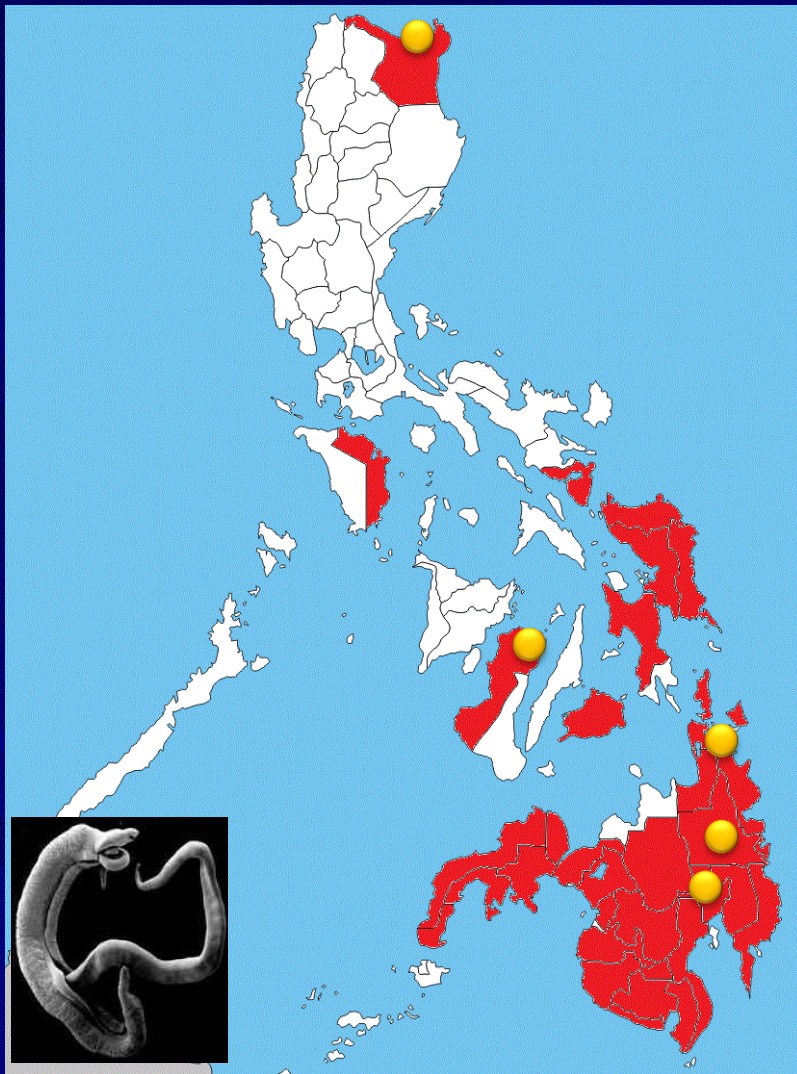


# Schistosomiasis in the Philippines



- Endemic in 12 regions covering 28 provinces, focal distribution, emerging in more areas
- 6.8% in school-age children in Calatrava, **Negros Occidental**
- 3.1% in school-age children in Carmen and Sto. Tomas, Davao del Norte
- 4.8% in school-age children in Surigao del Norte
- 31.8% (5-70%) in school-age children in Bunawan and Trento, Agusan del Sur

(Belizario *et al.*, 2007, 2012, 2013)

**WHO/DOH Target: <1%**

# Schistosomiasis in Children

- 32% in elementary and high school children in Agusan del Sur, heavy in 61%
- 54% (25-71%) in elementary school (Belizario *et al.*, 2008)
- 5.2% (3.4-8.9%) in PSAC (Daycare Centers) in Agusan del Sur, heavy in 0.3%

Ffup: 1.0%/0% (Belizario *et al.*, 2009)

(Current guidelines silent on MDA in this age group)



**DOH Sec., 2005: "I thought we had controlled schisto. already..."**

PHILIPPINE DAILY INQUIRER

## Across the **NATION**

THURSDAY, SEPTEMBER 21, 2006

# Schistosomiasis infection rate alarms WHO exec

SAN FRANCISCO, AGUSAN DEL SUR—AN official of the World Health Organization (WHO) raised an alarm over the growing number of cases of schistosomiasis among schoolchildren in the province.

Schistosomiasis, or bilharzia, is a snail-borne disease. It is sometimes called snail fever. The disease can be easily treated at its early stage with praziquantel, an antiparasitic and de-worming agent.

Although it has a low mortality rate, schistosomiasis, which can be contacted through wading in fresh water or drinking contaminated water, can be very devastating.

If left untreated, schistosomiasis can be hard to cure and can damage liver, lungs, intestines, or bladder.

Lester Chitsulo, WHO representative who

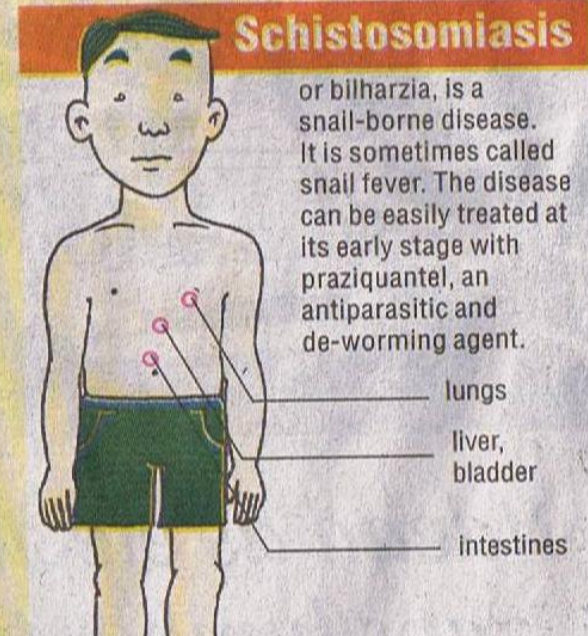
Philippines' National Health Institute, it was found that the water-borne disease is "notably high in Bunawan and Trento towns."

He said the study, conducted in August this year, showed that 507 out of 1,497 schoolchildren tested positive in Trento while 81 out of 351 were infected in Bunawan.

Among the symptoms found on affected children in Trento and Bunawan were abdominal pain, nausea, vomiting, diarrhea, anorexia, fever, headache, dizziness and allergic reactions.

Only Sibagat town, which is in the northern boundary of the province, was found to be schistosomiasis-free.

Dr. Vicente Belizario, head of the UP-NHI survey team, said there was a great possibility



**WHO: "All this time, the Philippines has always reported that schistosomiasis is under control in your country."**

**FYI: The Philippines is no. 2 in terms of schisto. cases, next to China!**

The background of the slide is a microscopic image showing several Schistosoma ova. These are oval-shaped structures with a thick, multi-layered shell and a central mass of developing miracidia. The ova are arranged in a horizontal row across the top and bottom of the slide.

## **DIAGNOSIS: A CONTINUING CHALLENGE**

**STOOL EXAMINATION HAS LIMITED SENSITIVITY**

**ABSENCE OF SCHISTO OVA IN STOOL**

**INAPPROPRIATE STOOL EXAMINATION TECHNIQUE**

**SCHISTO OVA MISTAKEN AS HOOKWORM OVA**

**LACK OF TRAINING OF MICROSCOPISTS**

**LACK OF QUALITY CONTROL**

**ULTRASOUND OF THE LIVER PROVIDES NONDEFINITIVE DIAGNOSIS**

**ANTIGEN DETECTION NOT AVAILABLE**

**RECTAL BIOPSY MAY BE EXPENSIVE AND INVASIVE**

# Major challenges in control of schistosomiasis in the Philippines

- Resurgence reported in some endemic areas
- Newly described endemic areas
- Poor diagnostics
- Challenges in drug delivery
- Low mass drug administration coverage
- Lack of information/awareness

# Food and Water Borne Diseases

## Illness due to contaminated food

- perhaps the most widespread health problem in the contemporary world
- an important cause of reduced economic productivity

(WHO)

# Food and Water Borne Parasitoses

*“The problems related to **food and waterborne parasitoses**, when considered in the aggregate, are substantial, and appear to be increasing in spite of economic growth and development.”*

(Murrell, Cross and Looareesuwan, 2001)

# FLUKES



*P. westermani*



*Sundathelphusa* spp.



Metcercariae in crab

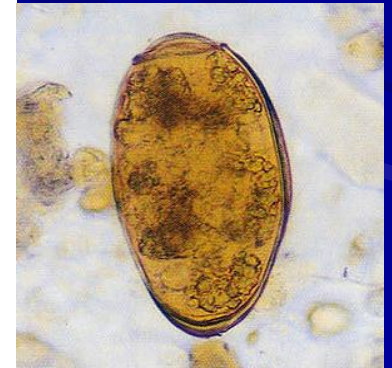


## Endemic areas:

Mindoro, Camarines, Sorsogon, Samar, Leyte, Davao, Cotabato, and Basilan

## More recently described endemic areas:

Davao Oriental  
Zamboanga del Norte – *hot spot!*  
Others?



# PARAGONIMIASIS IN THE PHILIPPINES



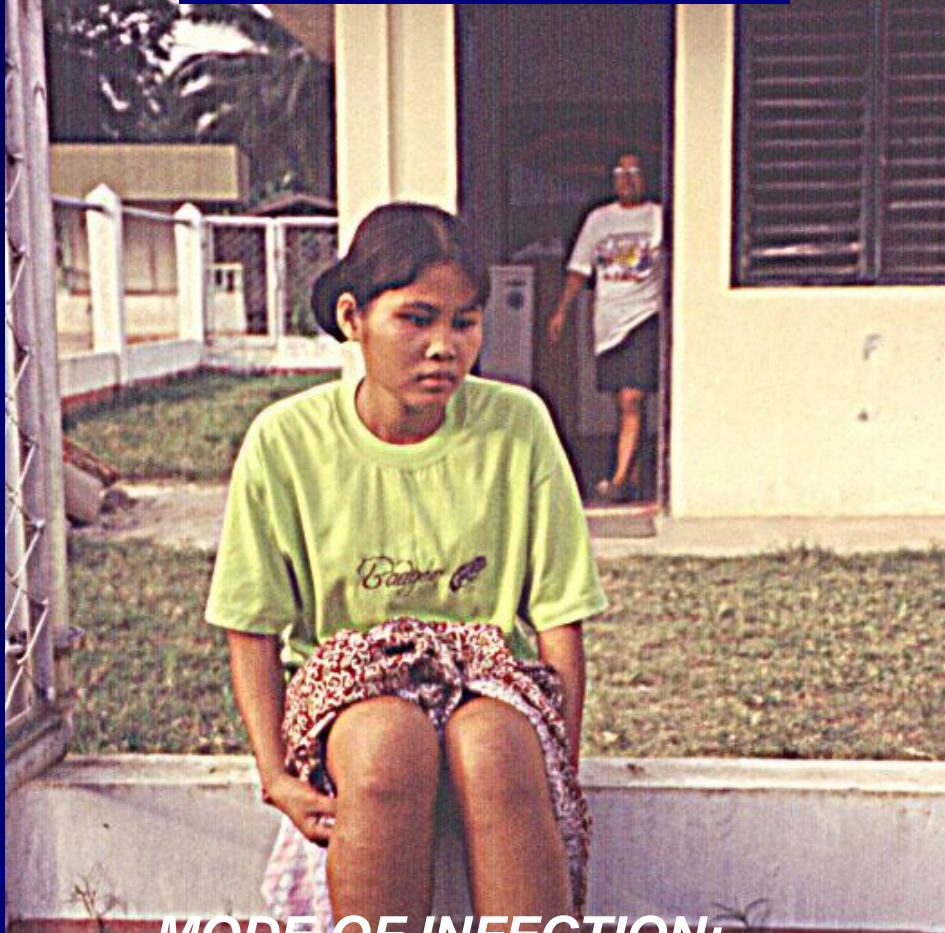
# Pulmonary Paragonimiasis in the Philippines (*In raw crab eating communities*)

- Pulmonary paragonimiasis (PP) in patients diagnosed to have PTB and not responding to treatment (*TB or Not TB???*)
- Sorsogon: 16 - 25% (Belizario *et al.*, 1995)
- Davao Oriental: up to 40% (DOH)
- Zamboanga del Norte: 15% (up to 28%); PP having familial pattern! (Belizario *et al.*, 2005)
- Majority of patients reported are adults; children are not spared.  
WOF: family history of PP
- PP and PTB: 30% of PP with co-infection  
(Belizario *et al.*, 1997)



**PARAGONIMIASIS CONTROL PROGRAM NEEDED!**

# INTESTINAL CAPILLARIASIS



**MODE OF INFECTION:  
CONSUMPTION OF  
RAW FRESH WATER FISH**  
*“People eating fishes,  
fishes eating feces.”*

## “Mystery Disease”, 1998

People in villages of Monkayo, Compostela Valley suffered from a mysterious illness presenting as chronic diarrhea and ending up dead by the 3<sup>rd</sup> or 4<sup>th</sup> month of illness.

### Index case:

A 16 year-old girl with a 2-month history of diarrhea, anorexia, bipedal edema and borborygmi

### Stool examination result:

*Capillaria* adults, larvae and eggs

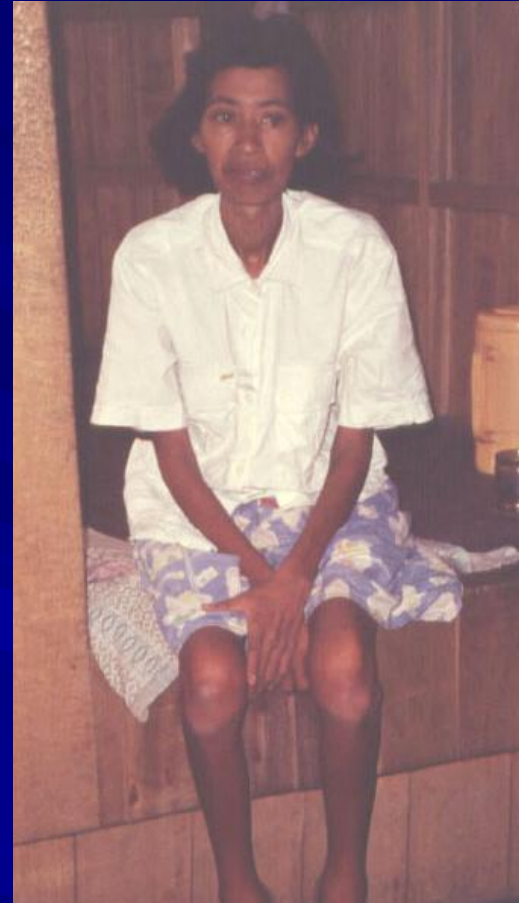


# CAPILLARIASIS THEN AND MORE RECENTLY

ILOCOS, 1960s



MONKAYO, 1990s



**Q: “What do you do when you see something that you don’t recognize?”**

**A (MedTech): “I don’t report it!”**



**Tagudin, Ilocos Sur, 1960s**



**Monkayo, CVP, 1990s  
Capillariasis in 22%  
of symptomatic patients**



**Map of the Philippines showing the location of Monkayo, Compostela Valley**

**To-date, deaths due to capillariasis in Zamboanga del Norte!**



## ENDEMIC REGIONS

Northern Luzon

Eastern Visayas

Western Mindanao

Southern Mindanao

Northern Mindanao – *latebreaking news*

*Others?*



FIG. 4. Map of Northern Luzon indicating provinces and towns where intestinal capillariasis was endemic. Cases are still reported from some of the places indicated by the black dots.

# It is still happening!!!

PHILIPPINE DAILY INQUIRER

TUESDAY, NOVEMBER 13, 2007

## Across the NATION

A15

# Worm in seafood kills dozens in Zambo villages

SIAYAN, ZAMBOANGA DEL Norte—Health officials confirmed the capillariasis outbreak in several villages of this town where more than 70 people, including children, have reportedly died.

Dr. Raymond Nadela, municipal health officer, expressed alarm over the health situation in some villages, saying that the capillaria worm (*Capillaria philippinensis*) attack "is now an outbreak."

Based on random tests of wastes from 326 residents in the area, 81 people have been found positive for the disease, Nadela said.

Emeliano Villalon, chair of Barangay Moyo, said that since he was elected late October, a total of 31 adults and nine children have died of capillariasis.

Villalon said 38 others died from April to August.

But Nadela said he could not "outrightly say those who died earlier were confirmed to have capillariasis."

"We labeled them as deaths with suspected capillariasis," he said.

Nadela said the victims got the disease from eating freshwater fish and shrimps from the nearby rivers of Siayan.

"These shrimps and fish are carrying this type of worm known as capillaria, a microscopic worm that gets into the intestine and eats up all the nutrition of the person," he said.

Maria Teresita dela Cruz, information officer of the Department of Health in Western Mindanao, said some people in the province "love to eat *kinilaw* and there's a particular fish from the river which they love to eat raw with vinegar."

Dela Cruz said other than Siayan town, the health department received the same report in the village of Femagas in

Katipunan town.

"But we don't have clear records as of this moment," she said.

Virgilio Lumawas, 43, a farmer of Moyo village, survived capillariasis but still complained of diarrhea.

Nadela said patients found with capillaria worms showed symptoms like diarrhea, extreme abdominal pain that leads to anemia, and muscle wasting.

"People think that they had gas pains, but the pain becomes excruciating coupled with gurgling sound, then the patient

could hardly eat or sleep," Nadela explained.

Siayan Mayor Wilfredo Suasico said he became alarmed by the deteriorating health situation "when I keep on signing for approval request letters and solicitations for coffins."

Since October, Suasico said, he had granted the release of funds for the purchase of 32 coffins intended for the villages of Moyo, Dinuyan, Poblacion Lopot, Polayo, Balunukan and Baloc.

The outbreak and the hardest hit, according to Nadela, is Moyo village where, Suasico

said, a total 24 coffins were delivered last month.

Nadela said that aside from capillariasis, the town was not ed for the presence of lymphatic filariasis or elephantiasis, an abnormal growth of the lymphatic nodes due to a mosquito-borne disease that attacks the blood, and leprosy.

Although the cases of filariasis and leprosy have been taken care of since two years ago, Nadela still considers the diseases serious in some villages of Siayan. *Julie S. Alipala, Inquirer Mindanao, with Inquirer Research*

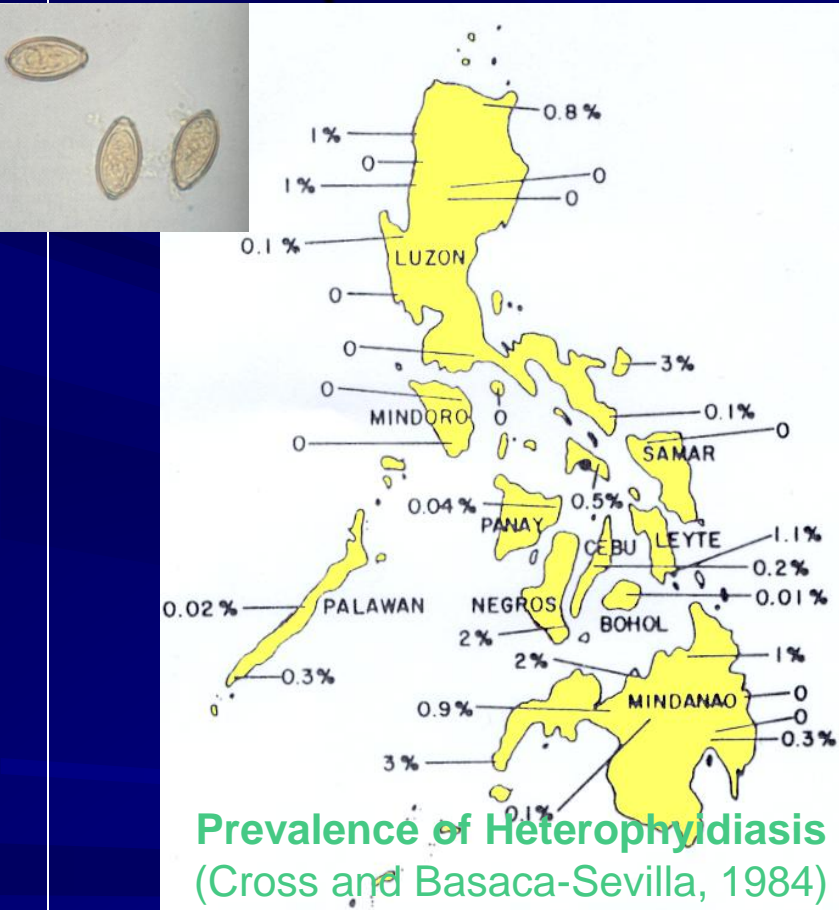
## "Recurrent capillariasis in ZDN"

In Misamis Occidental, too,  
we confirmed intestinal capillariasis!  
Where else?



# HETEROPHYDIASIS IN THE PHILIPPINES

## (In raw fish eating communities)



- Prevalence ranged from 0-3%
- <1% of 30,000 stools (nationwide) with heterophyid eggs
- Heterophyid species not known since only eggs have been found but most likely *Heterophyes heterophyes* (?)  
(Cross and Basaca-Sevilla, 1984)
- **Comval, Southern Mindanao, 17-36% *Haplorchis taichui***  
(Belizario, et al., 2000)

**MedTech: “Matagal na namin itong nakikita, hindi lang namin ni-rereport!”**

# **FASCIOLA OR NOT FASCIOLA IN STA. MONICA (SDN)???**

*(and probably other raw snail/kuhol eating communities)*

2002 - **Fasciola sp.** infection documented  
in Sta. Monica by DOH-PHT

2005 - Request by LGU/RHU for NIH/UPM  
to investigate liver fluke infections

- **Fasciolid infection** proposed, based  
on formalinized stool specimens  
submitted by LGU/RHU
- Collection of adult flukes revealed  
***Echinostoma malayanum***



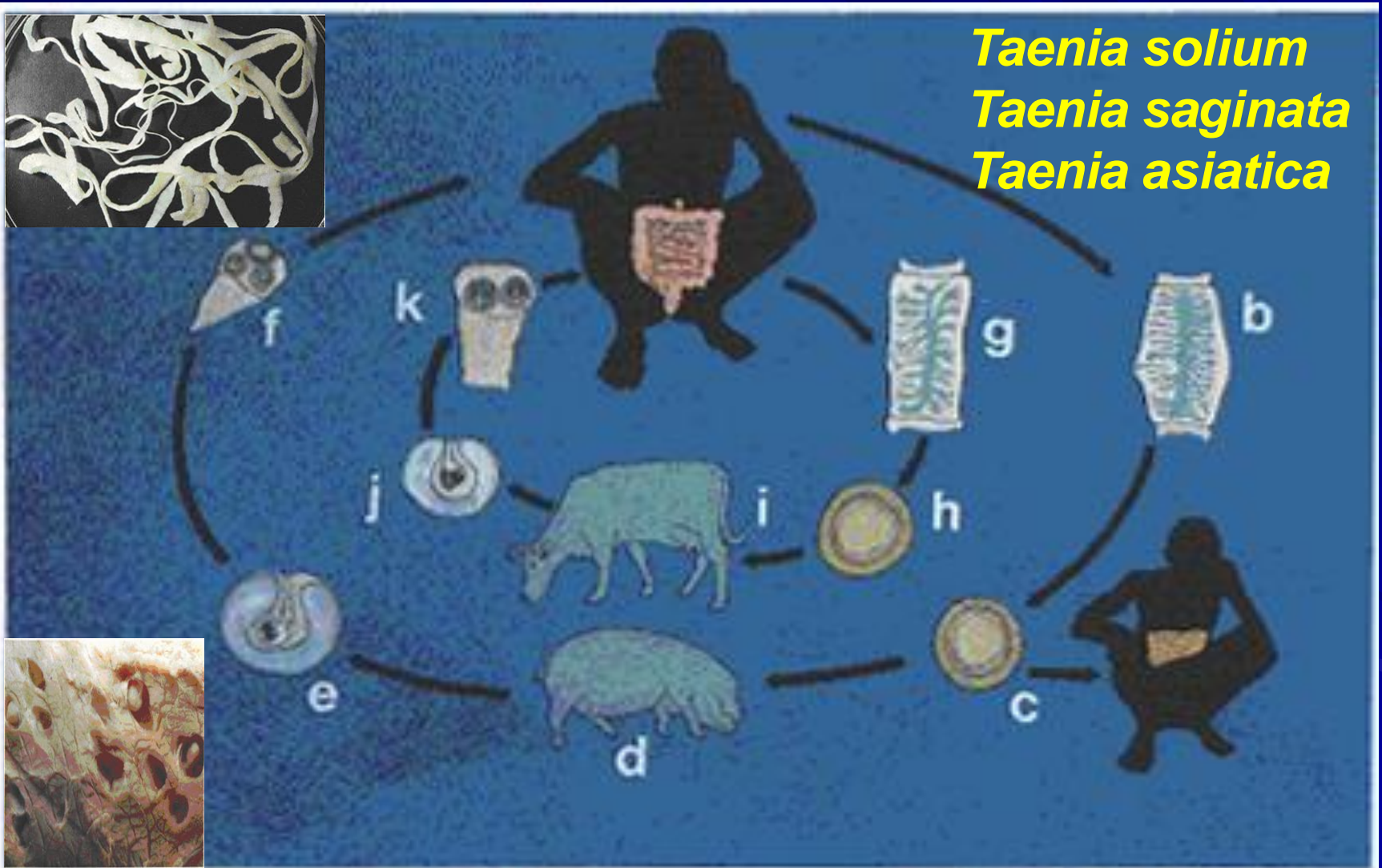


# TAPEWORMS

## Life cycle of *Taenia* spp.



*Taenia solium*  
*Taenia saginata*  
*Taenia asiatica*



# **DIARRHEAL DISEASES**

**Diarrhea remains the number one cause of illness in all age groups in the Philippines.**

- **One of the most frequent causes of childhood illness and a major contributor to childhood malnutrition**
- **Morbidity rate for diarrhea remained high at 1,250 cases per 100,000 population in 1995**

(DOH, National Objectives for Health, 1997-2004)

# DIARRHEAL DISEASES

**70% of diarrhea cases associated with contaminated food and water**

**Intestinal protozoan infections are not uncommon and manifest as diarrhea, but most infected individuals are asymptomatic (carriers).**

Larson



“What the? ... This is lemonade!  
Where’s my culture of amoebic dysentery?”

# AMOEBIASIS and AMOEBIC DYSENTERY



*E. histolytica*

## THE CULPRIT

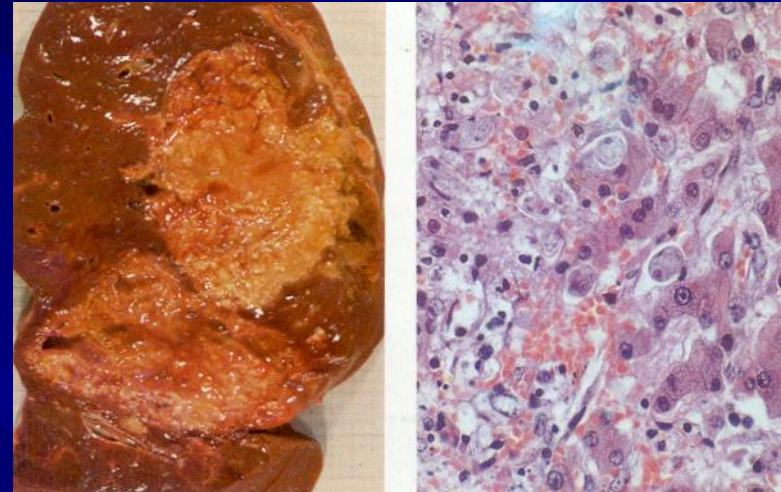
An important cause of diarrhea

**UNDERDIAGNOSIS OR OVERDIAGNOSIS IN THE PHILIPPINES?**

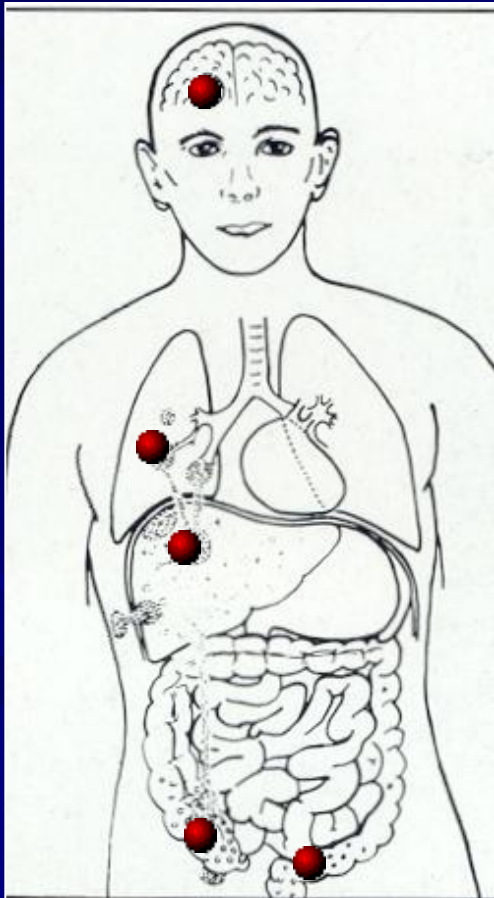
# AMOEBIASIS



Amoebic cysts from stool of asymptomatic food handler ingested by susceptible host

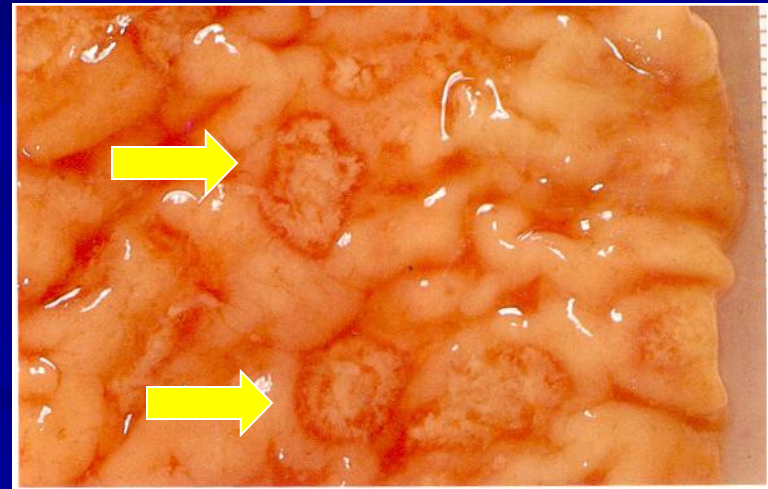


Amoebic liver abscess



Amoebae lodge in large intestine and cause ulceration and diarrhea.

Secondary sites are the liver, lung and brain.



Amoebic colitis: ulceration of the large intestine

# AMOEBIASIS

<b><i>Study Area</i></b>	<b><i>Infection Rate</i></b>	
<b>Nationwide</b>	<b>5%</b>	(Cross & Basaca-Sevilla, 1985)
<b>S. Mindanao</b>	<b>17%</b>	(Belizario <i>et al.</i> , 2000)
<b>Metro Manila</b>	<b>4%</b>	(Avila <i>et al.</i> , 2004)
<b>Metro Cebu</b>	<b>1.2%</b>	(Belizario <i>et al.</i> , 2005)
<b>Cagayan</b>	<b>0.8%</b>	(Belizario <i>et al.</i> , 2005)
<b>Isabela</b>	<b>1.4%</b>	(Belizario <i>et al.</i> , 2005)

10  $\mu$ m

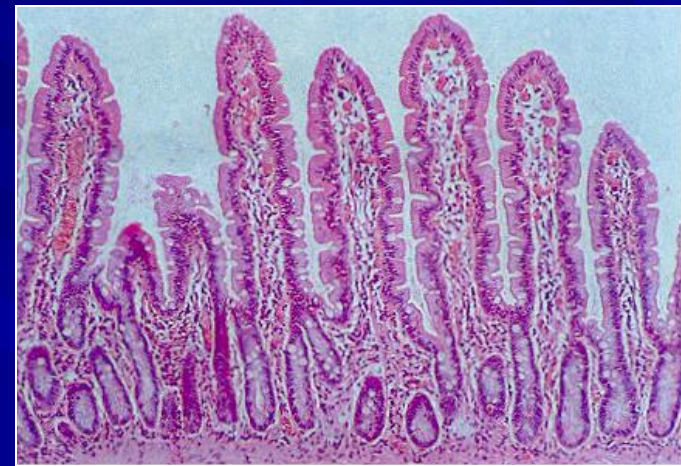
# GIARDIASIS



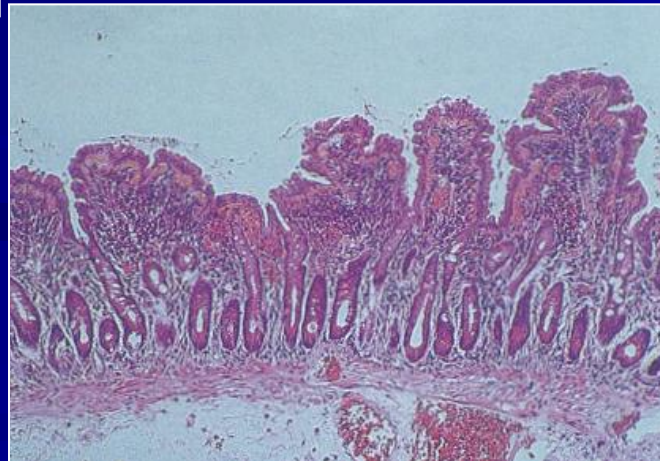
*Giardia* cysts from asymptomatic food handler ingested by susceptible host



Lodge in small intestine and cause destruction of intestinal villi causing malabsorption and diarrhea



vs. Normal intestinal villi



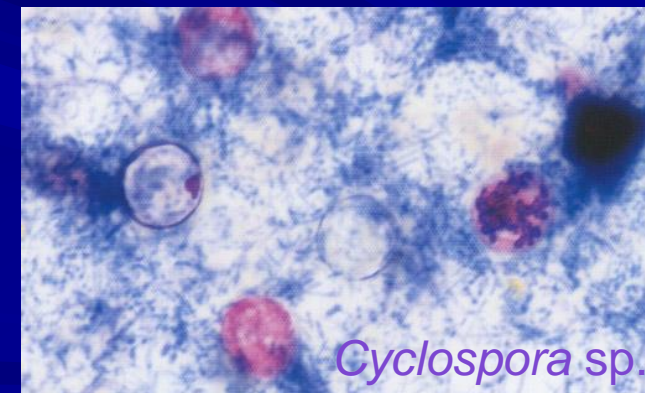
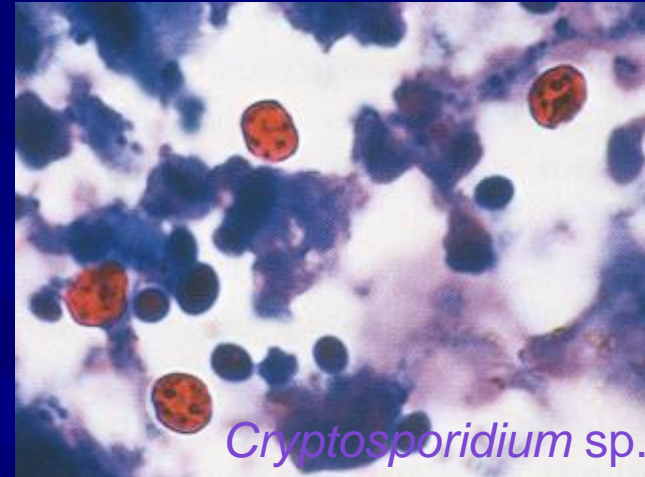
# OTHER INTESTINAL PROTOZOANS CAUSING DIARRRHEA

*Cryptosporidium parvum*

*Cyclospora cayetanensis*

*Blastocystis hominis*

Emerging as most common  
intestinal protozoan





## Parasitologic studies on food-handlers using stool concentration technique

Investigators	Study site	Cumulative prevalence
Avila <i>et al.</i> , 2002	School canteens in Metro Manila	61.8%
Esparar and Belizario, 2005	Tertiary hospital in Metro Manila	42.4%
Belizario <i>et al.</i> , 2005	Mall employees in Metro Cebu	38.3%

**Up to 6 out of 10 food handlers cleared by LHU found infected if proper laboratory method performed by trained microscopist**

# Intestinal Parasitoses in Mall Employees in Metro Cebu

(Belizario *et al.*, 2005)

No. positive for intestinal parasite or organism (n=162)	=	62 (38.3%)
No. infected with helminths	=	39 (24.1%)
No. infected with protozoans	=	29 (17.9%)

Considering 4000 workers screened per year, there may be >1500 misdiagnosed per year



***Misdiagnosis is probably a nationwide concern.***

# How can we do better in control of parasitic infections?

Capacity building to help ensure early diagnosis, treatment and control of parasitic infections

- Training on diagnosis, treatment and control
- Quality assurance
- Surveillance and control



# THE IMPORTANCE OF ENSURING QUALITY OF LABORATORY DIAGNOSIS

## Proficiency in the diagnosis of parasitic infections



More accurate diagnosis and reporting



Appropriate treatment



Quality data and evidence  
for policy and planning



# Control and prevention of parasitic diseases

# Summary

- Parasitic infections as continuing public health concerns in the Philippines
- Importance of good laboratory diagnosis of parasitic infections for appropriate treatment, policy formulation and control
- Capacity building is key to achieve good diagnosis and control
  - Strengthen Para/NTDs in Medtech curriculum
  - Continuing education/training
- Use of new tools to help ensure good diagnosis
  - Medical Teleparasitology

*Thank you*

