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CAWST is a Canadian non-profit organization focused on the principle that clean water changes lives. Safe water and basic sanitation are fundamentals necessary to empower the world's poorest people and break the cycle of poverty. CAWST believes that the place to start is to teach people the skills they need to have safe water in their homes.

CAWST transfers knowledge and skills to organizations and individuals in developing countries through education, training and consulting services. This ever expanding network can motivate individual households to take action to meet their own water and sanitation needs.

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This presentation is used with  
Lesson Plan 5: Transmission of  
Water Related Disease in the  
Biosand Filter for Technicians  
Trainer Manual.

Available at

[www.cawst.org/resources](http://www.cawst.org/resources)



# Water Related Diseases



# Learning Expectations

1. Identify common water related diseases.



*“So I can’t show you how, exactly, health care is a basic human right. But what I can argue is that no one should have to die of a disease that is treatable.”*

– Dr. Paul Farmer



# Water Related Diseases

- Diseases that are due to microorganisms (pathogens) in the water that people drink
- Diseases that are due to chemicals in the water that people drink
- Diseases which have part of their lifecycle in water
- Diseases with water-related vectors
- Diseases which spread due to a lack of water for hygiene



We are going to look at several water related diseases now. We will ask 4 questions about each disease:

## Questions

1. What are the symptoms?
2. What is it caused by?
3. How is it transmitted?
4. How can we prevent it?



# Cholera

[kirstyne.wordpress.com](http://kirstyne.wordpress.com)



[Connect.in.com](http://Connect.in.com)



# Cholera

## 1. Symptoms:

- *Watery diarrhea*
- *Nausea and vomiting*
- *Can lead to death*

## 2. Cause: Bacteria (*Vibrio cholerae*)



# Cholera

## 3. Transmission:

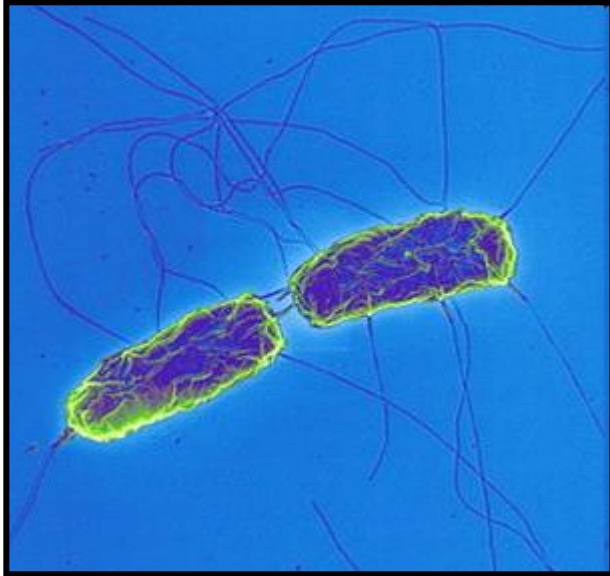
- *Fecally contaminated water*

## 4. Prevention:

- *Safe drinking water*
- *Proper hygiene practices*
- *Proper sanitation facilities*



# Typhoid



[physorg.com](http://physorg.com)



[mtxtremist.blogspot.com](http://mtxtremist.blogspot.com)

# Typhoid

## 1. Symptoms:

- *Sustained fever as high as 39°-40° C*
- *Malaise*
- *Headache*
- *Constipation or diarrhea*
- *Rose-coloured spots on the chest area*
- *Enlarged spleen and liver*

## 2. Cause: Bacteria (*Salmonella typhi*)



# Typhoid

## 3. Transmission:

- *Fecally contaminated water*
- *Contamination of food with feces*

## 4. Prevention:

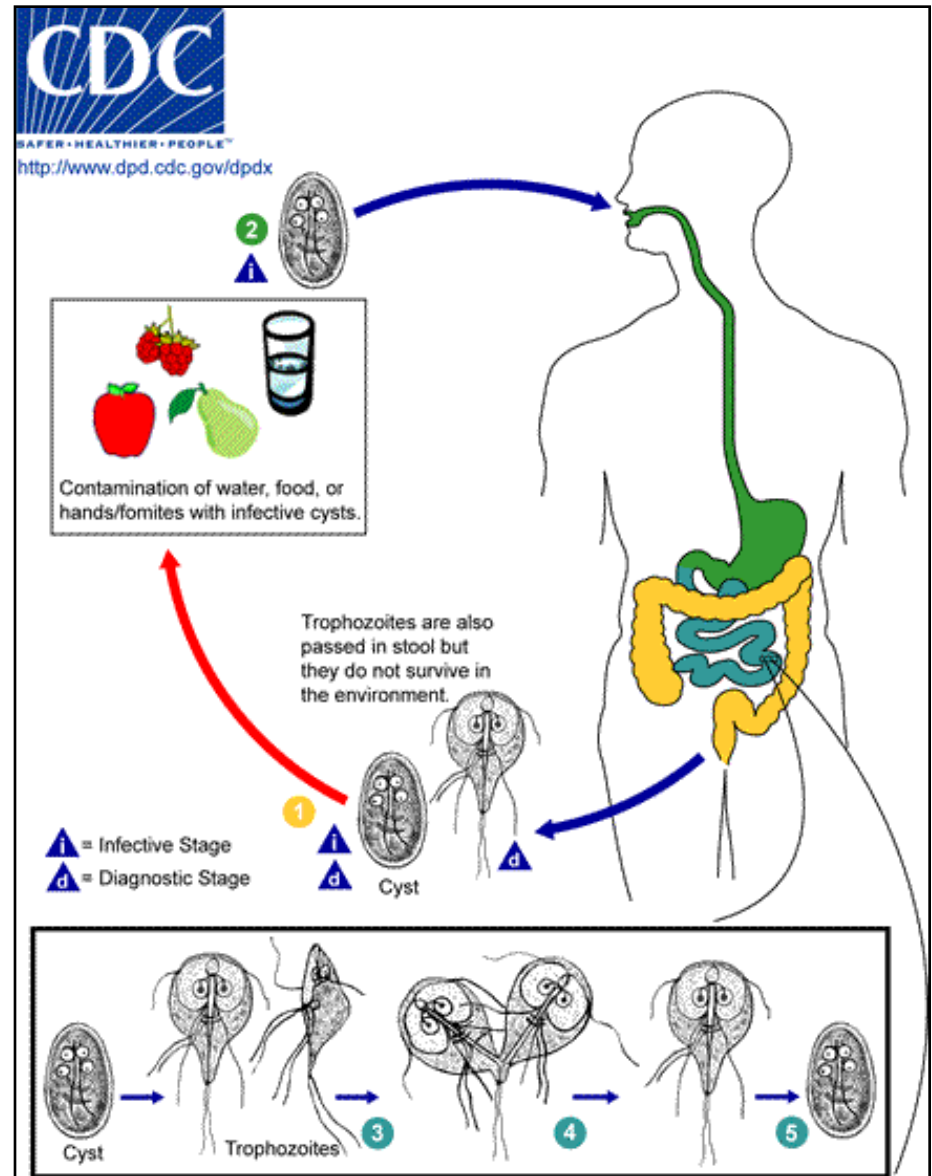
- *Safe drinking water*
- *Proper hygiene practices*
- *Proper sanitation facilities*



# Giardia



biology.unm.edu



# Giardia

## 1. Symptoms:

- *Diarrhea*
- *In immunocompromised individuals, such as people living with HIV/AIDS, the diarrhea is severe and often fatal*

## 2. Cause: Protozoa (*Giardia intestinalis*, *Giardia lamblia*)



# Giardia

## 3. Transmission:

- *Fecally contaminated water*
- *Contamination of food with feces*
- *Direct fecal-oral contamination*

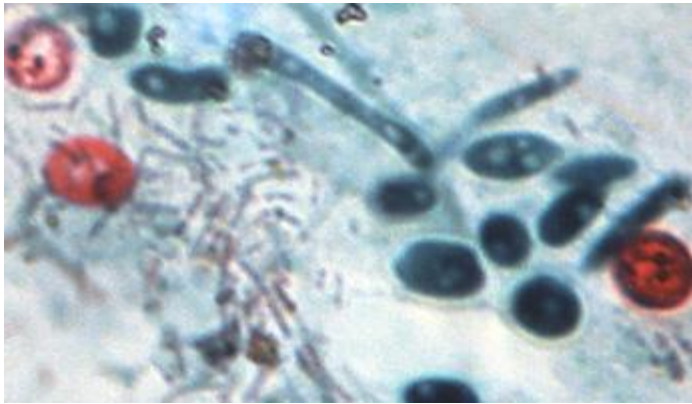
## 4. Prevention:

- *Safe drinking water*
- *Proper hygiene practices*
- *Proper sanitation facilities*

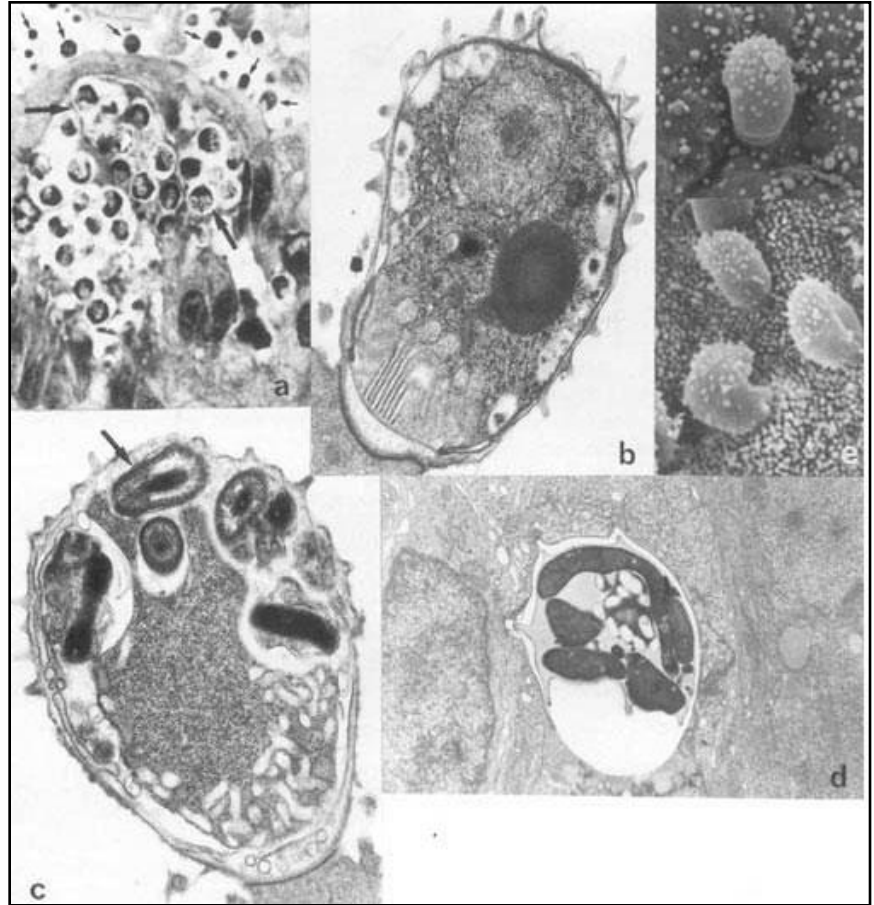




# Cryptosporidiosis



[ecdc.europa.eu](http://ecdc.europa.eu)



[examiner.com](http://examiner.com)

# Cryptosporidiosis

## 1. Symptoms:

- *Diarrhea longer than 10 days in duration*
- *Abdominal pain, Flatulence*
- *Bloating, Vomiting*
- *Weight loss*

## 2. Cause: Protozoa (*Cryptosporidium*)



# Cryptosporidiosis

## 3. Transmission:

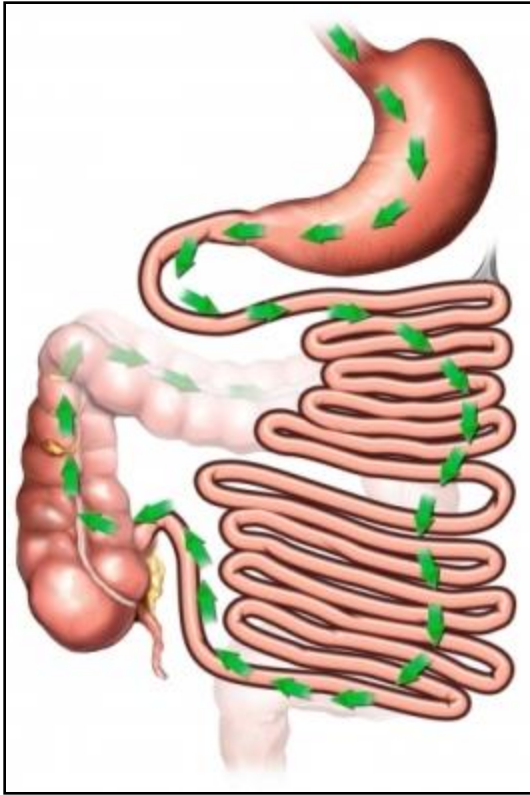
- *Fecally contaminated water*
- *Contamination of food with feces*
- *By direct fecal-oral contamination*

## 4. Prevention:

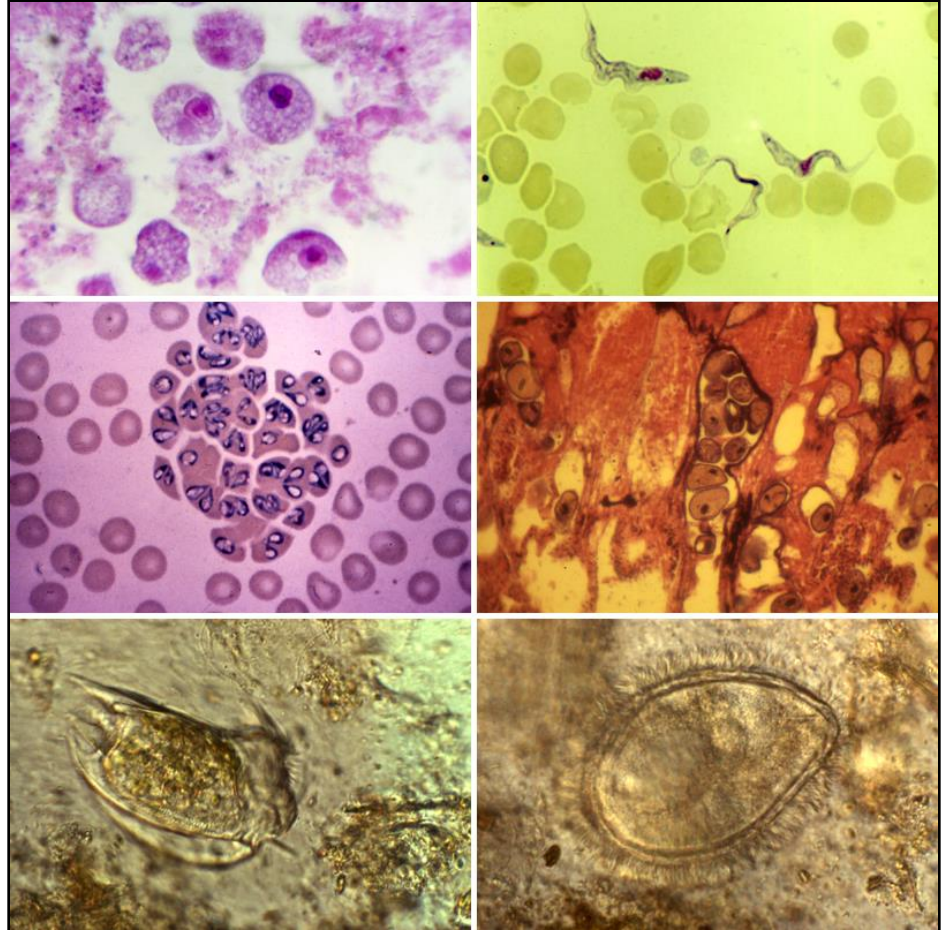
- *Safe drinking water*
- *Proper hygiene practices*
- *Proper sanitation facilities*



# Amoebic Dysentery



[aurorahealthcare.org](http://aurorahealthcare.org)



[nhc.ed.ac.uk](http://nhc.ed.ac.uk)

# Amoebic Dysentery

## 1. Symptoms:

- *Diarrhea, abdominal pain*
- *Liver infection*
- *Blood may be present in stool*

## 2. Cause: Protozoa (*Entamoeba histolytica*)



# Amoebic Dysentery

## 3. Transmission:

- *Fecally contaminated water*
- *Contamination of food with feces*
- *By direct fecal-oral contamination*

## 4. Prevention:

- *Safe drinking water*
- *Proper hygiene practices*
- *Proper sanitation facilities*



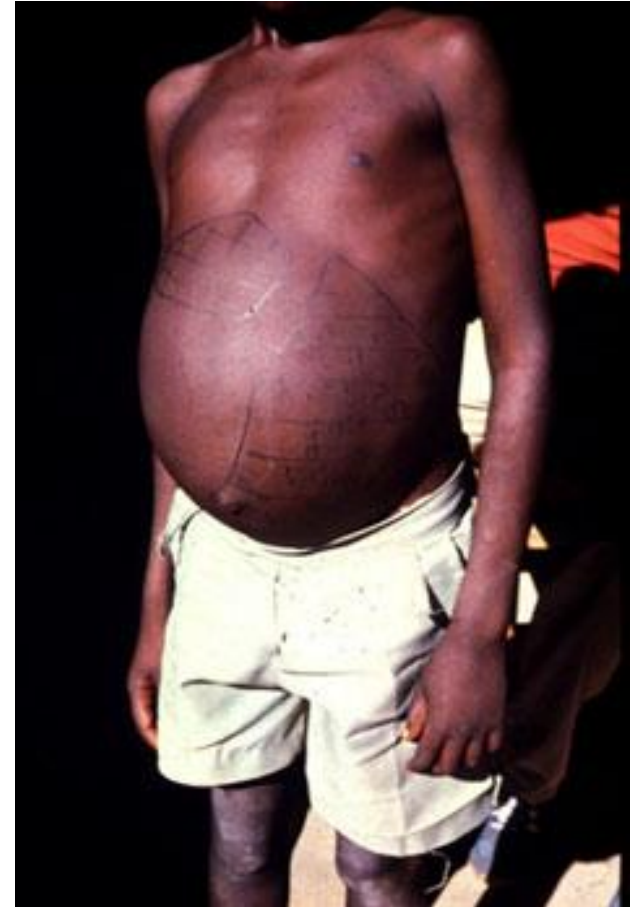
# Schistosomiasis (Bilharzia)



[www.asb.wchsgis.net](http://www.asb.wchsgis.net)



© Natural History Museum, London



[www.path.cam.ac.uk](http://www.path.cam.ac.uk)

# Schistosomiasis (Bilharzia)

## 1. Symptoms:

- *Rashes and itchy skin following larvae entry*
- *Fever, chills, cough and muscle aches*
- *Blood in urine and stools*
- *Enlarged liver and spleen*

## 2. Cause: Helminth (*Schistosoma haematobium*)





# Schistosomiasis (Bilharzia)

## 3. Transmission:

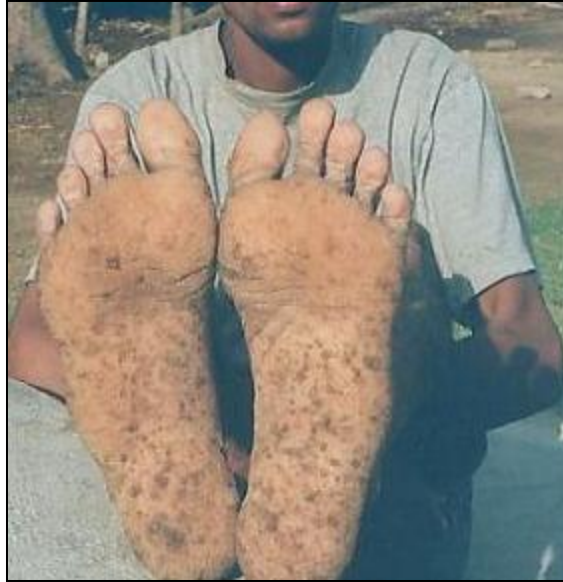
- *Urine and fecally contaminated water*
- *Free-swimming larvae penetrate skin*

## 4. Prevention:

- *Safe drinking water*
- *Proper hygiene education and practices*
- *Proper sanitation facilities*



# Arsenicosis



Source: Harvard University. "Harvard Arsenic Project." Internet. Accessed Sep 27, 05.  
[http://phys4.harvard.edu/%7Ewilson/arsenic/arsenic\\_project\\_introduction.html](http://phys4.harvard.edu/%7Ewilson/arsenic/arsenic_project_introduction.html)



# Arsenicosis

## 1. Symptoms:

- *Skin problems*
- *Skin, bladder, kidney, lung cancer*
- *Diabetes*
- *High blood pressure*
- *Reproductive disorders*

## 2. Cause: Chemical - *Arsenic*



# Arsenicosis

## 3. Transmission:

- *Drinking water containing high levels of arsenic*

## 4. Prevention:

- *Safe drinking water*
- *Deep wells, rainwater or surface water*
- *Testing for presence*



# Fluorosis



Source: [http://www.fannz.org.nz/text/the\\_case.htm](http://www.fannz.org.nz/text/the_case.htm)



Source: [http://www.unicef.org/india/wes\\_1428.htm?q=printme](http://www.unicef.org/india/wes_1428.htm?q=printme)

# Fluorosis

## 1. Symptoms:

- *Teeth and bone problems*
- *Skeletal problems*
- *Abdominal pain, nausea and vomiting*

## 2. Cause: Chemical - *Fluoride*



# Fluorosis

## 3. Transmission:

- *Drinking water containing high levels of fluoride*

## 4. Prevention:

- *Fluoride free drinking water*
- *Testing for presence*



# Review

1. List any diseases that are caused by pathogens or chemicals found in contaminated water:
  - *Giardia*
  - *Cryptosporidiosis*
  - *Cholera*
  - *Typhoid*
  - *Arsenicosis*





# Review

2. Why would the biosand filter be useful in the prevention of most of these diseases?

- *Provide safe drinking water*
- *Removes all types of pathogens*



# Review

3. What else is essential in the prevention of disease transmission that the biosand filter cannot protect against?

- *Proper hygiene and sanitation practices*
- *Health, hygiene education programs*
- *Monitoring of programs and filter usage*



# Review

4. What are the 4 types of pathogens and give one example of a water related disease they can cause?

- *Viruses – Hepatitis A & E, Polio*
- *Bacteria – Cholera, Typhoid*
- *Protozoa – Giardia, Cryptosporidiosis*
- *Helminths – Schistosomiasis (Bilharzia)*

