[63]**				
ORAL[55]				
Drug of choice:		Chloroquine phosphate[65]	1 g (600 mg base), then 500 mg (300 mg base) 6 hrs later, then 500 mg (300 mg base) at 24 and 48 hrs	10 mg base/kg (max. 600 mg base), then 5 mg base/kg 6 hrs later, then 5 mg base/kg at 24 and 48 hrs
All *Plasmodium*				
PARENTERAL				
Drug of choice:[66]		Quinidine gluconate[67]	10 mg/kg loading dose (max. 600 mg) in normal saline over 1-2 hrs, followed by continuous infusion of 0.02 mg/kg/min until PO therapy can be started	10 mg/kg loading dose (max. 600 mg) in normal saline over 1-2 hrs, followed by continuous infusion of 0.02 mg/kg/min until PO therapy can be started
	OR	Quinine dihydrochloride[67]*	20 mg/kg loading dose in 5% dextrose over 4 hrs, followed by 10 mg/kg over 2-4 hrs q8h (max. 1800 mg/d) until PO therapy can be started	20 mg/kg loading dose in 5% dextrose over 4 hrs, followed by 10 mg/kg over 2-4 hrs q8h (max. 1800 mg/d) until PO therapy can be started
Alternative:		Artemether[68]*	3.2 mg/kg IM, then 1.6 mg/kg daily x 5-7d	3.2 mg/kg IM, then 1.6 mg/kg daily x 5-7d
Prevention of relapses: *P. vivax* and *P. ovale* only				
Drug of choice:		Primaquine phosphate[64]	30 mg base/d x 14d	0.6 mg base/kg/d x 14d
MALARIA, Prevention of[69]				
Chloroquine-sensitive areas[54]				
Drug of choice:		Chloroquine phosphate[70,71]	500 mg (300 mg base), once/wk[72]	5 mg/kg base once/wk, up to adult dose of 300 mg base[72]

* Availability problems. See table on page 12.

63. *P. vivax* with decreased susceptibility to chloroquine is a significant problem in Papua New Guinea and Indonesia. There are also a few reports of resistance from Myanmar, India, the Solomon Islands, Vanuatu, Guyana, Brazil, Colombia and Peru.
64. Primaquine phosphate can cause hemolytic anemia, especially in patients whose red cells are deficient in glucose-6-phosphate dehydrogenase. This deficiency is most common in African, Asian and Mediterranean peoples. Patients should be screened for G-6-PD deficiency before treatment. Primaquine should not be used during pregnancy.
65. If chloroquine phosphate is not available, hydroxychloroquine sulfate is as effective; 400 mg of hydroxychloroquine sulfate is equivalent to 500 mg of chloroquine phosphate.
66. Exchange transfusion has been helpful for some patients with high-density (>10%) parasitemia, altered mental status, pulmonary edema or renal complications (KD Miller et al, N Engl J Med 1989; 321:65).
67. Continuous EKG, blood pressure and glucose monitoring are recommended, especially in pregnant women and young children. For problems with quinidine availability, call the manufacturer (Eli Lilly, 800-545-5979) or the CDC Malaria Hotline (770-488-7788). Quinidine may have greater antimalarial activity than quinine. The loading dose should be decreased or omitted in those patients who have received quinine or mefloquine. If more than 48 hours of parenteral treatment is required, the quinine or quinidine dose should be reduced by 30-50%.
68. Limited studies of efficacy except with *P. falciparum*; not FDA-approved or available in the US (Artemether-Quinine Meta-Analysis Study Group, Trans R Soc Trop Med Hyg 2001; 95:637; K Marsh, East Afr Med J 2002; 79:619).
69. No drug regimen guarantees protection against malaria. If fever develops within a year (particularly within the first two months) after travel to malarious areas, travelers should be advised to seek medical attention. Insect repellents, insecticide-impregnated bed nets and proper clothing are important adjuncts for malaria prophylaxis (Medical Letter 2003; 45:41). Malaria in pregnancy is particularly serious for both mother and fetus; therefore, prophylaxis is indicated if exposure can not be avoided.
70. In pregnancy, chloroquine prophylaxis has been used extensively and safely.
71. For prevention of attack after departure from areas where *P. vivax* and *P. ovale* are endemic, which includes almost all areas where malaria is found (except Haiti), some experts prescribe in addition primaquine phosphate 30 mg base/d or, for children, 0.6 mg base/kg/d during the last 2wks of prophylaxis. Others prefer to avoid the toxicity of primaquine and rely on surveillance to detect cases when they occur, particularly when exposure was limited or doubtful. See also footnote 64.
72. Beginning 1-2wks before travel and continuing weekly for the duration of stay and for 4wks after leaving.
73. Beginning 1-2d before travel and continuing for the duration of stay and for 1wk after leaving. In one study of malaria prophylaxis, atovaquone/proguanil was better tolerated than mefloquine in nonimmune travelers (D Overbosch et al, Clin Infect Dis 2001; 33:1015).

Infection	Drug	Adult dosage	Pediatric dosage
MALARIA, Prevention of (continued)			
Chloroquine-resistant areas[54]			
Drug of choice:	Atovaquone/ proguanil[56,71]	1 adult tab/d[73]	11-20kg: 1 peds tab/d[56,73] 21-30kg: 2 peds tabs/d[56,73] 31-40kg: 3 peds tabs/d[56,73] >40kg: 1 adult tab/d[56,73]
OR	Mefloquine[61,71,74]	250 mg once/wk[72]	5-10kg: 1/8 tab once/wk[72] 11-20kg: ¼ tab once/wk[72] 21-30kg: ½ tab once/wk[72] 31-45kg: ¾ tab once/wk[72] >45kg: 1 tab once/wk[72]
OR	Doxycycline[7,71]	100 mg daily[75]	2 mg/kg/d, up to 100 mg/d[75]
Alternatives:	Primaquine[7,64]	30 mg base daily[76]	0.6 mg/kg base daily
	Chloroquine phosphate	500 mg (300 mg base) once/wk[72]	5 mg/kg base once/wk, up to 300 mg base[72]
	plus proguanil[77]	200 mg once/d	<2yrs: 50 mg once/d 2-6yrs: 100 mg once/d 7-10yrs: 150 mg once/d >10yrs: 200 mg once/d
MALARIA, Self-Presumptive Treatment[78]			
Drug of Choice:	Atovaquone/ proguanil[7,56]	4 adult tabs daily x 3d	<5kg: not indicated 5-8kg: 2 peds tabs once/d x 3d 9-10kg: 3 peds tabs once/d x 3d 11-20kg: 1 adult tab once/d x 3d 21-30kg: 2 adult tabs once/d x 3d 31-40kg: 3 adult tabs once/d x 3d >40kg: 4 adult tabs once/d x 3d
OR	Quinine sulfate **plus** doxycycline[7,14]	650 mg q8h x 3-7d[57] 100 mg bid x 7d	30 mg/kg/d in 3 doses x 3-7d[57] 4 mg/kg/d in 2 doses x 7d
OR	Mefloquine[61]	750 mg followed 12 hrs later by 500 mg	15 mg/kg followed 12 hrs later by 10 mg/kg
MICROSPORIDIOSIS			
Ocular *(Encephalitozoon hellem, Encephalitozoon cuniculi, Vittaforma corneae [Nosema corneum])*			
Drug of choice:	Albendazole[7] **plus** fumagillin[79]*	400 mg bid	
Intestinal *(Enterocytozoon bieneusi, Encephalitozoon [Septata] intestinalis)*			
E. bieneusi[80]			
Drug of choice:	Fumagillin*	60 mg/d PO x 14d	
E. intestinalis			
Drug of choice:	Albendazole[7]	400 mg bid x 21d	
Disseminated (*E. hellem, E. cuniculi, E. intestinalis, Pleistophora sp., Trachipleistophora sp.* and *Brachiola vesicularum*)			
Drug of choice:[81]	Albendazole[7]	400 mg bid	
Mites, see SCABIES			
MONILIFORMIS *moniliformis* infection			
Drug of choice:	Pyrantel pamoate[7]	11 mg/kg once, repeat twice, 2wks apart	11 mg/kg once, repeat twice, 2wks apart

* Availability problems. See table on page 12.

74. Mefloquine has not been approved for use during pregnancy. However, it has been reported to be safe for prophylactic use during the second or third trimester of pregnancy and possibly during early pregnancy as well (CDC Health Information for International Travel, 2003-2004, page 111; BL Smoak et al, J Infect Dis 1997; 176:831). For pediatric doses <½ tablet, it is advisable to have a pharmacist crush the tablet, estimate doses by weighing, and package them in gelatin capsules. There is no data for use in children <5 kg, but based on dosages in other weight groups, a dose of 5 mg/kg can be used. Mefloquine is not recommended for patients with cardiac conduction abnormalities, and patients with a history of depression, seizures, psychosis or psychiatric disorders should avoid mefloquine prophylaxis. Resistance to mefloquine has been reported in some areas, such as the Thailand-Myanmar and Thailand-Cambodia borders; in these areas, atovaquone/proguanil or doxycycline should be used for prophylaxis.
75. Beginning 1-2d before travel and continuing for the duration of stay and for 4wks after leaving. Use of tetracyclines is contraindicated in pregnancy and in children <8 years old. Doxycycline can cause gastrointestinal disturbances, vaginal moniliasis and photosensitivity reactions.
76. Studies have shown that daily primaquine beginning 1d before departure and continued until 3-7d after leaving the malaria area provides effective prophylaxis against chloroquine-resistant *P. falciparum* (JK Baird et al, Clin Infect Dis 2003; 37:1659). Some studies have shown less efficacy against *P. vivax*. Nausea and abdominal pain can be diminished by taking with food.
77. Proguanil (*Paludrine* – Wyeth Ayerst, Canada; AstraZeneca, United Kingdom), which is not available alone in the US but is widely available in Canada and Europe, is recommended mainly for use in Africa south of the Sahara. Prophylaxis is recommended during exposure and for 4wks afterwards. Proguanil has been used in pregnancy without evidence of toxicity (PA Phillips-Howard and D Wood, Drug Saf 1996; 14:131).
78. A traveler can be given a course of atovaquone/proguanil, mefloquine or quinine plus doxycycline for presumptive self-treatment of febrile illness. The drug given for self-treatment should be different from that used for prophylaxis. This approach should be used only in very rare circumstances when a traveler can not promptly get to medical care.
79. Ocular lesions due to *E. hellem* in HIV-infected patients have responded to fumagillin eyedrops prepared from *Fumidil-B*, (bicyclohexyl ammonium fumagillin) used to control a microsporidial disease of honey bees (MC Diesenhouse, Am J Ophthalmol 1993; 115:293), available from Leiter's Park Avenue Pharmacy (see footnote 1). For lesions due to *V. corneae*, topical therapy is generally not effective and keratoplasty may be required (RM Davis et al, Ophthalmology 1990; 97:953).
80. Oral fumagillin (Sanofi Recherche, Gentilly, France) has been effective in treating *E. bieneusi* (J-M Molina et al, N Engl J Med 2002; 346:1963), but has been associated with thrombocytopenia. Highly active antiretroviral therapy (HAART) may lead to microbiologic and clinical response in HIV-infected patients with microsporidial diarrhea (USPHS/IDSA Guidelines for the Treatment of Opportunistic Infections in Adults and Adolescents with HIV, 2004; In press). Octreotide *(Sandostatin)* has provided symptomatic relief in some patients with large-volume diarrhea.
81. J-M Molina et al, J Infect Dis 1995; 171:245. There is no established treatment for *Pleistophora*. For disseminated disease due to *Trachipleistophora* or *Brachiola,* itraconazole 400 mg PO once/d plus albendazole may also be tried (CM Coyle et al, N Engl J Med 2004; 351:42).

Infection		Drug	Adult dosage	Pediatric dosage
***Naegleria* species**, see AMEBIC MENINGOENCEPHALITIS, PRIMARY				
Necator americanus, see HOOKWORM infection				
***OESOPHAGOSTOMUM** bifurcum*				
Drug of choice:		See footnote 82		
Onchocerca volvulus, see FILARIASIS				
Opisthorchis viverrini, see FLUKE infection				
Paragonimus westermani, see FLUKE infection				
Pediculus capitis, humanus, Phthirus pubis, see LICE				
Pinworm, see ENTEROBIUS				
PNEUMOCYSTIS JIROVECI (formerly *carinii)* pneumonia (PCP)[83]				
Drug of choice:		Trimethoprim-sulfamethoxazole	TMP 15 mg/kg/d, SMX 75 mg/kg/d, PO or IV in 3 or 4 doses x 14-21d	TMP 15 mg/kg/d, SMX 75 mg/kg/d, PO or IV in 3 or 4 doses x 14-21d
Alternatives:		Primaquine[7,64]	30 mg base PO daily x 21d	
		plus clindamycin[7]	600 mg IV q6h x 21d, or 300-450 mg PO q6h x 21d	
	OR	Trimethoprim[7]	5 mg/kg tid x 21d	
		plus dapsone[7]	100 mg daily x 21d	
	OR	Pentamidine	3-4 mg/kg IV daily x 14-21d	3-4 mg/kg IV daily x 14-21d
	OR	Atovaquone	750 mg bid x 21d	1-3mos: 30 mg/kg/d 4-24mos: 45 mg/kg/d >24mos: 30 mg/d
Primary and secondary prophylaxis[84]				
Drug of Choice:		Trimethoprim-sulfamethoxazole	1 tab (single or double strength) daily	TMP 150 mg/m^2, SMX 750 mg/m^2 in 2 doses on 3 consecutive days per wk
Alternatives:[85]		Dapsone[7]	50 mg bid, or 100 mg daily	2 mg/kg/d (max. 100 mg) or 4 mg/kg (max. 200 mg) each wk
	OR	Dapsone[7]	50 mg daily or 200 mg each wk	
		plus pyrimethamine[86]	50 mg or 75 mg each wk	
	OR	Pentamidine aerosol	300 mg inhaled monthly via *Respirgard II* nebulizer	≥5yrs: 300 mg inhaled monthly via *Respirgard II* nebulizer
	OR	Atovaquone[7]	1500 mg daily	1-3mos: 30 mg/kg/d 4-24mos: 45 mg/kg/d >24mos: 30 mg/kg/d
Roundworm, see ASCARIASIS				
Sappinia Diploidea, See AMEBIC MENINGOENCEPHALITIS, PRIMARY				
SCABIES *(Sarcoptes scabiei)*				
Drug of choice:		5% Permethrin	Topically[87]	Topically[87]
Alternatives:[88]		Ivermectin[7,89]	200 mcg/kg once[87]	200 mcg/kg once[87]
		10% Crotamiton	Topically once/daily x 2	Topically once/daily x 2
SCHISTOSOMIASIS *(Bilharziasis)*				
S. haematobium				
Drug of choice:		Praziquantel	40 mg/kg/d in 2 doses x 1d	40 mg/kg/d in 2 doses x 1d
S. japonicum				
Drug of choice:		Praziquantel	60 mg/kg/d in 3 doses x 1d	60 mg/kg/d in 3 doses x 1d
S. mansoni				
Drug of choice:		Praziquantel	40 mg/kg/d in 2 doses x 1d	40 mg/kg/d in 2 doses x 1d
Alternative:		Oxamniquine[90]*	15 mg/kg once[91]	20 mg/kg/d in 2 doses x 1d[91]
S. mekongi				
Drug of choice:		Praziquantel	60 mg/kg/d in 3 doses x 1d	60 mg/kg/d in 3 doses x 1d

* Availability problems. See table on page 12.

82. Albendazole or pyrantel pamoate may be effective (JB Ziem et al, Ann Trop Med Parasitol 2004; 98:385).
83. Pneumocystis has been reclassified as a fungus. In severe disease with room air $PO_2 \leq 70$ mmHg or Aa gradient ≥ 35 mmHg, prednisone should also be used (S Gagnon et al, N Engl J Med 1990; 323:1444; E Caumes et al, Clin Infect Dis 1994; 18:319).
84. Primary/secondary prophylaxis in patients with HIV can be discontinued after CD4 count increases to >200 x 10^6/L for >3mos.
85. An alternative trimethoprim/sulfamethoxazole regimen is one DS tab 3x/wk. Weekly therapy with sulfadoxine 500 mg/pyrimethamine 25 mg/leucovorin 25 mg was effective PCP prophylaxis in liver transplant patients (J Torre-Cisneros et al, Clin Infect Dis 1999; 29:771).
86. Plus leucovorin 25 mg with each dose of pyrimethamine.
87. In some cases, treatment may need to be repeated in 10-14 days.
88. Lindane (γ-benzene hexachloride; *Kwell)* should be reserved as a second-line agent. The FDA has recommended it should not be used for immunocompromised patients, young children, the elderly, and patients <50 kg.
89. Ivermectin, either alone or in combination with a topical scabicide, is the drug of choice for crusted scabies in immunocompromised patients (P del Giudice, Curr Opin Infect Dis 2004; 15:123). The safety of oral ivermectin in pregnancy and young children has not been established.
90. Oxamniquine has been effective in some areas in which praziquantel is less effective (FF Stelma et al, J Infect Dis 1997; 176:304). Oxamniquine is contraindicated in pregnancy.
91. In East Africa, the dose should be increased to 30 mg/kg, and in Egypt and South Africa to 30 mg/kg/d x 2d. Some experts recommend 40-60 mg/kg over 2-3d in all of Africa (KC Shekhar, Drugs 1991; 42:379).

Infection	Drug	Adult dosage	Pediatric dosage
Sleeping sickness, see TRYPANOSOMIASIS			
STRONGYLOIDIASIS *(Strongyloides stercoralis)*			
Drug of choice:[92]	Ivermectin	200 mcg/kg/d x 2d	200 mcg/kg/d x 2d
Alternative:	Albendazole[7]	400 mg bid x 7d	400 mg bid x 7d
OR	Thiabendazole	50 mg/kg/d in 2 doses x 2d (max 3g/d)[93]	50 mg/kg/d in 2 doses x 2d (max 3g/d)[93]
TAPEWORM infection			
— **Adult** (intestinal stage)			
Diphyllobothrium latum **(fish),** ***Taenia saginata*** **(beef),** ***Taenia solium*** **(pork),** ***Dipylidium caninum*** **(dog)**			
Drug of choice:	Praziquantel[7]	5-10 mg/kg once	5-10 mg/kg once
Alternative:	Niclosamide*	2 g once	50 mg/kg once
Hymenolepis nana **(dwarf tapeworm)**			
Drug of choice:	Praziquantel[7]	25 mg/kg once	25 mg/kg once
Alternative:	Nitazoxanide[4,7]	500 mg x 3d[94]	1-3yrs: 100 mg bid x 3d[94] 4-11yrs: 200 mg bid x 3d[94]
— **Larval** (tissue stage)			
Echinococcus granulosus (hydatid cyst)			
Drug of choice:[95]	Albendazole	400 mg bid x 1-6mos	15 mg/kg/d (max. 800 mg) x 1-6mos
Echinococcus multilocularis			
Treatment of choice:	See footnote 96		
Taenia solium *(Cysticercosis)*			
Treatment of choice:	See footnote 97		
Alternative:	Albendazole	400 mg bid x 8-30d; can be repeated as necessary	15 mg/kg/d (max. 800 mg) in 2 doses x 8-30d; can be repeated as necessary
OR	Praziquantel[7]	50-100 mg/kg/d in 3 doses x 30d	50-100 mg/kg/d in 3 doses x 30d
Toxocariasis, see VISCERAL LARVA MIGRANS			
TOXOPLASMOSIS *(Toxoplasma gondii)*[98]			
Drugs of choice:[99,100]	Pyrimethamine[101]	25-100 mg/d x 3-4wks	2 mg/kg/d x 3d, then 1 mg/kg/d (max. 25 mg/d) x 4wks[102]
	plus		
	sulfadiazine	1-1.5 g qid 3-4wks	100-200 mg/kg/d x 3-4wks
TRICHINELLOSIS *(Trichinella spiralis)*			
Drugs of choice:	Steroids for severe symptoms		
	plus		
	mebendazole[7]	200-400 mg tid x 3d, then 400-500 mg tid x 10d	200-400 mg tid x 3d, then 400-500 mg tid x 10d
Alternative:	Albendazole[7]	400 mg bid x 8-14d	400 mg bid x 8-14d
TRICHOMONIASIS *(Trichomonas vaginalis)*			
Drug of choice:[103]	Metronidazole	2 g once or 500 mg bid x 7d	15 mg/kg/d orally in 3 doses x 7d
OR	Tinidazole[5]	2 g once	50 mg/kg once (max. 2 g)

* Availability problems. See table on page 12.

92. In immunocompromised patients or disseminated disease, it may be necessary to prolong or repeat therapy, or to use other agents. Veterinary parenteral and enema formulations of ivermectin have been used in severely ill patients unable to take oral medications (PL Chiodini et al, Lancet 2000; 355:43; J Orem et al, Clin Infect Dis 2003; 37:152; PE Tarr Am J Trop Med Hyg 2003; 68:453).
93. This dosage is likely to be toxic and may have to be decreased.
94. JO Juan et al, Trans R Soc Trop Med Hyg 2002; 96:193.
95. Patients may benefit from surgical resection or percutaneous drainage of cysts. Praziquantel is useful preoperatively or in case of spillage of cyst contents during surgery. Percutaneous aspiration-injection-reaspiration (PAIR) with ultrasound guidance plus albendazole therapy has been effective for management of hepatic hydatid cyst disease (RA Smego, Jr., et al, Clin Infect Dis 2003; 37:1073).
96. Surgical excision is the only reliable means of cure. Reports have suggested that in nonresectable cases use of albendazole or mebendazole can stabilize and sometimes cure infection (P Craig, Curr Opin Infect Dis 2003; 16:437).
97. Initial therapy for patients with inflammed parenchymal cysticercosis should focus on symptomatic treatment with anti-seizure medication. Treatment of parenchymal cysticerci with albendazole or praziquantel is controversial (JM Maguire, N Engl J Med 2004; 350:215). Patients with live parenchymal cysts who have seizures should be treated with albendazole together with steroids (6 mg dexamethasone or 40-60 mg prednisone daily) and an anti-seizure medication (HH Garcia et al, N Engl J Med 2004; 350:249). Patients with subarachnoid cysts or giant cysts in the fissures should be treated for at least 30d (JV Proaño et al, N Engl J Med 2001; 345:879). Surgical intervention or CSF diversion is indicated for obstructive hydocephalus; prednisone 40 mg/d may be given with surgery. Arachnoiditis, vasculitis or cerebral edema is treated with prednisone 60 mg/d or dexamethasone 4-6 mg/d together with albendazole or praziquantel (AC White, Jr., Annu Rev Med 2000; 51:187). Any cysticercocidal drug may cause irreparable damage when used to treat ocular or spinal cysts, even when corticosteroids are used. An ophthalmic exam should always precede treatment to rule out intraocular cysts.
98. In ocular toxoplasmosis with macular involvement, corticosteroids are recommended in addition to antiparasitic therapy for an anti-inflammatory effect.
99. To treat CNS toxoplasmosis in HIV-infected patients, some clinicians have used pyrimethamine 50-100 mg/d (after a loading dose of 200 mg) with sulfadiazine and, when sulfonamide sensitivity developed, have given clindamycin 1.8-2.4 g/d in divided doses instead of the sulfonamide. Atovaquone plus pyrimethamine appears to be an effective alternative in sulfa-intolerant patients (K Chirgwin et al, Clin Infect Dis 2002; 34:1243). Treatment is followed by chronic suppression with lower dosage regimens of the same drugs. For primary prophylaxis in HIV patients with <100 x 10^6/L CD4 cells, either trimethoprim-sulfamethoxazole, pyrimethamine with dapsone, or atovaquone with or without pyrimethamine can be used. Primary or secondary prophylaxis may be discontinued when the CD4 count increases to >200 x 10^6/L for more than 3 months (USPHS/IDSA Guidelines for the Treatment of Opportunistic Infections in Adults and Adolescents with HIV, 2004; In press).
100. Women who develop toxoplasmosis during the first trimester of pregnancy can be treated with spiramycin (3-4 g/d). After the first trimester, if there is no documented transmission to the fetus, spiramycin can be continued until term. If transmission has occurred *in utero*, therapy with pyrimethamine and sulfadiazine should be started (JG Montoya and O Liesenfeld, Lancet 2004; 363:1965). Pyrimethamine is a potential teratogen and should be used only after the first trimester.
101. Plus leucovorin 10-25 mg with each dose of pyrimethamine.
102. Congenitally infected newborns should be treated with pyrimethamine every 2 or 3 days and a sulfonamide daily for about one year (JS Remington and G Desmonts in JS Remington and JO Klein, eds, *Infectious Disease of the Fetus and Newborn Infant*, 5th ed, Philadelphia:Saunders, 2001, page 290).
103. Sexual partners should be treated simultaneously. Metronidazole-resistant strains have been reported and can be treated with higher doses of metronidazole (2-4 g/d x 7-14d) or with tinidazole (WD Hager, Sex Transm Dis 2004; 31:343).

Infection	Drug	Adult dosage	Pediatric dosage
TRICHOSTRONGYLUS infection			
Drug of choice:	Pyrantel pamoate[7]	11 mg/kg base once (max. 1 g)	11 mg/kg once (max. 1 g)
Alternative:	Mebendazole[7]	100 mg bid x 3d	100 mg bid x 3d
OR	Albendazole[7]	400 mg once	400 mg once
TRICHURIASIS (*Trichuris trichiura,* whipworm)			
Drug of choice:	Mebendazole	100 mg bid x 3d or 500 mg once	100 mg bid x 3d or 500 mg once
Alternative:	Albendazole[7]	400 mg x 3d	400 mg x 3d
	Ivermectin[7]	200 mcg/kg daily x 3d	200 mcg/kg daily x 3d
TRYPANOSOMIASIS[104]			
T. cruzi (American trypanosomiasis, Chagas' disease)			
Drug of choice:	Benznidazole*	5-7 mg/kg/d in 2 divided doses x 30-90d	≤12yrs: 10 mg/kg/d in 2 doses x 30-90d
OR	Nifurtimox[105]*	8-10 mg/kg/d in 3-4 doses x 90-120d	1-10yrs: 15-20 mg/kg/d in 4 doses x 90d 11-16yrs: 12.5-15 mg/kg/d in 4 doses x 90d
T. brucei gambiense (West African trypanosomiasis, sleeping sickness)			
hemolymphatic stage			
Drug of choice:[106]	Pentamidine isethionate[7]	4 mg/kg/d IM x 10d	4 mg/kg/d IM x 10d
Alternative:	Suramin*	100-200 mg (test dose) IV, then 1 g IV on days 1,3,7,14 and 21	20 mg/kg on days 1,3,7,14 and 21
Late disease with CNS involvement			
Drug of Choice:	Melarsoprol[107]	2.2 mg/kg/d x 10d	2.2 mg/kg/d x 10d
OR	Eflornithine[108]*	400 mg/kg/d in 4 doses x 14d	400 mg/kg/d in 4 doses x 14d
T. b. rhodesiense (East African trypanosomiasis, sleeping sickness)			
hemolymphatic stage			
Drug of choice:	Suramin*	100-200 mg (test dose) IV, then 1 g IV on days 1,3,7,14 and 21	20 mg/kg on days 1,3,7,14 and 21
Late disease with CNS involvement			
Drug of choice:	Melarsoprol[107]	2-3.6 mg/kg/d x 3d; after 7d 3.6 mg/kg/d x 3d; repeat again after 7d	2-3.6 mg/kg/d x 3d; after 7d 3.6 mg/kg/d x 3d; repeat again after 7d
VISCERAL LARVA MIGRANS[109] *(Toxocariasis)*			
Drug of choice:	Albendazole[7]	400 mg bid x 5d	400 mg bid x 5d
	Mebendazole[7]	100-200 mg bid x 5d	100-200 mg bid x 5d
Whipworm, see TRICHURIASIS			
Wuchereria bancrofti, see FILARIASIS			

* Availability problems. See table on page 12.

104. MP Barrett et al, Lancet 2003; 362:1469.
105. The addition of gamma interferon to nifurtimox for 20d in experimental animals and in a limited number of patients appears to shorten the acute phase of Chagas' disease (RE McCabe et al, J Infect Dis 1991; 163:912).
106. For treatment of *T.b. gambiense*, pentamidine and suramin have equal efficacy but pentamidine is better tolerated.
107. In frail patients, begin with as little as 18 mg and increase the dose progressively. Pretreatment with suramin has been advocated for debilitated patients. Corticosteroids have been used to prevent arsenical encephalopathy (J Pepin et al, Trans R Soc Trop Med Hyg 1995; 89:92). Up to 20% of patients with *T.b. gambiense* fail to respond to melarsoprol (MP Barrett, Lancet 1999; 353:1113).
108. Eflornithine is highly effective in *T.b. gambiense* but not against *T.b. rhodesiense* infections. It is available in limited supply only from the WHO and the CDC.
109. Optimum duration of therapy is not known; some Medical Letter consultants would treat for 20d. For severe symptoms or eye involvement, corticosteroids can be used in addition.

MANUFACTURERS OF DRUGS USED TO TREAT PARASITIC INFECTIONS

albendazole – *Albenza* (GlaxoSmithKline)
Albenza (GlaxoSmithKline) – albendazole
Alinia (Romark) – nitazoxanide
amphotericin – *Fungizone* (Apothecon), others
Ancobon (ICN) – flucytosine
§ *Antiminth* (Pfizer) – pyrantel pamoate
• *Aralen* (Sanofi) – chloroquine HCl and chloroquine phosphate
§ artemether – *Artenam* (Arenco, Belgium)
§ *Artenam* (Arenco, Belgium) – artemether
§ artesunate – (Guilin No. 1 Factory, People's Republic of China)
atovaquone – *Mepron* (GlaxoSmithKline)
atovaquone/proguanil – *Malarone* (GlaxoSmithKline)
azithromycin – *Zithromax* (Pfizer)
• *Bactrim* (Roche) – TMP/Sulfa
§ benznidazole – *Rochagan* (Roche, Brazil)
Biaxin (Abbott) – clarithromycin
§ *Biltricide* (Bayer) – praziquantel
† bithionol – *Bitin* (Tanabe, Japan)
† *Bitin* (Tanabe, Japan) – bithionol
§ *Brolene* (Aventis, Canada) – propamidine isethionate
chloroquine HCl and chloroquine phosphate – *Aralen* (Sanofi), others
clarithromycin – *Biaxin* (Abbott)
• *Cleocin* (Pfizer) – clindamycin
clindamycin – *Cleocin* (Pfizer), others
crotamiton – *Eurax* (Westwood-Squibb)
dapsone – (Jacobus)
Daraprim (GlaxoSmithKline) – pyrimethamine USP
† diethylcarbamazine citrate USP – *Hetrazan*
Diflucan (Roerig) – fluconazole
§ diloxanide furoate – *Furamide* (Boots, United Kingdom)
doxycycline – *Vibramycin* (Pfizer), others
† eflornithine (Difluoromethylornithine, DFMO) – *Ornidyl* (Aventis)
§ *Egaten* (Novartis) – triclabendazole
Elimite (Allergan) – permethrin
Ergamisol (Janssen) – levamisole
Eurax (Westwood-Squibb) – crotamiton
fluconazole – *Diflucan* (Roerig)
• *Flagyl* (Searle) – metronidazole
flucytosine – *Ancobon* (ICN)
• *Fungizone* (Apothecon) – amphotericin
§ *Furamide* (Boots, United Kingdom) – diloxanide furoate
§ furazolidone – *Furozone* (Roberts)
§ *Furozone* (Roberts) – furazolidone
† *Germanin* (Bayer, Germany) – suramin sodium
§ *Glucantime* (Aventis, France) – meglumine antimonate
† *Hetrazan* – diethylcarbamazine citrate USP
Humatin (Monarch) – paromomycin
§ *Impavido* (Zentaris, Germany) – miltefosine
iodoquinol – *Yodoxin* (Glenwood), others
itraconazole – *Sporanox* (Janssen-Ortho)
ivermectin – *Stromectol* (Merck)
ketoconazole – *Nizoral* (Janssen), others
† *Lampit* (Bayer, Germany) – nifurtimox
Lariam (Roche) – mefloquine
§ *Leshcutan* (Teva, Israel) – topical paromomycin
levamisole – *Ergamisol* (Janssen)
Malarone (GlaxoSmithKline) – atovaquone/proguanil
malathion – *Ovide* (Medicis)
mebendazole – *Vermox* (McNeil)
mefloquine – *Lariam* (Roche)
§ meglumine antimonate – *Glucantime* (Aventis, France)
† melarsoprol – *Mel-B* (Specia)
† *Mel-B* (Specia) – melarsoprol
Mepron (GlaxoSmithKline) – atovaquone
metronidazole – *Flagyl* (Searle), others
§ miltefosine – *Impavido* (Zentaris, Germany)
NebuPent (Fujisawa) – pentamidine isethionate
Neutrexin (US Bioscience) – trimetrexate
§ niclosamide – *Yomesan* (Bayer, Germany)
† nifurtimox – *Lampit* (Bayer, Germany)
nitazoxanide – *Alinia* (Romark)
• *Nizoral* (Janssen) – ketoconazole
Nix (GlaxoSmithKline) – permethrin
§ ornidazole – *Tiberal* (Roche, France)
† *Ornidyl* (Aventis) – eflornithine (Difluoromethylornithine, DFMO)
Ovide (Medicis) – malathion
§ oxamniquine – *Vansil* (Pfizer)
§ *Paludrine* (Wyeth Ayerst, Canada; AstraZeneca, United Kingdom) – proguanil
paromomycin – *Humatin* (Monarch); *Leshcutan* (Teva, Israel; (topical formulation not available in US)
Pentam 300 (Fujisawa) – pentamidine isethionate
pentamidine isethionate – *Pentam 300* (Fujisawa), *NebuPent* (Fujisawa)
† *Pentostam* (GlaxoSmithKline, United Kingdom) – sodium stibogluconate
permethrin – *Nix* (GlaxoSmithKline), *Elimite* (Allergan)
§ praziquantel – *Biltricide* (Bayer)
primaquine phosphate USP
§ proguanil – *Paludrine* (Wyeth Ayerst, Canada; AstraZeneca, United Kingdom)
proguanil/atovaquone – *Malarone* (GlaxoSmithKline)
§ propamidine isethionate – *Brolene* (Aventis, Canada)
§ pyrantel pamoate – *Antiminth* (Pfizer)
pyrethrins and piperonyl butoxide – *RID* (Pfizer), others
pyrimethamine USP – *Daraprim* (GlaxoSmithKline)
* quinidine gluconate (Eli Lilly)
§ quinine dihydrochloride
quinine sulfate – many manufacturers
• *RID* (Pfizer) – pyrethrins and piperonyl butoxide
• *Rifadin* (Aventis) – rifampin
rifampin – *Rifadin* (Aventis), others
§ *Rochagan* (Roche, Brazil) – benznidazole
* *Rovamycine* (Aventis) – spiramycin
† sodium stibogluconate – *Pentostam* (GlaxoSmithKline, United Kingdom)
* spiramycin – *Rovamycine* (Aventis)
Sporanox (Janssen-Ortho) – itraconazole
Stromectol (Merck) – ivermectin
sulfadiazine
† suramin sodium – *Germanin* (Bayer, Germany)
§ *Tiberal* (Roche, France) – ornidazole
Tindamax (Presutti) – tinidazole
tinidazole – *Tindamax* (Presutti)
TMP/Sulfa – *Bactrim* (Roche), others
§ triclabendazole – *Egaten* (Novartis)
trimetrexate – *Neutrexin* (US Bioscience)
§ *Vansil* (Pfizer) – oxamniquine
Vermox (McNeil) – mebendazole
• *Vibramycin* (Pfizer) – doxycycline
• *Yodoxin* (Glenwood) – iodoquinol
§ *Yomesan* (Bayer, Germany) – niclosamide
Zithromax (Pfizer) – azithromycin

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* Available in the US only from the manufacturer.
§ Not available in the US; may be available through a compounding pharmacy
† Available under an Investigational New Drug (IND) protocol from the CDC Drug Service, Centers for Disease Control and Prevention, Atlanta, Georgia 30333; 404-639-3670 (evenings, weekends, or holidays: 404-639-2888).
• Also available generically.