

TOXOPLASMOSIS (*Toxoplasma gondii*)

Drug	Adult dosage	Pediatric dosage
Drug of choice: ¹ plus sulfadiazine ⁴	Pyrimethamine ² 25-100 mg/d PO x 3-4 wks 1-1.5 g PO qid x 3-4 wks	2 mg/kg/d PO x 2d, then 1 mg/kg/d (max. 25 mg/d) x 4 wks ³ 100-200 mg/kg/d PO x 3-4 wks

1. 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. Treatment is usually given for at least 4-6 weeks. Atovaquone (1500 mg PO bid) plus pyrimethamine (200 mg loading dose, followed by 75 mg/d PO) for 6 weeks appears to be an effective alternative in sulfa-intolerant patients (K Chirgwin et al, Clin Infect Dis 2002; 34:1243). Atovaquone must be taken with a meal to enhance absorption. Treatment is followed by chronic suppression with lower dosage regimens of the same drugs. For primary prophylaxis in HIV patients with <100 x 10⁶/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 10⁶/L for >3mos (MMWR Morb Mortal Wkly Rep 2004; 53 [RR15]:1). In ocular toxoplasmosis with macular involvement, corticosteroids are recommended in addition to antiparasitic therapy for an anti-inflammatory effect. In one randomized single-blind study, trimethoprim/sulfamethoxazole was reported to be as effective as pyrimethamine/sulfadiazine for treatment of ocular toxoplasmosis (M Soheilian et al, Ophthalmology 2005; 112:1876). Women who develop toxoplasmosis during the first trimester of pregnancy should 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.

2. Plus leucovorin 10-25 mg with each dose of pyrimethamine. Pyrimethamine should be taken with food to minimize gastrointestinal adverse effects.
3. 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*, 6th ed, Philadelphia:Saunders, 2006, page 1038).
4. Sulfadiazine should be taken on an empty stomach with adequate water.

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MANUFACTURERS OF DRUGS USED TO TREAT PARASITIC INFECTIONS

albendazole – <i>Albenza</i> (GlaxoSmithKline) – albendazole	§ <i>Glucantime</i> (Aventis, France) – meglumine antimonate
<i>Alinia</i> (Romark) – nitazoxanide	† <i>Hetrazan</i> – diethylcarbamazine citrate (DEC)
<i>AmBisome</i> (Gilead) – amphotericin B, liposomal amphotericin B – <i>Fungizone</i> (Apothecon), others	<i>Humatin</i> (Monarch) – paromomycin
amphotericin B, liposomal – <i>AmBisome</i> (Gilead)	§ <i>Impavido</i> (Zentaris, Germany) – miltefosine
<i>Ancobon</i> (Valeant) – flucytosine	iodoquinol – <i>Yodoxin</i> (Glenwood), others
§ <i>Antiminth</i> (Pfizer) – pyrantel pamoate	itraconazole – <i>Sporanox</i> (Janssen-Ortho), others
• <i>Aralen</i> (Sanofi) – chloroquine HCl and chloroquine phosphate	ivermectin – <i>Stromectol</i> (Merck)
§ artemether – <i>Arteman</i> (Arenco, Belgium)	ketoconazole – <i>Nizoral</i> (Janssen), others
§ artemether/lumefantrine – <i>Coartem</i> , <i>Riamet</i> (Novartis)	† <i>Lampit</i> (Bayer, Germany) – nifurtimox
§ <i>Arteman</i> (Arenco, Belgium) – artemether	<i>Lariam</i> (Roche) – mefloquine
§ artesunate – (Guilin No. 1 Factory, People's Republic of China)	§ <i>Leschutan</i> (Teva, Israel) – topical paromomycin
atovaquone – <i>Mepron</i> (GlaxoSmithKline)	levamisole – <i>Ergamisol</i> (Janssen)
atovaquone/proguanil – <i>Malarone</i> (GlaxoSmithKline)	lumefantrine/artemether – <i>Coartem</i> , <i>Riamet</i> (Novartis)
azithromycin – <i>Zithromax</i> (Pfizer), others	<i>Malarone</i> (GlaxoSmithKline) – atovaquone/proguanil
• <i>Bactrim</i> (Roche) – TMP/Sulfa	malathion – <i>Ovide</i> (Medicis)
§ benznidazole – <i>Rochagan</i> (Brazil)	mebendazole – <i>Vermox</i> (McNeil), others
• <i>Biaxin</i> (Abbott) – clarithromycin	mefloquine – <i>Lariam</i> (Roche)
§ <i>Biltricide</i> (Bayer) – praziquantel	§ meglumine antimonate – <i>Glucantime</i> (Aventis, France)
† bithionol – <i>Bitin</i> (Tanabe, Japan)	† <i>Melarsoprol</i> – <i>Mel-B</i>
† <i>Bitin</i> (Tanabe, Japan) – bithionol	† <i>Mel-B</i> – melarsoprol
§ <i>Brolene</i> (Aventis, Canada) – propamidine isethionate	<i>Mepron</i> (GlaxoSmithKline) – atovaquone
chloroquine HCl and chloroquine phosphate – <i>Aralen</i> (Sanofi), others	metronidazole – <i>Flagyl</i> (Pfizer), others
clarithromycin – <i>Biaxin</i> (Abbott), others	§ miconazole – <i>Monistat</i> i.v.
• <i>Cleocin</i> (Pfizer) – clindamycin	§ miltefosine – <i>Impavido</i> (Zentaris, Germany)
clindamycin – <i>Cleocin</i> (Pfizer), others	§ <i>Monistat</i> i.v. – miconazole
<i>Coartem</i> (Novartis) – artemether/lumefantrine	<i>NebuPent</i> (Fujisawa) – pentamidine isethionate
crotamiton – <i>Eurax</i> (Westwood-Squibb)	§ niclosamide – <i>Yomesan</i> (Bayer, Germany)
dapsone – (Jacobus)	† <i>nifurtimox</i> – <i>Lampit</i> (Bayer, Germany)
§ <i>Daraprim</i> (GlaxoSmithKline) – pyrimethamine USP	nitazoxanide – <i>Alinia</i> (Romark)
† diethylcarbamazine citrate (DEC) – <i>Hetrazan</i>	<i>Nix</i> (GlaxoSmithKline) – permethrin
• <i>Diflucan</i> (Pfizer) – fluconazole	• <i>Nizoral</i> (Janssen) – ketoconazole
§ diloxanide furoate – <i>Furamide</i> (Boots, United Kingdom)	§ <i>ornidazole</i> – <i>Tiberal</i> (Roche, France)
doxycycline – <i>Vibramycin</i> (Pfizer), others	<i>Ornidyl</i> (Aventis) – eflornithine (Difluoromethylornithine, DFMO)
eflornithine (Difluoromethylornithine, DFMO) – <i>Ornidyl</i> (Aventis)	<i>Ovide</i> (Medicis) – malathion
§ <i>Egaten</i> (Novartis) – triclabendazole	§ oxamniquine – <i>Vansil</i> (Pfizer)
<i>Elmite</i> (Allergan) – permethrin	§ <i>Paludrine</i> (AstraZeneca, United Kingdom) – proguanil
<i>Ergamisol</i> (Janssen) – levamisole	paromomycin – <i>Humatin</i> (Monarch); <i>Leschutan</i> (Teva, Israel; topical formulation not available in US)
<i>Eurax</i> (Westwood-Squibb) – crotamiton	<i>Pentam 300</i> (Fujisawa) – pentamidine isethionate
• <i>Flagyl</i> (Pfizer) – metronidazole	pentamidine isethionate – <i>Pentam 300</i> (Fujisawa), <i>NebuPent</i> (Fujisawa)
§ <i>Flisint</i> (Sanofi-Aventis, France) – fumagillin	† <i>Pentostam</i> (GlaxoSmithKline, United Kingdom) – sodium stibogluconate
fluconazole – <i>Diflucan</i> (Pfizer), others	permethrin – <i>Nix</i> (GlaxoSmithKline), <i>Elmite</i> (Allergan)
flucytosine – <i>Ancobon</i> (Valeant)	§ praziquantel – <i>Biltricide</i> (Bayer)
§ fumagillin – <i>Flisint</i> (Sanofi-Aventis, France)	primaquine phosphate USP
• <i>Fungizone</i> (Apothecon) – amphotericin	§ proguanil – <i>Paludrine</i> (AstraZeneca, United Kingdom)
§ <i>Furamide</i> (Boots, United Kingdom) – diloxanide furoate	proguanil/atovaquone – <i>Malarone</i> (GlaxoSmithKline)
§ furazolidone – <i>Furozone</i> (Roberts)	§ propanidimine isethionate – <i>Brolene</i> (Aventis, Canada)
§ <i>Furozone</i> (Roberts) – furazolidone	§ pyrantel pamoate – <i>Antiminth</i> (Pfizer)
† <i>Germanin</i> (Bayer, Germany) – suramin sodium	

(continued)

- pyrethrins and piperonyl butoxide – *RID* (Pfizer),
others
- § pyrimethamine USP – *Daraprim* (GlaxoSmithKline)
Qualaquin – quinine sulfate (Mutual Pharmaceutical
Co/AR Scientific)
- quinacrine
- * quinidine gluconate (Eli Lilly)
- § quinine dihydrochloride
quinine sulfate – *Qualaquin* (Mutual Pharmaceutical
Co/AR Scientific)
- Riamet* (Novartis) – artemether/lumefantrine
- *RID* (Pfizer) – pyrethrins and piperonyl butoxide
- *Rifadin* (Aventis) – rifampin
- rifampin – *Rifadin* (Aventis), others
- § *Rochagan* (Brazil) – benznidazole
- * *Rovamycin* (Aventis) – spiramycin
- † sodium stibogluconate – *Pentostam*
(GlaxoSmithKline, United Kingdom)
- * spiramycin – *Rovamycin* (Aventis)
- *Sporanox* (Janssen-Ortho) – itraconazole
Stromectol (Merck) – ivermectin
sulfadiazine – (Eon)
- † suramin sodium – *Germanin* (Bayer, Germany)
- § *Tiberal* (Roche, France) – ornidazole
Tindamax (Mission) – tinidazole
tinidazole – *Tindamax* (Mission)
TMP/Sulfa – *Bactrim* (Roche), others
- § triclabendazole – *Egaten* (Novartis)
- § *Vansil* (Pfizer) – oxamniquine
- *Vermox* (McNeil) – mebendazole
- *Vibramycin* (Pfizer) – doxycycline
- *Yodoxin* (Glenwood) – iodoquinol
- § *Yomesan* (Bayer, Germany) – niclosamide
- *Zithromax* (Pfizer) – azithromycin

* Available in the US only from the manufacturer.

§ Not available commercially. It may be obtained through compounding pharmacies such as Panorama Compounding Pharmacy, 6744 Balboa Blvd, Van Nuys, CA 91406 (800-247-9767) or Medical Center Pharmacy, New Haven, CT (203-688-6816). Other compounding pharmacies may be found through the National Association of Compounding Pharmacies (800-687-7850) or the Professional Compounding Centers of America (800-331-2498, www.pccarx.com).

† Available from the CDC Drug Service, Centers for Disease Control and Prevention, Atlanta, Georgia 30333; 404-639-3670 (evenings, weekends, or holidays: 770-488-7100).

• Also available generically.

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