	Parasite	Stage infective to humans	Stage infective to vector/Intermediate Host	Host	Vector/Intermediate Host	Diagnosis	Drugs	Notes
MALARIA	*P. falciparum*	sporozoite	gametocyte	human	Anapholes spp.	thick/thin smear	altimicin	Cerebral malaria, drug resistance-8-11 day incubation
	P. vivax	sporozoite	gametocyte	human	Anapholes spp.	thick/thin smear	chloriquine	hypnozoite-10-17 day incubation
	P. ovale	sporozoite	gametocyte	human	Anapholes spp.	thick/thin smear	chloriquine	hypnozoite-10-17 day incubation
	P. malariae	sporozoite	gametocyte	human	Anapholes spp.	thick/thin smear	chloriquine	RBC inf>30 yrs-18-40 day incubation
TRYPANOSOMIASIS	*Trypanosoma cruzi*	trypomastigote	trypomastigote	armadillo, opossum, agouti, rodents, humans, dogs, cats	Reduviid spp.	Thick or thin Blood smear-identification of trypomastigotes, xenodiagnosis, serology	Nifurtimox, Benzimadazole	Chagoma Romana's Sign, apical aneurism, cardiomegaly, megacolon, megesophagus
	Trypanosoma brucei rhodesiense	trypomastigote	trypomastigote	domestic & wild animals are resevior hosts to humans; CATTLE	Tsetse fly	identification of trypomastigotes, xenodiagnosis, serology	Suramin & Melarsoprol (if CNS)	Acute
	Trypanosoma brucei gambiense	trypomastigote	trypomastigote	human (are resevior hosts to animals), PIGS	Tsetse fly	identification of trypomastigotes, xenodiagnosis, serology	Suramin & Melarsoprol (if CNS)	Chronic
LEISHMANIA	*Leishmaniasis donovani*	promastigote	amastigote	dogs, rodents	Lutzomyia spp. And Phlebotomus spp. Sandfly	amastigotes in marrow/spleen smears, culture; zenodiagnosis	Pentostam	Systemic-Kala Azar (DOUBLE DAILY PEAK FEVER)
	Leishmaniasis tropica	promastigote	amastigote	dogs, rodents	Phlebotomus spp. Sandfly	amastigotes in lesion, culture	Pentostam	Cutaneous-small red papule, dry
	Leishmaniasis major	promastigote	amastigote	dogs, rodents	Phlebotomus spp. Sandfly	amastigotes in lesion, culture	Pentostam	Cutaneous-small red papule, serous
	Leishmaniasis braziliensis	promastigote	amastigote	dogs, rodents, SLOTHS	Lutzomyia spp. Sandfly	Direct Only-amastigotes in lesion, culture	Pentostam-Amphiteracin B	Cutaneous-Espunda, Uta

	Trichomonas vaginalis	trophozoite		humans		trophozoite in urine or vaginal discharge smear	Metronidazole (Flagyl)	sexually transmitted
	Giardia lamblia	ingestion of cysts in water (trophozoite not infective)		dogs (low pathology), beavers		Direct:cysts in stool, ELISA, Immunofluorescence; Indirect: String Test	Metronidazole (Flagyl)	fecal-oral, CHRONIC diarrhea -attack of intestinal villi
	Cryptosporidium parvum	ingestion of sporulated oocysts in water; only 3 oocysts leads to established infection; water-borne epidemic		human to human, bovine, dog-like genotypes, emerging Zoonosis		oocysts in stool: Ziehl-Neelsen stain	NONE! Supportive treatment only!	fecal-oral, Explosive diarrhea, watery, brown-green; gastroenteritis
D I A R R H E A	*Entamoeba histolytica*	ingestion of cysts in water-fecal-oral route		NOT zoonotic; humans only hosts		cysts in stool, trophozoites (RBC=invasive)-diagnostic of invasive form, ultrasound for ALA while aspirating cyst; Indirect-imaging Colon;trophozoites in fluid stool, cysts in normal stool	Metronidazole (Flagyl)	fecal-oral, no fever; if ALA then fever, gradual onset, fishy odor
	Balantidium coli	ingestion of cysts in water-food		humans, pigs			Metronidazole (Flagyl)/Tetracycline	

	Toxoplasma gondii	ingestion of bradyzoites in raw meat, tachyzoites in raw milk, or sporulated oocysts		definitive: cat; intermediate: SHEEP, GOATS, PIGS, pigeons, deer, free ranging poultry, dogs, rabbits….		IgG, IgM Serology-testing maternal sera for antibodies; if IgG neg, retest monthly; if IgG pos, rule out recent or active infection; if IgM positive, follow up infant and treat prophylactically	SPIRAMYCIN for pregnant women;SPIRAMYCIN also for infants born to IgM positive mothers; prophylactic for AIDS pts if CD4+ drops below 200	pregnant women who aquire infection during pregnancy risk abortion,chorioretinitis,hydrocephalus,cognitive and visual impairment to fetus--primary route of infection is undercooked meat!
SCHISTOSOMIASIS	*Shistosoma haematobium*	cercaria	miracidia	humans-any pool of water	Bulinis spp.	serology, detection of eggs in urine-Best time to take urine sample--MIDDAY (10am-2pm), Imaging; Morbididty Assessment; HEMATURIA-anemia-Dip Stick; ultrasound if hydronephrosis, thickened bladder wall and polyps, ureter occlusion	Praziquantel	eggs=terminal spine skin-lungs-liver-blood vessels near bladder; hematuria, anemia
	Shistosoma mansoni	cercaria	miracidia	humans, rodents, baboons-any pool of water	Biomphalaria	detection of eggs in stool, rectal biopsy; ultrasound if Symmer's fibrosis	Praziquantel	eggs=lateral spine, skin-lungs-liver-blood vessel-intestinal varices
	Shistosoma japonicum	cercaria	miracidia	humans, mammals-water buffaloes-ponds	Oncomelania	detection of eggs in stool, rectal biopsy; ultrasound if Symmer's pipe-stem fibrosis	Praziquantel	eggs=small spine skin-lungs-liver-blood vessel-intestinal varices

LIVER FLUKES	*Fasciola hepatica*	encysted cercaria		Sheeps, cattle, humans	Lymnaea spp.(snail); secondary intermediate host-grass	eggs in feces	Triclabendazole	enlarged, tender or chirrotic liver damage, with diarrhea and anemia, atrophy of portal vessels, may be fatal
	Opisthorchis sinensis	ingestion of encysted cercaria in undercooked fish	miracidium-snail, cercaria-fish	reptiles, birds, mammals-including dogs	various SNAIL and Freshwater FISH species (1st Prosobranch Snails, 2nd Freshwater Fish)	unlikely to diagnose because usually asymptomatic (Very APATHOGENIC disease)	Praziquantel	mechanical and toxic irritation to bile ducts-rarely fatal
LUNG FLUKE	*Paragonimus westermani*	ingestion of encysted metacercaria in uncooked crustacea (crab)	miracidium-snail, cercaria-crab	humans; cats and dogs share adult with us	various SNAIL and FISH species (1st Aquatic Snails, 2nd Crustacea)	eggs in sputum or feces; X-Ray or imaging with mass in lung	Praziquantel	LUNG fluke; after ingestion of metacercariae in uncooked crustacea, young flukes migrate to lungs where they become encapsulated
	Taenia saginata	larval stage encysted in beef=Cysticercus bovis	cow eats eggs from human feces	humans	undercooked beef (beef tapeworm)	identification of proglottids in feces	NICOLSAMIDE, Praziquantel AND PURGE	usually asymptomatic; no hooks on scolex, 4 suckers; >13 lateral branches

	Taenia solium	larval stage encysted in pork=Cysticercus cellulosae	pig eats eggs from human feces	humans	undercooked pork	identification of proglottids in feces/cysticercosis difficult to diagnose	NICOLSAMIDE AND PURGE; NOT Praziquantel since patient may have Neurocysticercosis	neurocysticercosis, ocular cysticercosis-can cause unilocular blindness; cysticercosis (in brain) can be fatal; hooks on scolex, suckers; <13 lateral branches
	Dipylidium caninum	larval	eggs	dogs (main), (cats), babies	flea (cysticercoid)-FELIS CTENOCEPHALAIDES-Temporary Ectoparasite!	identification of proglottids in feces	NICOLSAMIDE AND PURGE, Praziquantel	usually a parasite of dogs and cats
	Echinococcus granulosus	ingestion of eggs IMMEDIATELY INFECTIVE passed in carnivore feces	protoscoleces in hydatid cyst ingested by carnivore	dogs, jackals, dingoes, coyotes-	humans, sheep	ultrasound, serology (ELISA), CT, MRI, X-ray	PAIR (Puncture, Aspirate, Inject, Reaspirate)-ALBENDAZOLE(humans) , Praziquantel (dogs)	Cystic Hydatid Disease (CHD); Cyclozoonosis-important in SHEEP rearing communities
	Echinococcus multilocularis	ingestion of eggs passed in carnivore feces	protoscoleces in hydatid cyst ingested by carnivore	definitive: wild carnivores-foxes, wild dogs; intermediate: rodents		ultrasound, serology	Lifellong Albendazole-stops cancerous growth	Alveolar Hydatid Disease (AHD), more aggressive & faster growing (often fatal) than E. granulosus b/c rodents have shorter life span

	Diphyllobothrium latum	ingestion of larva in freshwater fish	copepod with infective larva eaten by fish	dogs, cats, humans	copepod-fish	eggs in feces	Nicolsamide + Purge, Praziquantel	parasite competes for vit B12, causes MEGALOBLASTIC ANEMIA
	Necator americanus	L3 penetrates skin (ground itch)		humans		eggs in feces	Albendazol	Larva migrate from skin to lungs to small intestinesIron deficiency anemia-pigmented neutrophils, numerous platelets
	Anclyostoma duodenale	L3 penetrates skin (ground itch)-can also infect oral mucous membrane		humans		eggs in feces	Albendazol	
	Ancylostoma caninum	L3 penetrates skin		dogs		Characteristic wiggly lines on skin	Thiabendezole (topical cream)	Cutaneous Larva Migrans (CLM); Eosinophilic Enteritis
	Ancylostoma braziliense	L3 penetrates skin		cats				
	Strongyloides stercoralis	L3 penetrates skin	can be free living nematode	humans, dogs, cats		fresh worms or eggs feces, ELISA, eosinophilia	Thiabendezole	Hyperinfection Syndrome-intestinal symptoms, flattening of villi, malabsorption, smelly yellow stool,diarrhea, pulmonary symptoms-Larva currens-autoinfection
	Toxicara canis	ingestion of L2 in egg (after 2 weeks in environment, shed as L1)		puppies (vertical transmission from mother)		ultrasound	de-worm puppies and kittens, control of feces in public areas-treat OLM with laser therapy	Ocular Larva Migrans (OLM)-differentiate from retinoblastoma, Visceral Larva Migrans (VLM)

	Ascaris lumbricoides	ingestion of L2 in egg (develop after weeks/months)-foodborne		humans		eggs or worms in feces	Albendazol	Does not cause diarrhea but worms shed in bouts of diarrhea from other causes; Loeffler's Syndrome (larvae-lung symptoms
	Enterobius vermicularis	L3 ingested in egg-IMMEDIATELY INFECTIVE		cecum of humans		scotch tape test-eggs	ALBENDAZOL or Mebendezol	itchy anus, esp at night
	Tricuris trichuria	ingestion of L1 in EGG (after 2 weeks, depends on climate)		cecum of humans		eggs in feces(bipolar plugs)-fecal flotation	Albendazol, Mebendezol	Bloody Diarrhea, PROLAPSE OF THE RECTUM, Anemia, Abdominal Pain, Impaired growth of children, Reduced Cognitive fxn
	Trichinella spp	ingestion of L1 in MUSCLE from undercooked pork		T. Spiralis-pigs, rats, humans; T. Nelsoni-wild pigs, hyenas, wart hogs; T. Nativa-polar bears, arctic foxes		ELISA, muscle biopsy (most cases diagnosed post-mortem, self limiting infection)	Mebendezol-prolonged and against the larvae	freezing meat kills *T. spiralis* (rats-pigs)-temperte climates and S. U.S. and *T. nelsoni* (wild pigs, hyenas, wart hogs)-Africa, but NOT *T. nativa* (polar bears, arctic foxes)-Arctic, PERIORBITAL EDEMA, EOSINOPHILIA
	Onchocerca volvulus	L3 innoculated in bite	Similium spp. (Black flies)	human	microfilaria (L1) in peripheral blood	skin snips-bloodless	Ivermectin (2Xper year)	River blindness-hanging groin due to loss of skin elasticity

	Loa loa	L3 innoculated in bite	Chrysops spp. (come down from canopy)-L1 Microfilariae produced in adult, female chrysops ingests L1 Larvae, and inoculates L3 larvae during blood meal	human	microfilaria (L1) in peripheral blood	microfilaria in conjunctiva	Ivermectin	Calabar swellings-result of adult worms being damaged when adult worms migrate across bony areas-mostly back of hand and arm; very red warm, itchy, last long time
	Dracunculus medinensis	L3 ingested with Cyclops	Cyclops sp.(freshwater flea)	human	microfilaria (L1) in peripheral blood	emergence of female adult worm	Albendazole, Thiabendazole, moist bandage for pain	Guinea Worm; PPP 1 year for adult to mature in gut
	Wucheria bancrofti	L3 innoculated in mosquito bite	culex spp.	humans	THICK blood film;microfilaria (L1) in peripheral blood	ICT test card	DEC, Albendazol, Ivermectin (2 drug regimens)-ALB + IVER or ALB + DEC	Lymphatic filariasis-elephantiasis due to 2ndary bacterial infection

Stercoraria- infective stage begins in rectum	Feed at night, trypomastigotes in bloodstream, amastigotes in muscle or nerves cells	Also transmitted: blood transfusions, congenital, lab, organ transplants
Salivaria- infective stage begins in salivary glands	East Africa & Central Africa	
Salivaria- infective stage begins in salivary glands	West Africa & Central Africa	
Leishmaniases do NOT need water to breed in		
Ulcerates after 2-4 months (dry)	Oriental Sore, ulcers heal spontaneously in 2-3 months in immunocom-petent patients	
Ulcerates after 2 weeks, serous exudate (wet) produced		
Localized cutaneous later metastatic mucocutaneous disease "Espunda"	Ulcer (few months), oral and nasal lesions may develop after 3-20 years- very destructive lesions	Males more affected than females- occupational disease

80% women symptomatic- Vagina: Males Asymptomatic- site Prostate Gland, Urethra, Epididymis		
AKA-Giardia Intestinalis, Giardia Duodenale Traveler's Diarrhea	Trophozoites attached to small int mucosa, cysts fassed in feces (hard stool), cysts ingested	Usually no clinical features: symptoms may be any or all of: foul smelling, fatty, loose stools; sulphorous belching; flatulence- offensive, abdominal pain, weight loss- anorexia; abdominal distension; Occasionally followed by MALABSORPTION SYNDROME
Parasite has presence in Enterocytes, not in lumen like Giardia; villous atrophy	Do NOT treat with anti-diarrheals cuz want to flush out oocysts, not block!	In immunodeficient large volume diarrhea; infection self-limiting
dysentery= passage of mucous and blood in feces	Amoebic Dysentery; Amoebic Liver Abcesses (ALA) or brain, eye, lungs, skin, spleen, genitals abcesses	cysts have 4 nuclei, 95% Asymptomatic, gradual onset, NO Fever, blood and mucous in stool, tear drop ulcers in gut; cysts may survive in favorable environment for 3 months
Giant, cliated cell; ulcers in gut; bloody diarrhea		

Unsporulated Oocysts shed 1-5 days for sporulation in environment; these oocysts develop sporozoites inside them that are infective to individual or int host; can survive for 1 year	Cat sheds oocysts for 3 weeks (21 days) when it gets infected; IgM first, then IgG persisting for life; tachyzoites (bradyzoites) transported around body in Leukocytes (MQ's)	Predilection sites-brain, eye, muscles; immunocompetent individuals Asymptomatic-life long acquired immunity develops
Non-Zoonoses; Africa, Mid-East, Ind Ocean Islands, India; BLADDER	Schistosomas-Acute Schisto or KATAYAMA FEVER (immune complex syndrome due to onset of egg laying)…acute febrile rxn with Hypereosinophilia (lasts 3-8wks)	History…water contact hours earlier; Swimmer's itch due to penetraton of Schistosomulum (0-3 days); Schistosomular Pneumonitis…due to migration of schistosomulae (3-10 days)
Zoonoses;South America, Caribbean, Africa, Madagascar, Middle East; INTESTINE	Hepatomegaly due to: Portal Hypertension; Hematemesis due to: Ruptured esophageal varices; Splenomegaly; Melania/Anemia	
Zoonoses;China, Japan, Philippines, Taiwan, Indonesia; INTESTINE	Hepatomegaly due to: Portal Hypertension; Hematemesis due to: Ruptured esophageal varices; Splenomegaly; Melania/Anemia	

Adults live in BILE DUCTS; Immature flukes in Liver Parenchyma; Zoonosis; morbidity and mortality in sheep and cattle	Sheep and cattle-raising areas: South America, Europe, Africa, Australia, New Zealand, warmer West U.S.; 1 metacercaria, 1 fluke	Young flukes damage liver-severe headache, backache, chills, fever; Adult flukes(bile ducts) cause atrophy of portal vessels, hemorrhage, and secondary pathological conditions may be lethal.
mostly far east--. Maylasia and Korean Peninsula, China, Japan, Vietnam	areas of freshwater farming, raw sushi eating risks, when human feces used as ferilizer in fish ponds to encourage growth of plants	Mechanical and toxic infections of bile ducts occur when infection is heavy (up to 6000 flukes)
Cough, blood-stained sputum		
humans infected by eating undercooked beef. Cattle infected by eating larvae, produce cistercerci in muscle. Humans eat this uncooked cattle, infected	cystercerci in active muscles-tongue, masseters, leg muscles, heart; overall, embryophore, protective shell, protects larva from environment so larval stage can penetrate small int, oncosphere, mobile embryo penetrates gut, develops into cystercerci, gets into all muscles of cow	Humans can eat all the eggs they want of Taenia Saginata and they will not be infected! Must go through cattle intermediate!

Neurocysticercosis- epileptic fits, seizures, headaches, visual hallucinations, focal seizures, comotose; Tx for Neurocysticercosis: ALBENDIZOL+ CORTICOSTEROIDS		
Apathogenic to definitive host; Tapeworm eggs, Female flea lays eggs, eggs develop into larvae, if larvae eat egg of dipylidium caninum develop into pupae. Dogs good at eating fleas, so can transmit to humans.		
endoparasites where dogs serve as definitive hosts and humans may act as intermediate hosts	eggs can last for 1 year	
Disease transmitted from WILD CARNIVORES TO RODENTS! Rodents (microtyne) eat eggs and get lesions in liver; if humans eat cysts, NO INFECTION, protoscoloses destroyed in stomach. When dogs eat cysts, infected-in gut	worlwide distribution;parasites send hyphae to other parts of liver, leading to necrosis of liver	

Broad tapeworm; worldwide, but major foci in northern hemisphere around freshwater lakes		
For Hookworm: infection by skin penetration (Ancylostoma- also by oral infection)--> GROUND ITCH; Larval migration to Lungs--> PNEUMONITIS; Larval migration up respiratory escalator coughed up and then swallowed to small int--> ANEMIA	For Hookworm: HOOKWORM ANEMIA: Tiredness, Edema, Myalgia, Pallor, Breathlessness--> IRON DEFICIENCY ANEMIA: Hypochromic, Microcytic (smaller RBC's), Pigmented Neutrophils, Numerous Platelets	
Most people have a few hookworms, and some wormy people have thousands of hookworms		
CLM; Eosinophilic Enteritis		
CLM; Eosinophilic Enteritis		
L3 larvae reinfect same individual- infection can be maintained for > 30 years: LARVA CURRENS- wiggly lines, lasting for only few hourst on TRUNK, intensely itchy		
Soil Transmission		

LOEFFLER's SYNDROME-FEVER, cough, wheeze, EOSINOPHILIA; mechanical obstruction-jaundice, apendicitis, pancreatis, asphyxia	Appearance of adult worms in bouts of diarrhea(not caused by this parasite), out of the mouth, out of the nose, out of the ear	
when kids not sleeping well, not doing well in school-caution flag	females migrate to anus to lay eggs in perianal region	
Whipworms; most infections are asymptomatic; wormy people have heavy infections; worm free children have better school attendance, better spelling and increased growth rates	NO MIGRATION!	
L1 Larvae become adults in small int, L1 Larvae migrate into muscles; No egg stage produced; humans infected by eating undercooked pork, also undercooked horses (cuz horses eating rats in stables, humans eating undercooked horses)	Enteric Phase: mild to nausea, vomiting, colic, diarrhea, sweating; MigratoryPhase: invasive, Periorbital Edema, Eosinophilia, Myalgia, Fever; Encystment Phase: Edema, Dehyrdation, Fever	
Vector breeds in fast-flowing rivers-Africa; in coffee plantations where have irrigation canals-Central and South America	Nodules-onchocercomata occur in legs-Africa, on head-South America, Central America; MF PRODUCE PATHOLOGY, adults-little pathology; Mainly, Mf in skin and eye	Skin: pruritis, lichenification (lizard skin), depigmentation, dermal atrophy, HANGING GROIN; Eye: Sclerozing Keratitis--> BLINDNESS caused by Mf dying in retina

transmission only during long rainy season-rain forests in Zaire and West Africa; large flies, attracted by dark colors and woodsmoke; most at risk-living on edges of forested areas and plantation hills		
Infected persons entering water source, adult female extrudes uterus, produces ulcer, releasing L1 Larvae to be picked up by Cyclops(freshwater fleas) which moult to L3 larvae inside fleas		
Fevers, Lymphoedema, Hydrocoele, Eosinophilia; predilection site in males is Spermatic Cord. Males-Elephantiasis and Hydrocoele; Females-Elephantiasis		