

# Infections from Abroad Unwanted Souvenirs

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# Why should you care?

8 million Americans travel to foreign countries each year

About half of those people get sick

Only 10% of people follow the CDC guidelines for immunizations and prophylaxis while traveling

Most of these patients present to Emergency Departments or Primary care



# 3<sup>rd</sup> World Travel

- Overpopulation
- Poor Sanitation
- No sewer systems
- Malnutrition
- Poor vaccinations
- Poverty



# Health information for international travelers on the CDC website

Write to Medical Advisory Service for  
International Travelers Abroad: for \$25  
they will send you an info packet about all  
the infectious diseases in a region (or look  
on the net)

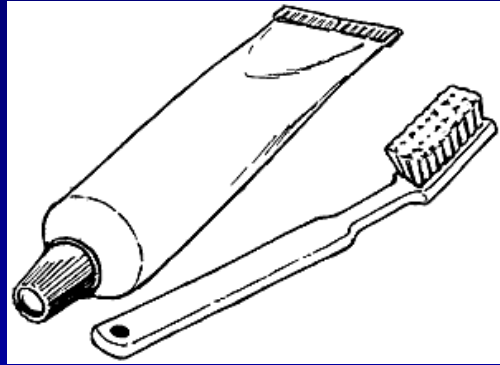
[www.cdc.gov](http://www.cdc.gov)

“Travel expands the mind and  
loosens the bowels”

S.L Gorbach

- Most people who go to Mexico or a foreign country think they get sick from drinking the water
- Usually not the reason that you get sick
- Everyone knows that the water is contaminated

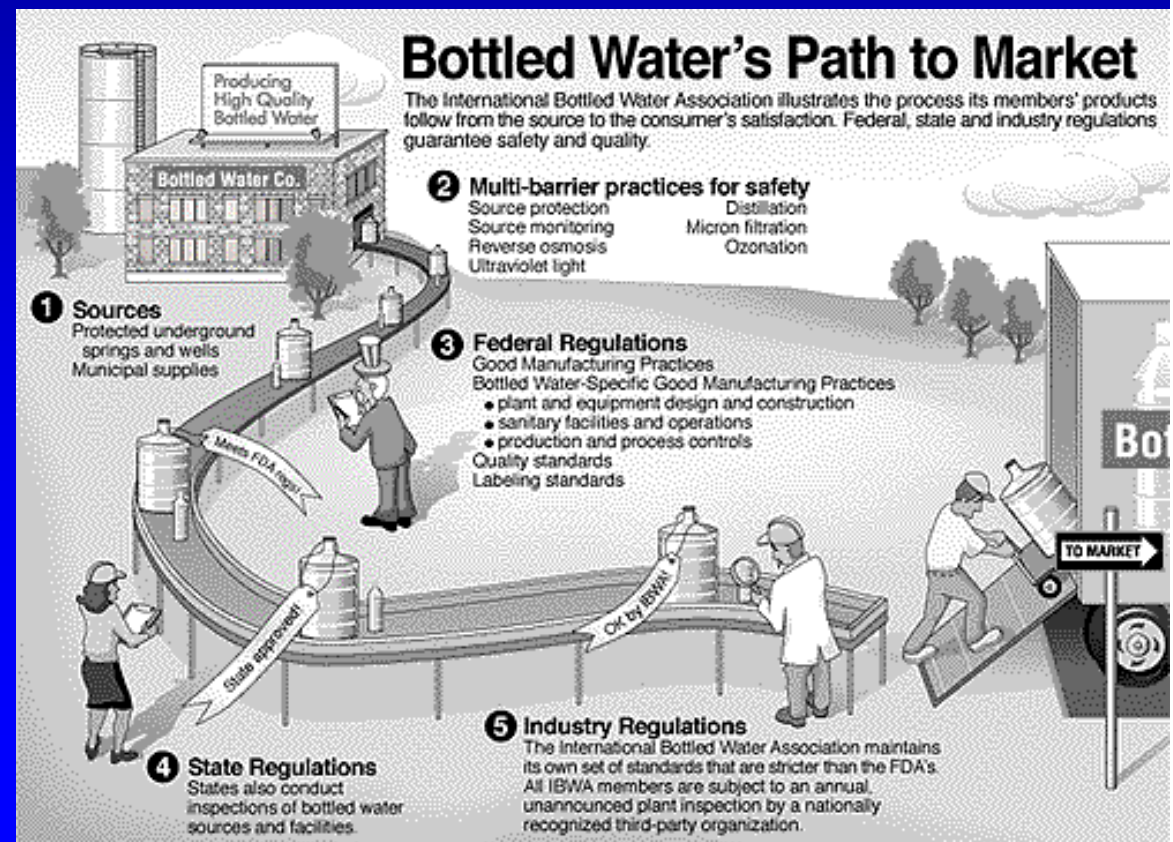




- People duct tape their mouth closed in the shower
- People brush their teeth with beer
- People pinch their nose shut while in the shower
- Everyone drinks bottled beverages



- Drinking bottled water in a third world country does not guarantee that you will not get sick
- Water in the bottles is filtered, but the bottle are washed with tap water prior to being filled.
- Carbonated Bottled Beverages





# Why do people get sick?

- FOOD, FOOD, FOOD, FOOD
- Fecal-oral transmission

Chef

House flies

Water

Food



# How to stay “well”

All meat and seafood well cooked

No raw vegetables or iodinate

Treat or boil water

Carbonated beverages

Avoid Ice

After all of that, 20-30% still get Traveler’s Diarrhea



# Pepto-Bismol

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- Helps prevent Travelers Diarrhea
- 40-60% reduction in incidence of travelers diarrhea
- 2 Tabs QID
- Toxicity of Pepto Bismol?

ASA Toxicity



# Prophylactic Antibiotics?

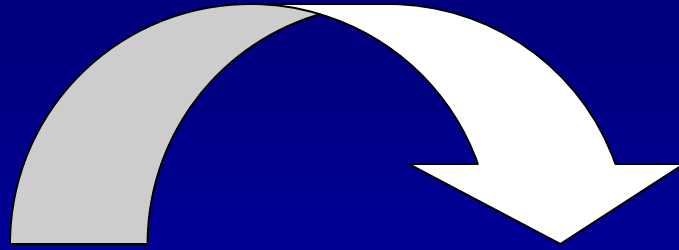
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- Prior to 1989: Abx prophylaxis with Doxy or Cipro
- 1989 stopped recommendation because treatment is effective, abx side effects, and resistance
- GI side effects, sun sensitivity, Stevens Johnson, Resistance

Boil it, Cook it, Peel it,  
or Forget it!

If it's too hot to touch, or has to be  
peeled, you can eat it

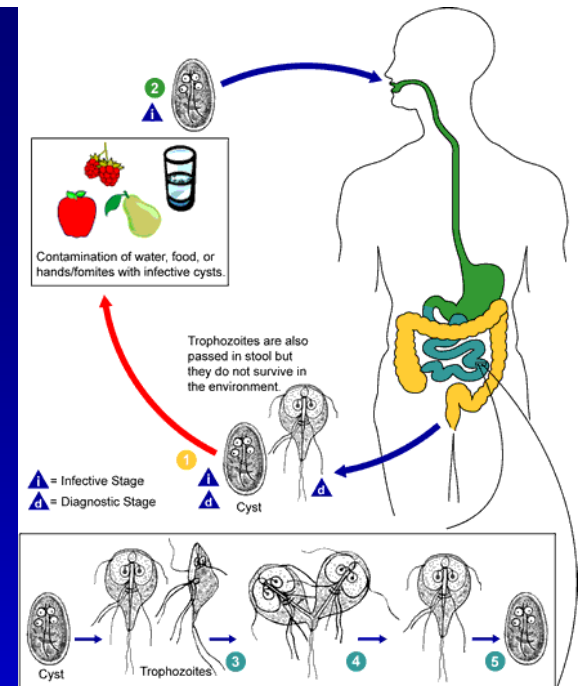




Which bug landed him here?

# Giardia

- Worldwide distribution
- Most frequent parasitic intestinal disease in US
- Breakdown of water purification
- Day Care Centers: 20-50% carriers in US
  - 100% kids in Guatemala have been infected
- Camping/Drinking from contaminated streams
  - Can survive up to 2-3 months in cold water
- Only need 10-11 cysts to get sick: ½ cup H<sub>2</sub>O





# Giardia

“Think before you drink”

“Boil or suffer Turmoil”

“Drink from the stream  
and you will live in the  
latreen”

**Giardia Fact Sheet**

The parasite *Giardia* has been found in many New Zealand lakes, rivers, and streams.

**WHAT IS IT?**

*Giardia* is a parasite that lives in the intestine. It cannot be seen by the naked eye but can cause severe diarrhoea.

The *Giardia* life cycle has two stages. The swimming (feeding) stage, and the cyst (resting) stage. The cyst is the infective stage. Cysts infect a person's intestine and begin the feeding stage.

**HOW IS IT SPREAD?**

*Giardia* can be spread by any mammal including possums, rats, and mice. It can occur in humans as a result of poor personal hygiene, unhygienic food handling, and by drinking contaminated water.

*Giardia* is spread by cysts being passed in the faeces and subsequently entering a new host through the mouth. Poor toilet waste disposal can result in cysts entering water systems such as streams and lakes. *Giardia* cysts can survive in very cold water.

When contaminated water is drunk *Giardia* enters the intestine where it feeds and produces more cysts which are in turn passed out in the faeces.

**TREATING WATER**

If you suspect that water may be contaminated with *Giardia* there are three ways to make it safe to drink.


1. **Boiling water:**  
Bring water to a fast boil for more than 3 minutes to kill the cysts.
2. **Chemical purification:**  
Iodine solutions are probably the most effective means of chemical purification. These are available from chemist shops. The effectiveness of chlorine-based purification tablets is varied. Check the manufacturer's specifications on the packet to ensure that the tablets will kill parasites such as *Giardia*.  
12-15 drops of 2.5% tincture of iodine solution per litre of water, or 2-4 drops of chlorine-based household bleach per litre will kill the cysts after 20 minutes contact time.
3. **Filtration:**  
Portable filtering mechanisms are now available from some outdoor equipment retailers. Water filtered through *Giardia* rated filters need not be boiled and is pleasant to drink. To be effective in removing cysts, the filter should have a pore size of 5 micrometres or less. The equipment should specify that it removes or destroys *Giardia* cysts.

**IF YOU'VE GOT IT**


The signs and symptoms of *Giardia* are: explosive foul smelling diarrhoea, stomach cramps, bloating, dehydration, nausea, and weight loss. As a carrier you risk spreading the parasite to the environment and other people.

Treatment is simple and quick acting with prescribed drugs. Frequent visitors to back country may wish to carry prescription medicine (eg. Flagyl) in their first aid kits. If you suspect that you have *Giardia* see your doctor as soon as practical.


**Magnified view of *Giardia***



Feeding (swimming) stage



Cyst (resting) stage



Drinking *Giardia* cysts

Feeding and multiplying in intestine

Cysts passed out in faeces

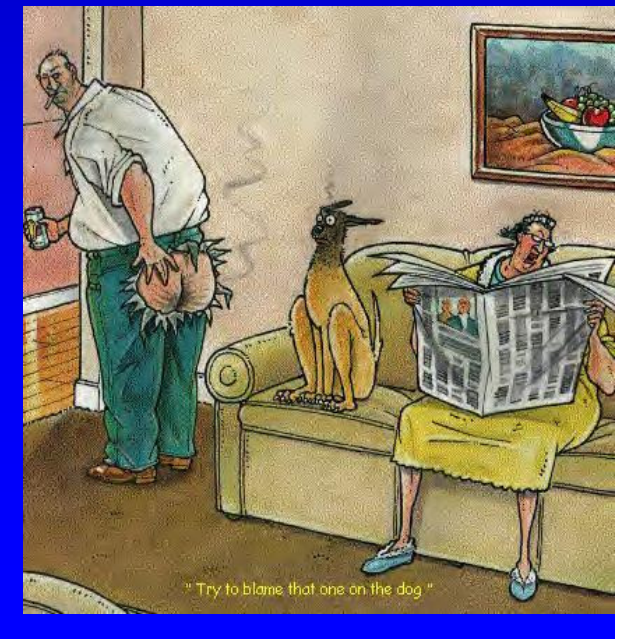
New hosts

**LIFE CYCLE**

CONSERVATION  
TE PAPA ATAMAHU  
Department of Conservation,  
PO Box 19-426, Wellington  
November 1998

# Giardia: Symptoms

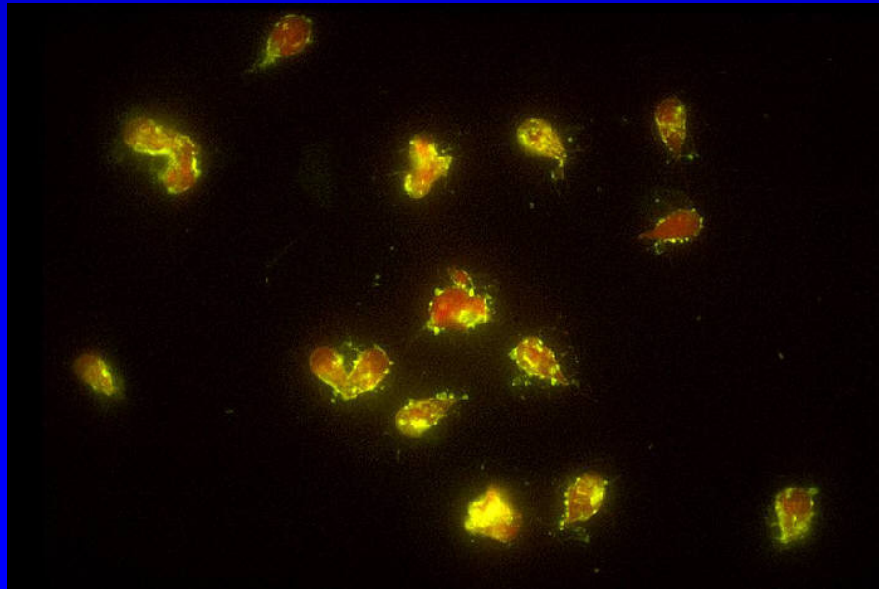
- 7-10 days after ingestion
- Foul flatulence, burps, waterfall
- Abdominal distension/bloating: Malabsorption/B12
- Explosive, foul, watery diarrhea
- Giardia does not kill anyone: it makes them wish it did



# Giardia: Diagnosis

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- Stool Cx x 3: Sensitivity 50-75% + \$
  - Treat empirically
  - Immunodiagnosis: high sensitivity and specificity
  - String Test - duodenum
- 



# Giardia: Treatment

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- Flagyl is mainstay of treatment in US
  - 250mg-500mg TID x 7 Days
  - 85% Cure Rate
- Tiniva or Tinidazole
  - 2 gm single dose: 90-95% cure rate
- Furizolidone: liquid for children
  - Adults: 100mg PO TID x 5-10 days

# Clinical Case

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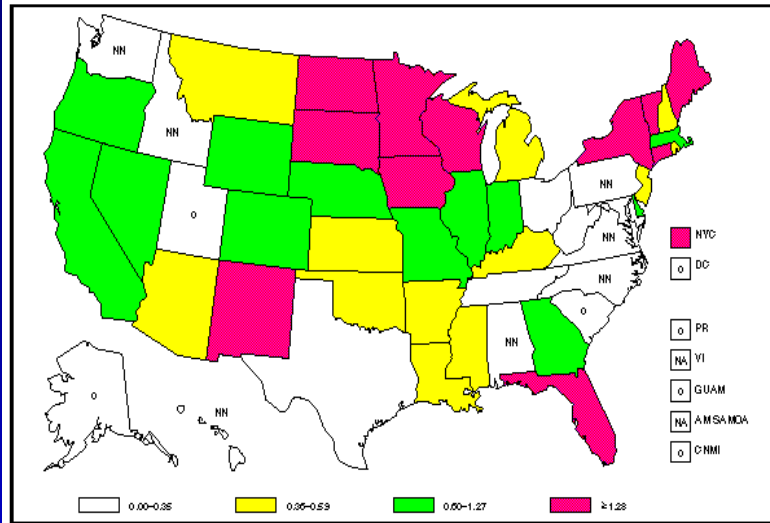
- 27 year old man with AIDS brought in by his domestic partner for severe “disabling” watery diarrhea
- Tachycardic, dehydrated and guiac negative

# Cryptosporidium

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- Can survive up to 12 months in cold water
- Significant cause of mortality in patients with AIDS
- Outbreaks in water system
  - Resistant to halogens
- Treat symptomatically in immunocompetent
- Treat with Paromomycin in AIDS

CRYPTOSPORIDIOSIS — reported cases per 100,000 population, United States and territories, 1997



Surveillance data from 1997 suggest that infection with cryptosporidium is geographically widespread. The highest reported rates were primarily in the north central and northeastern states. As in 1995 and 1996, cases primarily were reported in the late summer among children and adolescents aged <15 years.



# Clinical Case

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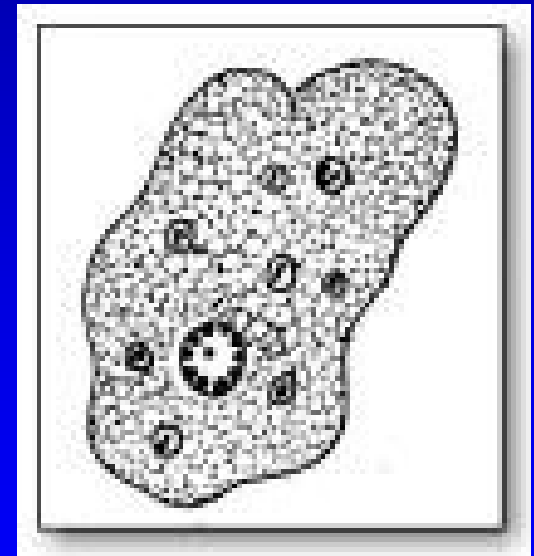
- 36 year old female, recently returned from Mexico, fever, cough, mild RUQ pain x 18 days. Negative RUQ US.
- Rx cefalexin, no improvement. ESR 110



# Entamoeba histolytica: Etiology

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- Amebic dysentery and amebic hepatitis
- 0.5-50% of the world harbors *E. histolytica*
- 1-3% of US population infected
- Humans, dogs, cats, rodents
- Fecal/Oral Route of cysts
- Most *Entamoeba* infections are not pathogenic



## E. Histolytica: Symptoms

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- Dysentary
  - Liver, Lung, Brain Abscesses
  - Pneumonitis
  - Encephalitis
  - Liver Dysfunction
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## E. Histolytica: Diagnosis

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- Clinical: Lack of high fever and PMN leukocytosis
- Stool O+P: Cysts

# E Histolytica: Treatment

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- Iodoquinol for asymptomatic infections
- Metronidazole for symptomatic infections
- Percutaneous drainage only for symptomatic, large, refractory abscesses
- Surgical drainage is not recommended

# Clinical Case

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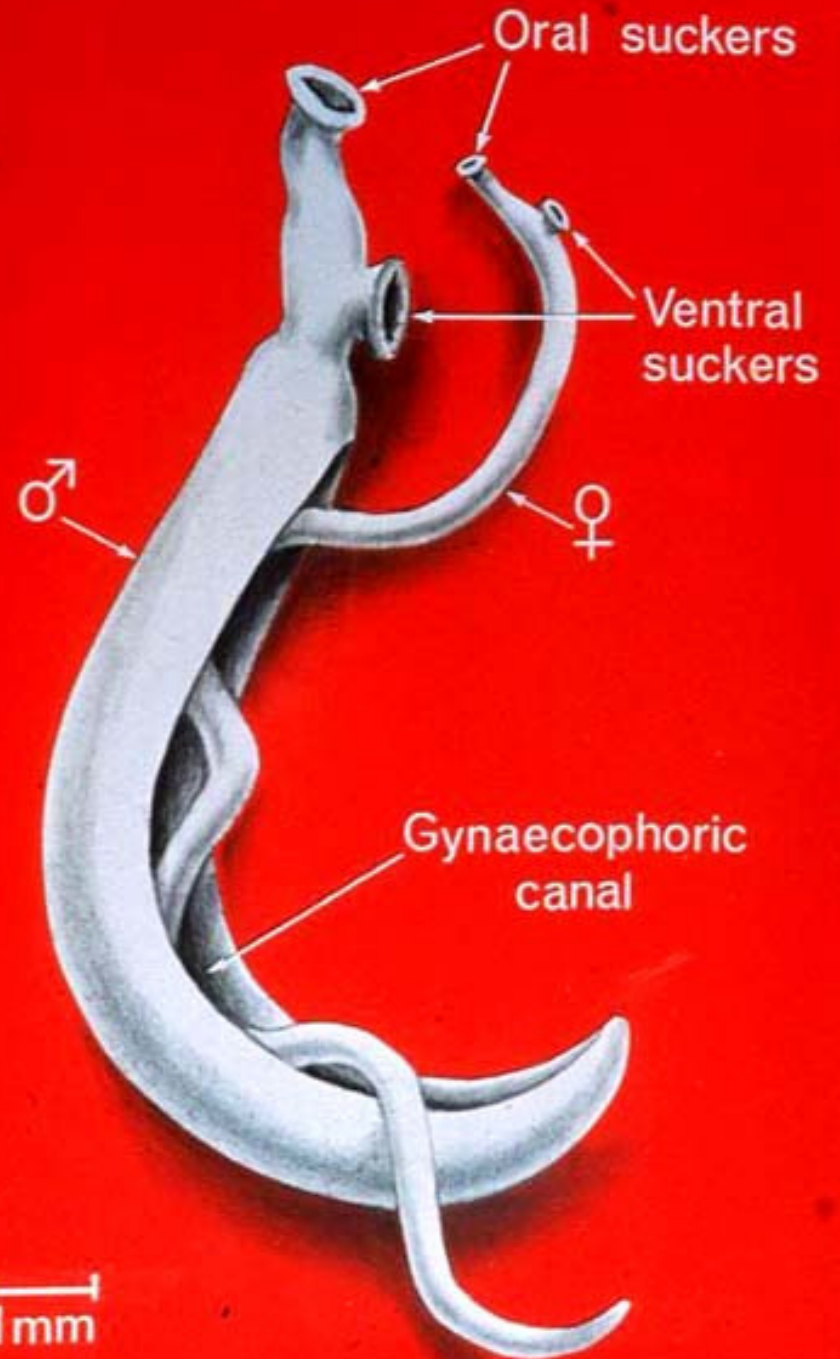
- 52 year old female from the Caribbean comes in with splenomegaly and chronic hematuria.

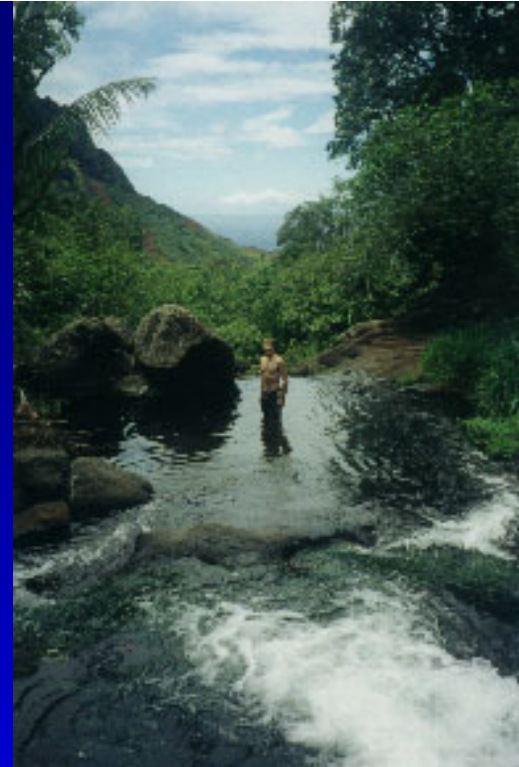
# WHO: Five Most Neglected Diseases

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- Doctors without Borders: Western Profit Motive Model
- Schistosomiasis
- Trypanosoma cruzi
- Chloroquine-Resistant Malaria
- Leishmaniasis
- African sleeping sickness

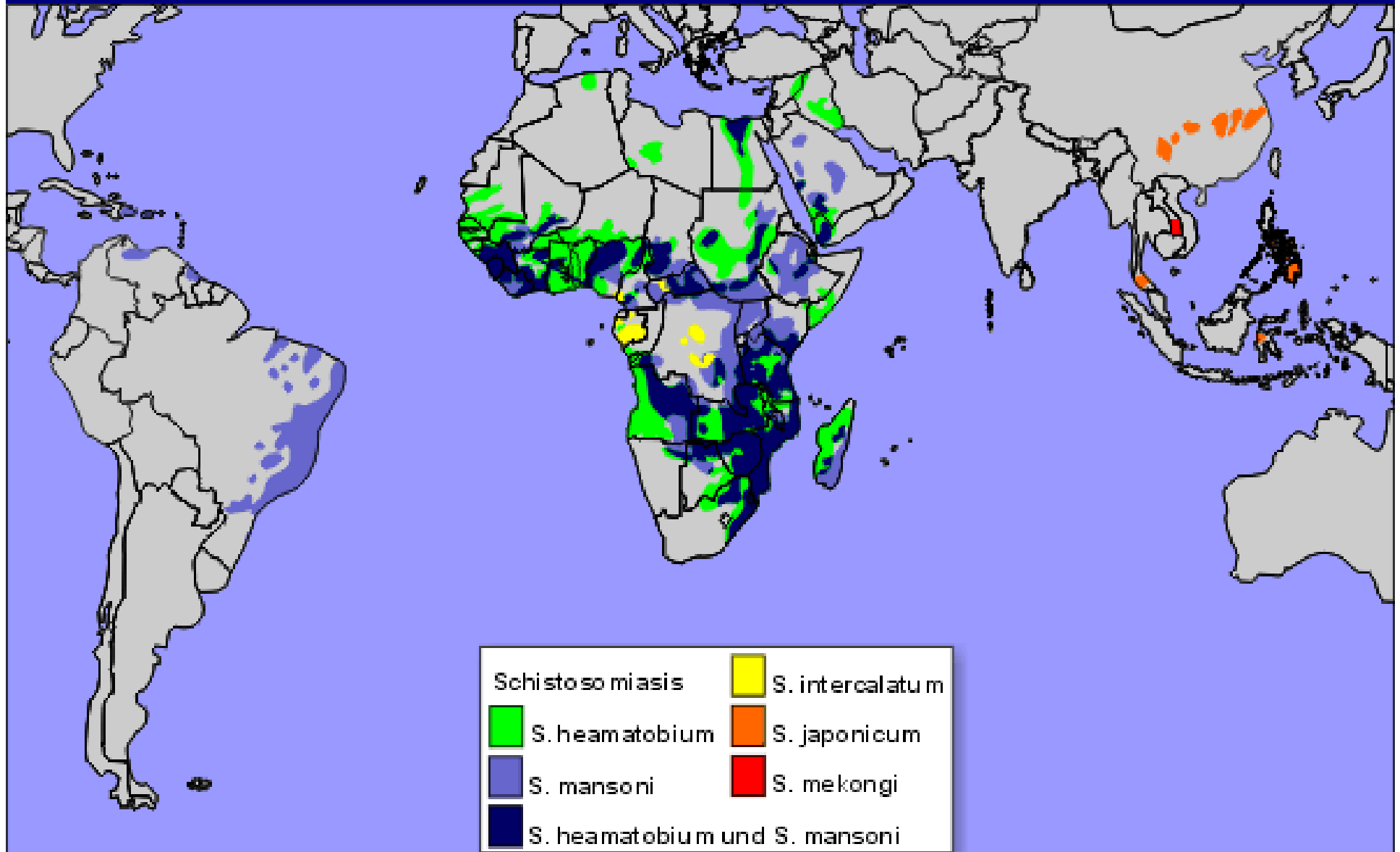
# Schistosomiasis





## Schistosomiasis Hazard







# Schistosomiasis: Etiology

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- *S. hematobium*: Africa
- *S. Mansoni*: Africa and America
- *S. japonicum*: Far East
- 250 Million people infected
- 600 Million at risk
- Infection acquired by direct skin penetration by cercaria in fresh water

# Schistosomiasis: Symptoms

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- Dermatitis: swimmers itch
- Splenomegaly, LAD, hematuria, heart failure, portal HTN, ascites, CNS
- Diagnosis based on above symptoms and eggs in urine or feces
- Rx: Praziquantel



11 year old boy with schistosomiasis. Enlarged liver and spleen are marked.



# Trematodes: Flukes

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- *Clonorchis sinenses*: Chinese liver fluke
  - Raw or undercooked fish
  - Jaundice, Bile Duct Rx: Praziquantel
- *Fasciolopsis buski*: Giant intestinal fluke
  - Central and Southeast Asia
  - Water Chestnuts
  - N/V/D Rx: Praziquantel
- *Paragonimus westermani*: Lung fluke
  - Asia, Africa, South America: Crabmeat
  - Rust colored sputum Rx Praziquantel



# Dateline Korea. 1954.

- US soldiers on leave in Tokyo
- Officers and enlisted men go to the same restaurants
- Enlisted men get flukes, officers don't
- Why?





# African Trypanosomiasis



# Trypanosomiasis

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- **Trypanosoma brucei gambiense**
  - Slowly developing disease
  - Western and Central Africa
- **Trypanosoma rhodesiense**
  - Rapidly progressing disease
  - Eastern 1/3 of Africa
  - Death from cardiac failure 6-9 months
- 6,000-10,000 cases per year
- 35 Million people at risk
- 25 million cattle at risk

# Trypanosomiasis: Stages

- **Stage 1: Bite Reaction**

- Non pustular, itchy, painful chancre
- Forms 1-3 weeks after bite, No scar after healing



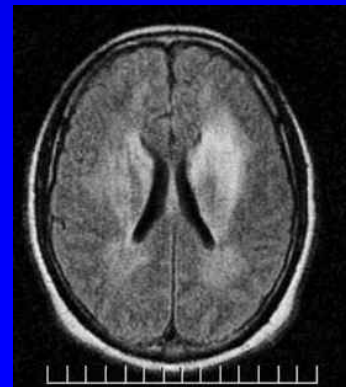
- **Stage 2: Parasitemia**

- Fever, Malaise, LAD, Headache, Edema
- Kerandal's sign: Painful palm and ulnar region of hand
- Winterbottom's sign: posterior cervical LAD



- **Stage 3: CNS**

- Lethargy, Slow shuffling gait,
- Retardation





# Trypanosomiasis

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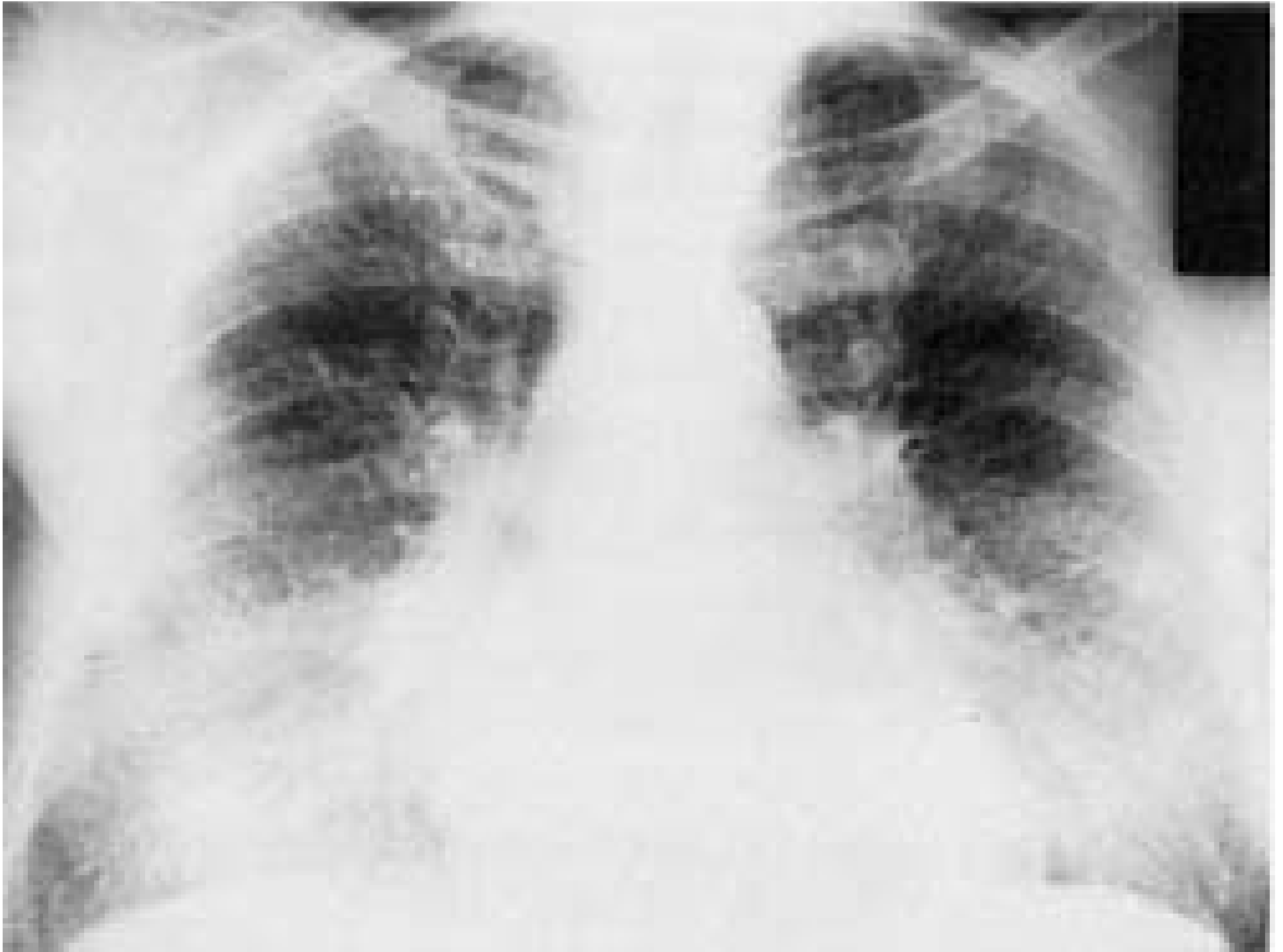
- Pathogenesis unknown
- Diagnosis: Lymph node aspirate, blood, CSF
- Treatment: Pentamidine isethionate or Suramin
- CNS cases: Melarsoprol, an organic arsenic compound



# Clinical Case

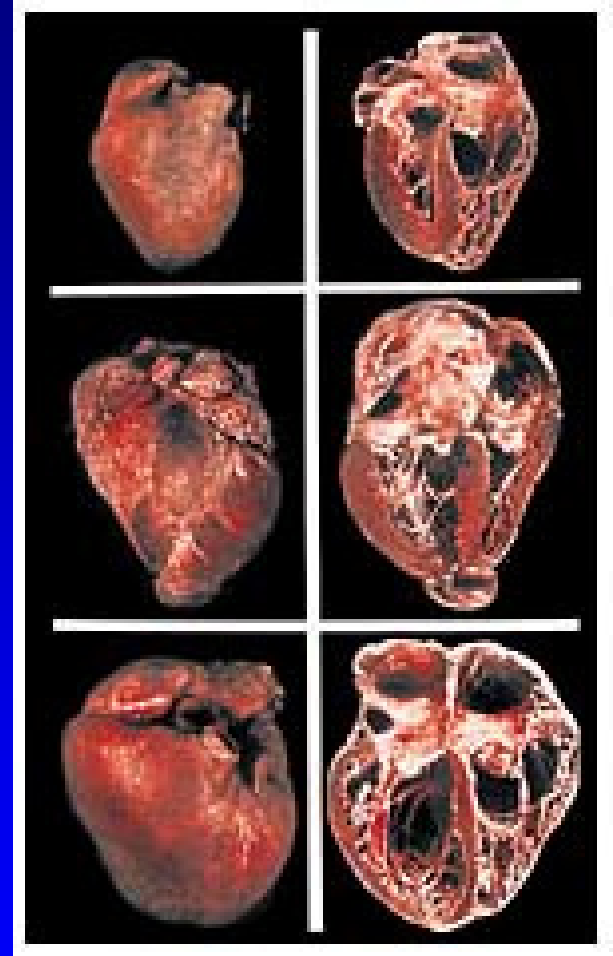
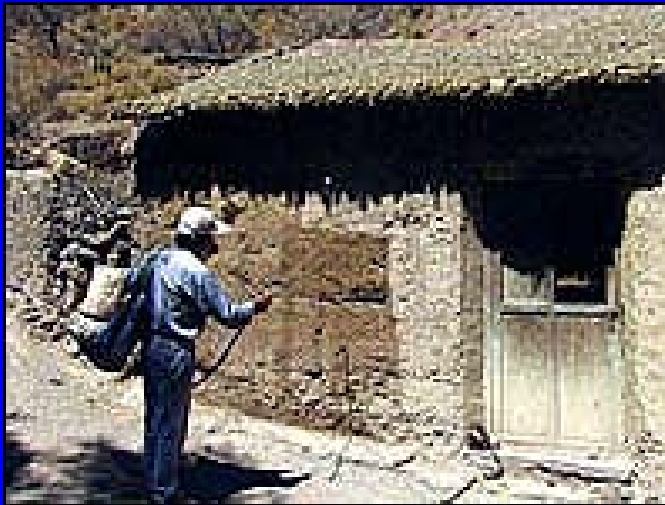
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- 43 year old man recently in Guatemala comes in with cough, shortness of breath, and lower leg swelling
- On physical exam, he has JVD, Laterally deviated PMI, B lower leg edema and appears to be in florid heart failure





# Chagas Disease



## Chagas Disease



Isolated cases in Texas, California, Maryland

# Chagas Disease: Etiology

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- *Trypanosoma cruzi*
- Named for Brazilian MD Carlos Chagas 1909
- Leading cause of heart disease in Latin America
- Sixteen million people affected
- 1/4 of the population at risk
- 50,000 Deaths per year
- #1 cause of death in South American Athletes



# Chagas Disease: Transmission

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- Triatomine Bug: Reduvid or Kissing
- South American Transfusions: estimated to be 50% contaminated
  - Higher than HIV or Hep C



# Chagas Disease: Symptoms

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- Primary Lesion
  - Chagoma: Ramana's Sign
- Acute Stage
  - 7-14 Days after infection
  - Insomnia, malaise, fatigue, myalgias, fever
  - Often not recognized
- Chronic Stage (10-20% of those infected)
  - Cardiomegaly, Failure
  - Esophagus, Colon: Toxic Megacolon



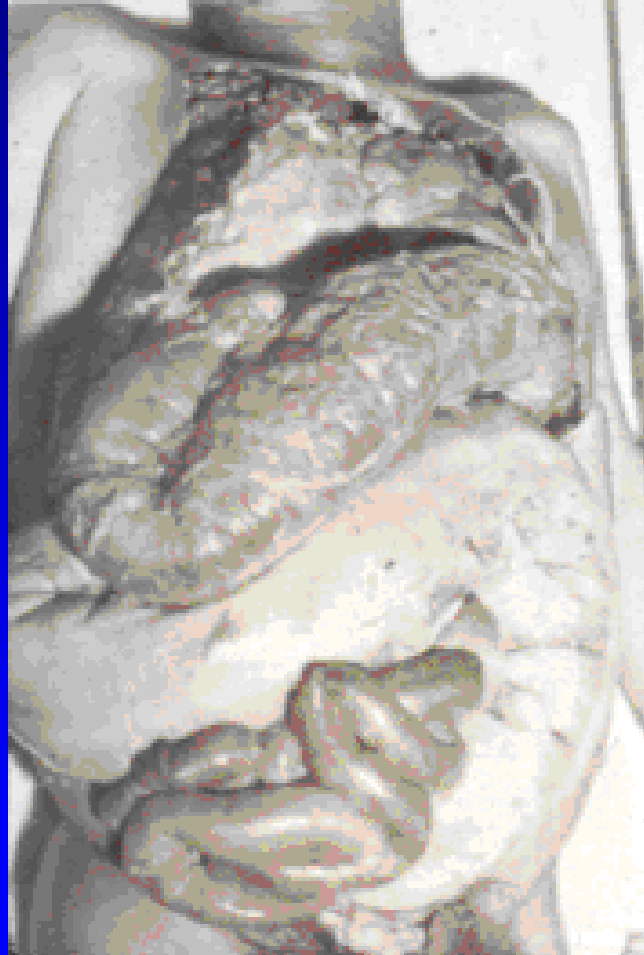


## Ramana's Sign: unilateral conjunctivitis and orbital edema

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# Toxic Megacolon in Chagas's disease



# Chagas Disease: Treatment

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- Most drugs are either not effective or too toxic to take
- Benznidazole and Nifurtimox
- UCSF: Protease inhibitor about to enter clinical drug trials
- Vaccines have not worked yet although they may be feasible

# Leishmaniasis



- *L. donovani*: visceral, Kala-azar
- *L. tropica*: cutaneous
- *L. braziliensis*, *mexicana*, *peruviana*: mucocutaneous
- Asia, Mediterranean, Central and South America, Africa



# Leishmaniasis

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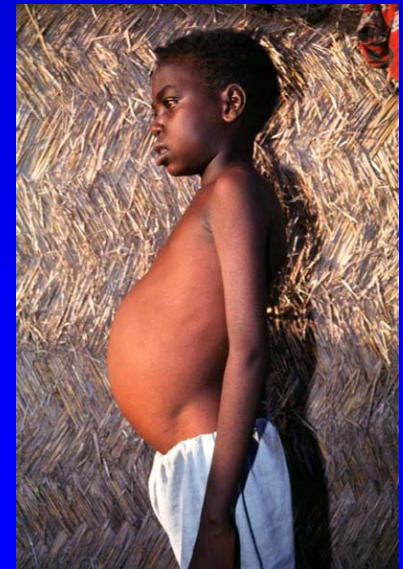
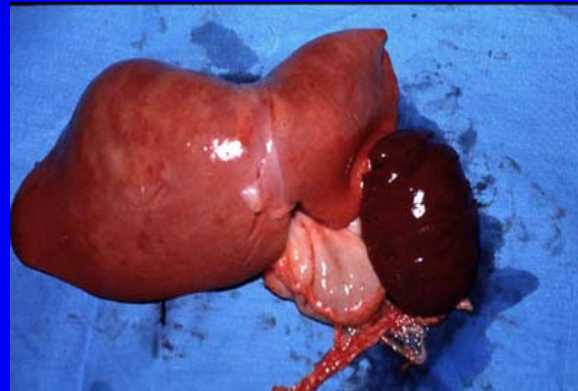
- Bite of the Sand Fly (Phlebotomus)
- Diagnosis:
  - Organisms at site of lesion
  - Skin test for exposure: Montenegro
  - anti-leishmanial antibodies by immuno-fluorescence
- Immunization not effective
- Rx: Sodium stibogluconate (Pentostam)



# L. donovani: Visceral, Kala-azar

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- One to four months after bite
- Fever to 102-104
- Hepatosplenomegaly
- Hyperpigmented lesions: black disease = kala-azar
- Death if not treated
- Rx: Sodium stibogluconate (Pentostam)



# L. tropica: cutaneous

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- Oriental sore, Baghdad boil, Delhi Ulcer
- Papule 1-2 weeks after a bite
- Develops into a painless ulcer
- Ulcer heals in 2-10 months if not treated
- Local scarring



# Mucocutaneous Leishmaniasis



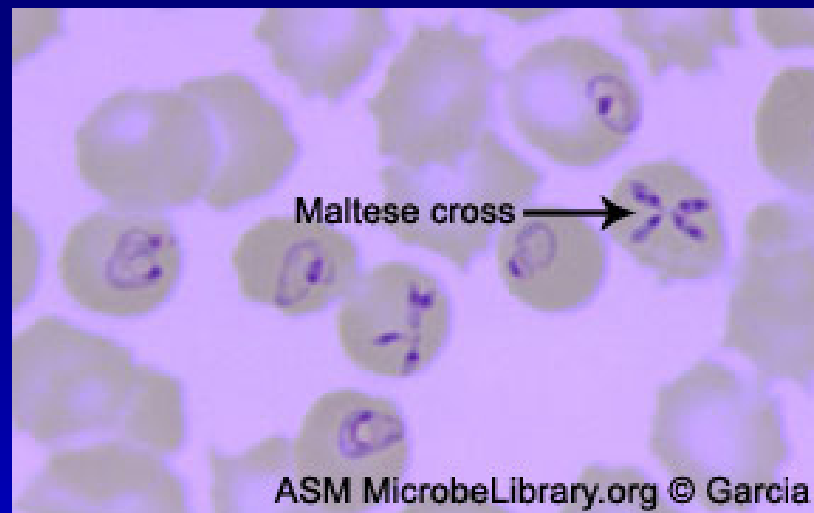
- *L. braziliensis*, *L. mexicana*, *L. peruviana*
- Presentation: same as cutaneous Leishmaniasis but lesions can metastasize: oral, nasal, pharyngeal



# Clinical Case

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- 45 Year old man who owns a cattle ranch and dairy in the northeast United States comes in with a malaria like illness with fevers, hepatosplenomegaly, and microcytic hemolytic anemia



## Babesia microti

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Fever, Jaundice, Hepatomegaly,  
Hemolytic Anemia

Maltese cross (falciparum)

Tick Bite: Ixodes dammini

Rx: Clindamycin and quinine

# Clinical Case

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- A 10 year old boy was swimming in with his brother at a freshwater Arizona lake.
- Several days later the child develops fever, neck stiffness, and has a seizure.

- **Naegleria fowleri**

- Freshwater ponds and lakes
- Invade CNS through olfactory or cornea
- >95% mortality
- Organism identified in CSF
- Rx: Amphotericin B into ventricle or Ampho B and Miconazole systemically



- **Acanthamoeba**

- Contact lenses stored in plain water
- Diagnosed from corneal scrapings
- Meningoencephalitis
- No proven Rx: Try Propamidine + neomycin/gramicidin/polymyxin eye drops
- Ketoconazole for Meningoencephalitis



# Clinical Case

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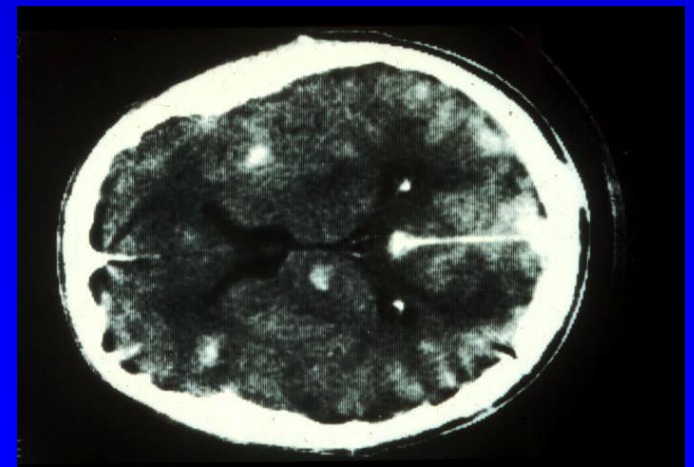
- 34 year old man with AIDS last CD4 count was 37 who comes in with fever, AMS, and just had a seizure

# Toxoplasma Gondii

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- Ingestion of infected meat, cat litter box, blood tx
  - Pregnancy and immunodeficient
  - Headache, fever, AMS, seizures, TORCH, Encephalitis
  - Focal neuro findings in 80% of patients
  - Serological testing not useful
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- CT scan with contrast: ring enhancing lesions or MRI
- Pyrimethamine, sulfadiazine, and folate



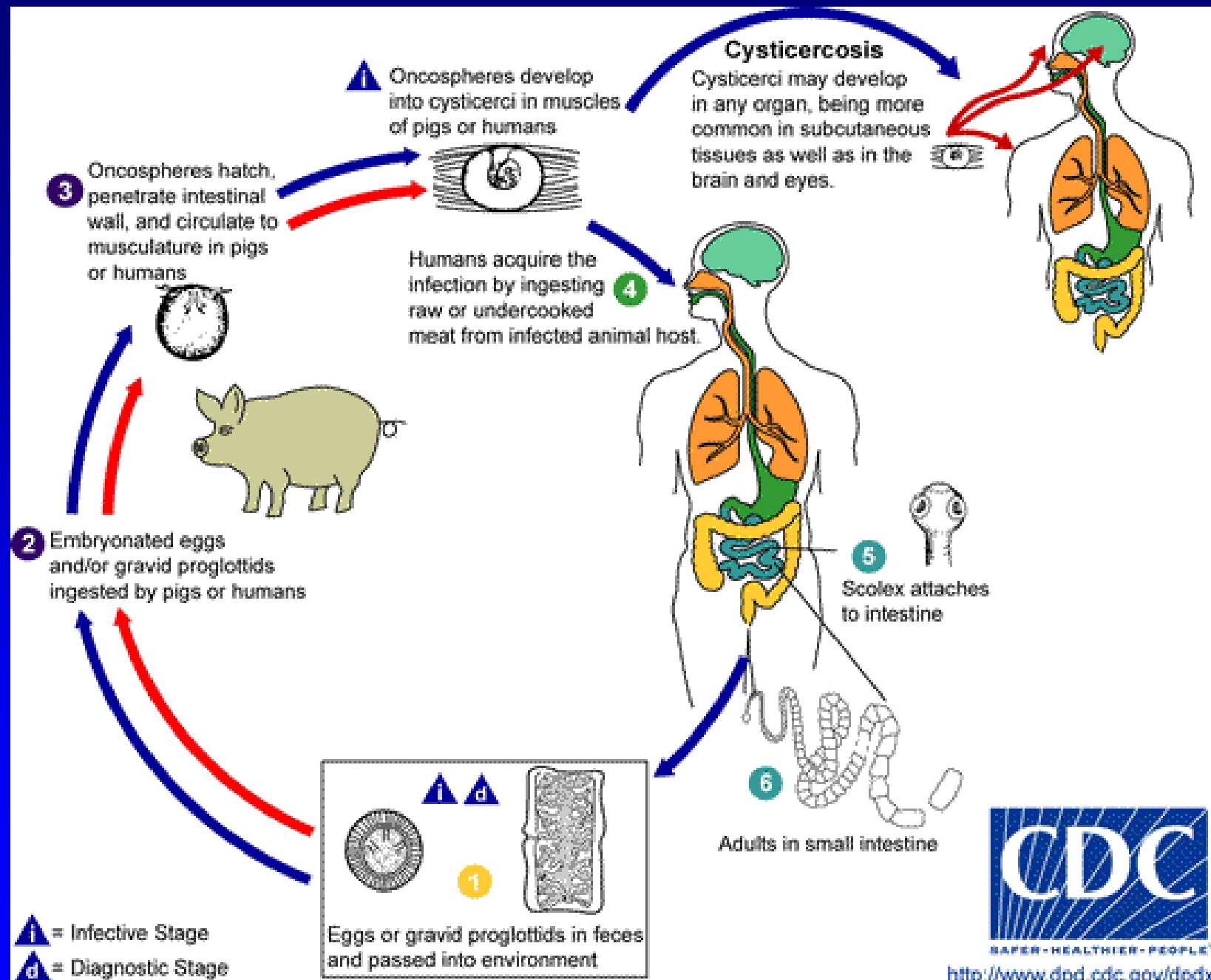
# Clinical Case

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- 37 year old hispanic man brought in by the family after a 1<sup>st</sup> time seizure. He is originally from Mexico and has no history of HIV.







# Taenia Solium

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- Cysticercosis in humans usually occurs because of contamination with egg-harboring feces rather than ingestion of cysticerci in pork.
- This contamination can be either **direct**: contact with an infected person who practices poor hygiene, caring for infected children or the disabled, sexual activities that have anal or perianal contact, autoinfection via one's own contaminated feces,
- Or **indirect**: eating raw foods handled by an infected person, living in an environment with no sanitation system and thus contaminated soil/water, using feces as fertilizer (nightsoil), or traveling to an endemic area



# Nematodes

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- *Trichinella spiralis*
  - Undercooked Pork: N/V/D/Abd Pain
  - Muscle then heart then brain
  - Rx: Steroids and Mebendazole
- *Trichuris trichuria* (whipworm)
  - Dysentary, prolapsed rectum Rx: Mebendazole
- *Enterobius vermicularis*
  - Perianal, perineal, vaginal itching: Scotch Tape Test
  - Pyrental pamoate or Mebedazole

# Clinical Case

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- 21 year old man from Mississippi comes in with a “rash” on the foot
- Patient also complains of chronic cough and diarrhea

# Clinical Case

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# Nematodes

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- *Strongyloides stercoralis* (Threadworm)
  - Skin to Lung to GI Tract to Blood: Autoinfection
  - Bronchial Pneumonia, N/V/D/C, Skin (local)
  - Rx: Ivermectin or Thiabendazole
- *Necator americanus* and *Ancylostoma duodenale* (Hookworms)
  - Anemia + Above: Pulmonary/GI/Skin
  - Rx: Ivermectin or Thiabendazole
- *Ancylostoma braziliensis* (cutaneous larva migrans, creeping eruption)
  - Dogs and cats: Skin Infx: Rx: Mebendazole



# Clinical Case

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A 35 year old man comes into the ED hysterical. He was at a sushi restaurant that he eats at once a week and he coughed up a worm. What are the two most common worms responsible for his symptoms?



Ascaris

Anisakiasis

# Ascaris

- All ages can become infected
  - Most common in children 5-9
  - Morbidity 1 Billion dollars/year
- Infection by ingestion of eggs
  - Eggs resistant to chemical disinfectants/last for months in sewer
  - Killed by heat
  - Hatch in small intestine: GI to Liver to Lungs to GI
- Symptoms are pulmonary and GI
  - Pneumonia, cough, N/V/D/Abd Pain
- Dx: O+P : Eggs in Stool
- Rx: Mebendazole
  - 200 mg PO QD for adults
  - 100 mg PO QD for children







# Dracunculus medinensis



- **Dracunculus medinensis (Guinea Worm)**
  - Ingestion of water contaminated with water fleas: Cyclops
  - Organism migrates from GI tract to sub-Q tissues
  - Mebendazole
  
- **Wuchereria bancrofti and Brugia malayi**
  - Mosquito bite
  - Elephantiasis: Lymphadenitis and Lymphedema
  - Rx: Mebendazole





# Tapeworms

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- **Tenia Solium: pork tapeworm**
  - Light infx – asymptomatic: Heavy: N/V/D/Abd Pain
  - Cystercercosis: lung, liver, eye, brain
  - Rx: Praziquantel
- **Tenia Saginata: beef tapeworm**
- **Diphyllobothrium lattum: fish tapeworm**
  - B12 Deficiency Rx: Praziquantel
- **Echinococcus granulosus:**
  - Cysts in Liver, Lung, Bone, Brain
  - Dogs, Sheep
  - Surgical resection



*Onchocerca volvulus*

Loa Loa



- **Onchocerca volvulus (river blindness)**
  - Guatemala, Mexico, Columbia, Venezuela, Africa
  - Black Fly: Injects parasite into skin, migrates to eye
  - Blindness: Rx: Diethylcarbamazine, Mebendazole
- **Loa Loa:**
  - African Rain Forest
  - Deer Fly Bite
  - Rx: Diethylcarbamazine, Mebendazole



# Medical Kit

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- Water filter and iodine
- DEET and long sleeve clothes
- Cipro and/or Doxyclyne
- Vicodin or percocet (copy scripts)
- Sutures, Staple Gun, Dermabond
- Smartphone
- Women should all include a pregnancy test
- Compazine or Phenergan or Zofran
- Needles/Syringes/Safety pins
- Sam Splint and Ace Wrap



Thank You and Summary