MODULE

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c) Both

d) None of the above

6

b

c) Hymenolepis nana
d) Diphyllobothrium latum

17. Which of the following cestodes are more common in our country?
a) Taenia solium
b) Taenia saginata
c) Hymenolepis nana
d) D. latum
e) b & c

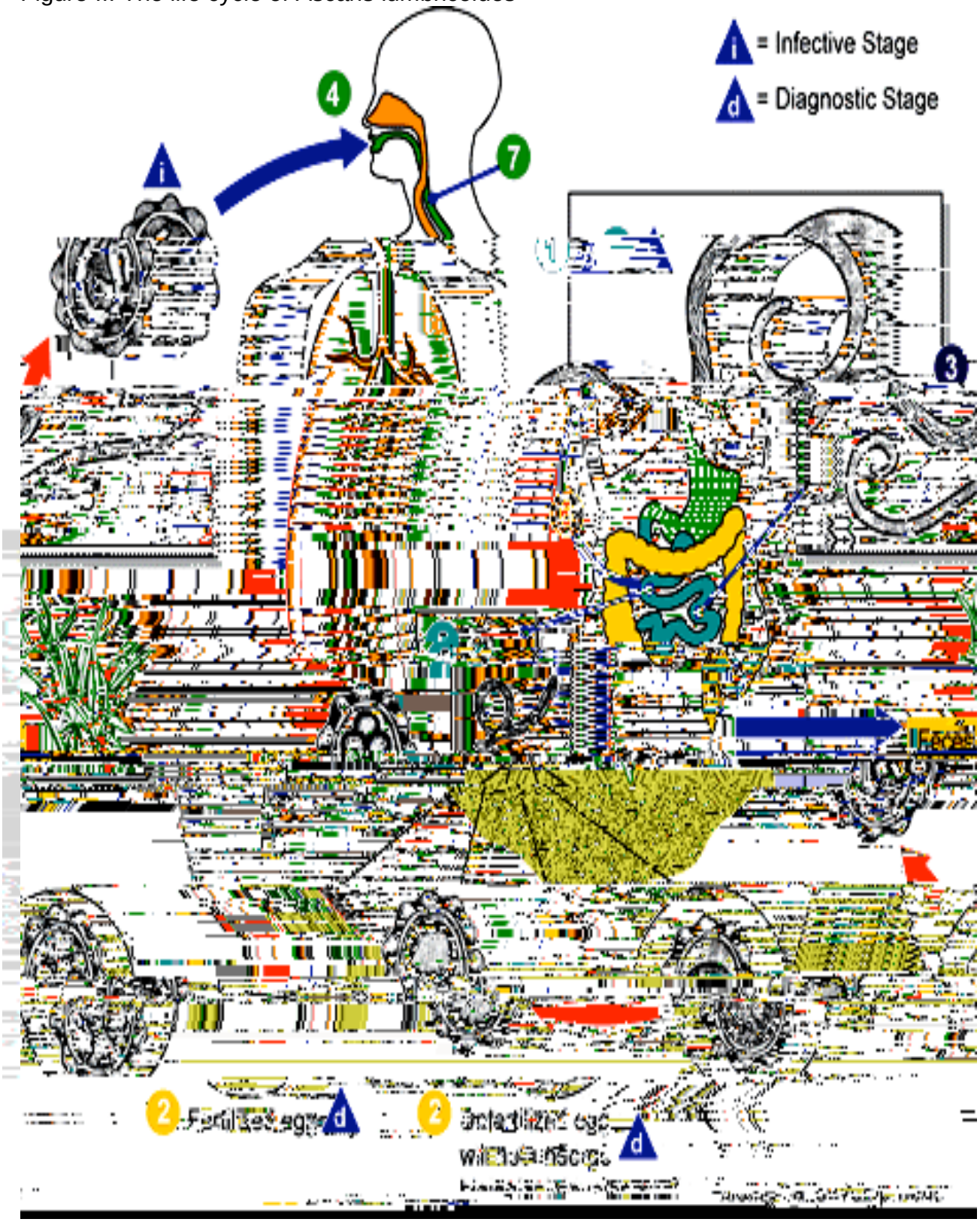
18. All of the following are features of cestode infections except:
a) Cough
b) Abdominal cramp
c) Diarrhea
d) Anorexia

19. Which of the following drugs can effectively treat tapeworm infection?
a) Piperazine
b) Niclosamide
c) Mebendazole
d) Metronidazole
e) b & c

20. Which of the following is not the appropriate preventive or control measure for tapeworm infection?
a) Cooking meat above 56 ^{o}C
b) Practicing personal hygiene
c) Encouraging use of excreta for soil fertilization
d) Freezing meat at 10 ^{o}C for 24 - 48 hrs

shared tasks among themselves. The public health nurse tried to search for sick people and found some individuals with variable degree of abdominal complaints and she advised them to get medical care at Zway Health Center. The sanitarian moved around the village and obs e

Figure II: The life cycle of Ascaris lumbricoides



Source: CDC

Clinical features

Most infections are asymptomatic. However, in heavier infections abdominal pain or discomfort, nausea, vomiting, anorexia and passage of adult worms via anus or mouth may occur.

During the lung phase, about 9 - 12 days after ingestion of the eggs, the individual may occasionally present with dry cough, chest pain, fever, wheezing, shortness of breath and blood streaked sputum associated with increased eosinophils in the circulation. This condition is called *eosinophilic pneuoirii.iim0Tmr 6 60 0 570 1965 85T*

2.5.2. Trichuriasis (whip worm infection)

Definition

Trichuriasis is an infection of the human intestinal tract, caused by the nematode Trichuris trichuira (whip worm).

Epidemiology

The distribution of trichuriasis is worldwide, being most abundant in the warm moist regions of the world. The parasite commonly occurs together with *Ascaris lumbricoides* and likewise mainly affects children. In Ethiopia it is found in 90% of 50 communities in the central and northern plateaus with a mean prevalence of 49%. (3) Infection results from the ingestion of eggs in contaminated soil. Transmission may occur through the medium of food or water or directly from the hands of individuals. Children may be heavily infected and constitute important reservoirs.

Figure III: The life cycle of Trichuris trichuira

Source: CDC

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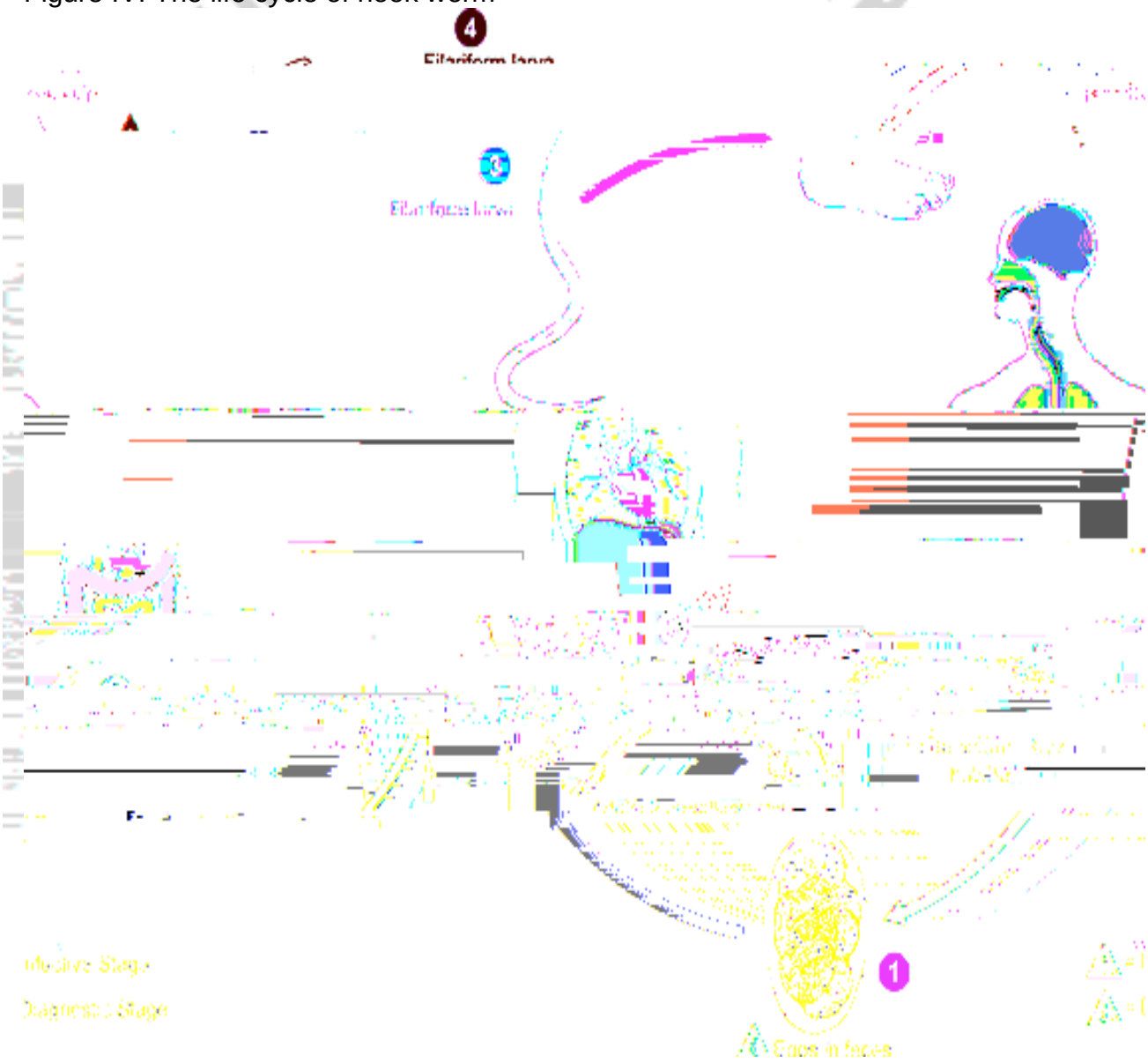
world. In Ethiopia, Necator americanus is more common than Ancylostoma duodenale, and hookworm infections are most prevalent in communities located between 800 and 1200m altitude. Infection rates ranged between 7% and 67% among 10 school populations in the lowlands of Gondar Region and at community level rates ranged from 4% to 75% among 16 villages in west Abaya (3). In most areas, older children have the greatest incidence and intensity of hookworm infection. In rural areas where fields are fertilized with night soil, older working adults may also be heavily infected.

Figure IV: The life cycle of hook worm



Source: CDC

N.B. The period from skin penetration to appearance of eggs in the feces is about 4-6 weeks

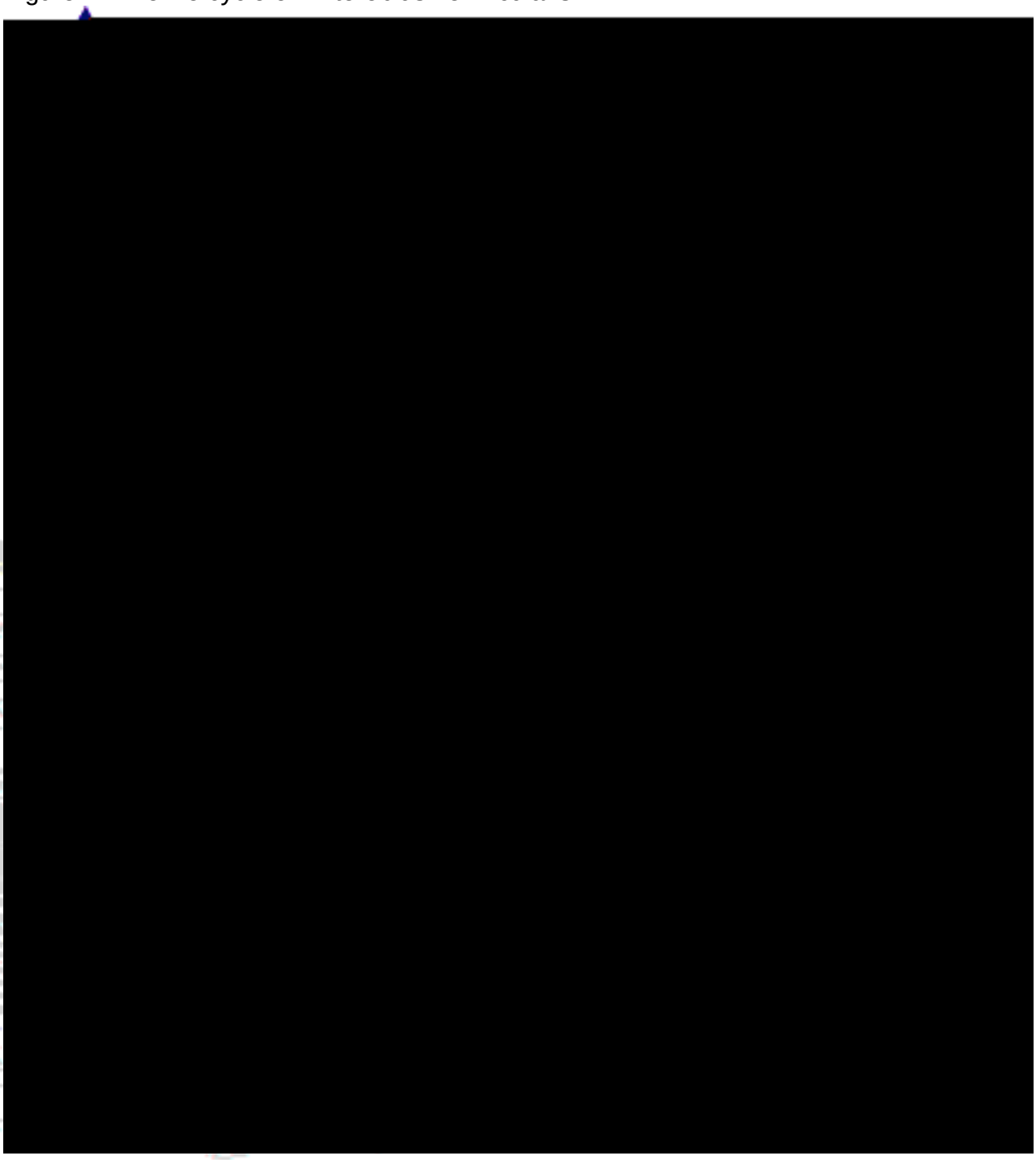
Clinical Features

Most hookworm infections are asymptomatic. However, infective larvae may provoke itching rash at the site of skin penetration. Moreover, larvae migrating through the lungs occasionally cause mild transient pneumonitis in the early intestinal phase. Infected ~~persy 00 171 0 Tm (o)T23 0~~ Tm .00 1217 Tm (o)T23 0 Tm .00 12 60 0 0 34 0 Tm j 60 0

Epidemiology

Enterobiasis is a worldwide disease infecting mostly children. In Ethiopia past surveys have reported low prevalence of E. vermicularis. In Gondar area 5% of school children were found to contain E.vermicularis eggs under their nails, but only 0.5% of them shed eggs in the stool (3). Infections occur by ingestion of the eggs that reach the mouth on soiled hands or in contaminated food or drink. The intense perianal itching is an important factor in autoinfection and maintenance of the primary reservoir. Because of the predominance of person-to-person transmission, autoinfection through the perianal-fecal-oral route and through egg contamination of blankets and clothing, enterobiasis is more common in some families and institutions (orphanages, boarding schools, asylums, and refugee camps) where people live under crowded conditions.

Figure V: The life cycle of Enterobius vermicularis



Source: CDC

Clinical features

Most pinworm infections are asymptomatic. The most common symptom when present is intense perianal itching. It is worse at night and may lead to excoriation

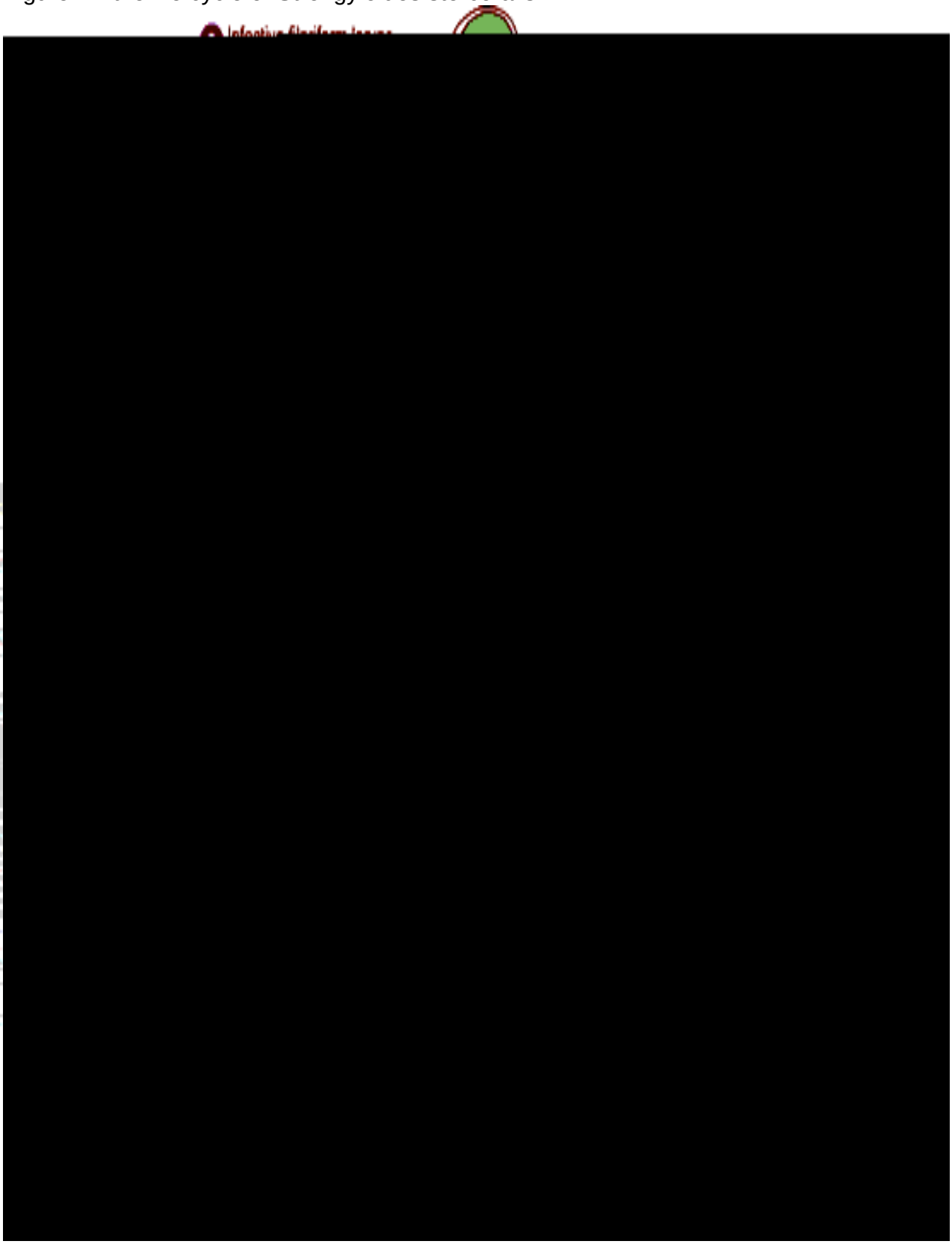
the stool. The rhabditiform larvae may undergo further development in either of two ways:

(1) As **free living adult** under suitable conditions of moisture and temperature or

(2) As **infective filariform larvae** under unfavorable conditions.

These infective larvae are capable of penetrating the skin of man. After skin penetration the filariform larvae reach the lymphatics or capillaries and are

Figure IV: the life cycle of Strongyloides stercoralis



Source: CDC

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• Albendazole 15 mg/kg twice a day maximum of 400 mg daily for three days repeat same dose after 7 days.

Complicated cases (hyperinfection syndrome):

Drug of choice: Ivermectin 200µg/kg/d po (or 6 mg po/d) for 3 days

Alternatives:

Thiabendazole for five to seven days or albendazole for two weeks.

Supportive therapy: it is also important to manage complications such as gram-negative sepsis, pneumonia or meningitis.

2.5.6 Prevention and control of intestinal nematodes

1. Health education
2. Sanitary disposal of fe

2.6. Intestinal protozoa i[illegible]

Intestinal protozoal diseases are caused by unicellular microprganisms which invade the wall of the intestine such as amebiasis, giardiasis, cryptosporidiosis and isosporidiosis.

2.6.1. Amoebiasis

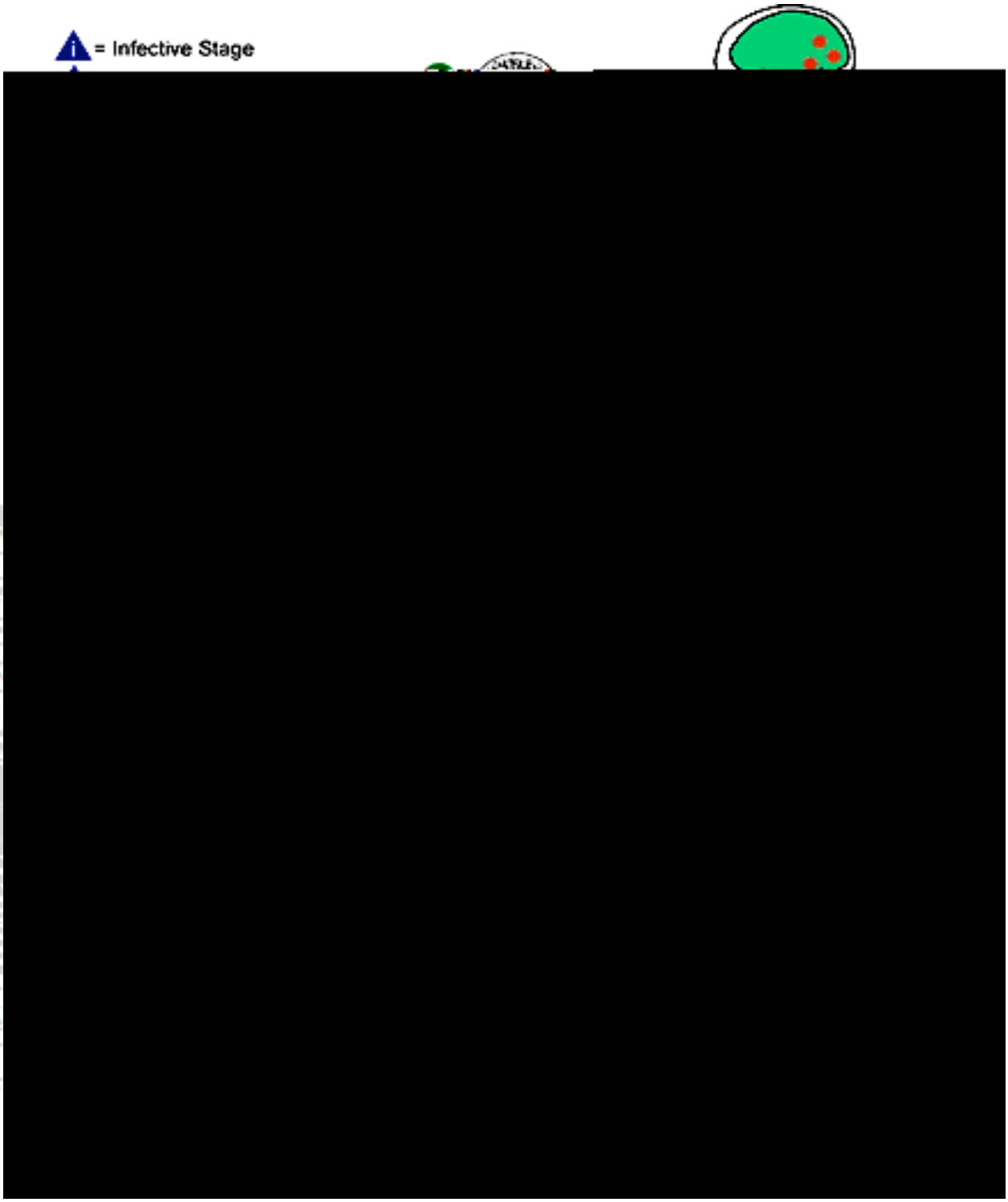
Etiology

Amoebiasis is caused by *Entamoeba histolytica*, the only pathogenic entamoeba [illegible]

causing new infections in others. However, such infections don't occur following the ingestion of trophozoites, because they undergo rapid degeneration and die on exposure to the outside environment and the low P^H of the normal gastric contents.

Figure V: Life cycle of E. histolytica

E. histolytica requires a single host to complete its cycle



Source: CDC

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Treatment

Adults: Metronidazole 500 mg TID for 7 – 10 days or

Tinidazole 2 gm daily for 3 days

Children: Metronidazole 20 – 25 mg/kg daily in 3 divided doses for 7 - 10days or

Tinidazole 50 mg/kg maximum of 2 gm daily for 3 days

2.6.2. Giardiasis

Etiology

Giardiasis is caused by Giardia intestinalis, which is the only pathogenic intestinal flagellate known to infect humans. It has two morphological forms, namely trophozoite and cyst. The trophozoite is actively motile and invading stage of the parasite, and lives on the villi of the small intestine. The cyst is inactive, non-motile and non-invading stage of the parasite, and responsible for the transmission of

• Sporadic as in travelers or

• Epidemic as water borne or institutional out breaks.

In endemic areas, children, particularly those that are malnourished are more frequently infected than adults. The water borne route is the main way of transmission though food borne transmission can also occur. Ingestion of as few as 10 cysts is sufficient to cause infection in humans.

Figure VIII: Life cycle

Clinical features

Most infections are asymptomatic, but patients may present with transient, recurrent or chronic symptoms. In symptomatic cases the major manifestations are diarrhea, bloating, belching, nausea, vomiting, abdominal cramps, anorexia and flatulence. In severe cases, steatorrhea (malabsorption of fat) can occur.

Diagnosis

Macroscopically the stool is usually offensive, bulky, pale, non-bloody, mucoid (fatty) or watery.

Finding the trophozoite and/or the cyst form during microscopic examination of stool is diagnostic.

Treatment

Drugs of choice

Adult dose:

- Metronidazole 500 mg po TID for 5 days or 2gm daily for 3 days OR
- Tinidazole 2 gm single dose OR
- Albendazole 400 mg/day for 5 days

Children:

- Metronidazole 15 mg/kg/day in 3 divided doses for 5 days or 40 mg/kg/day for 3 days

or

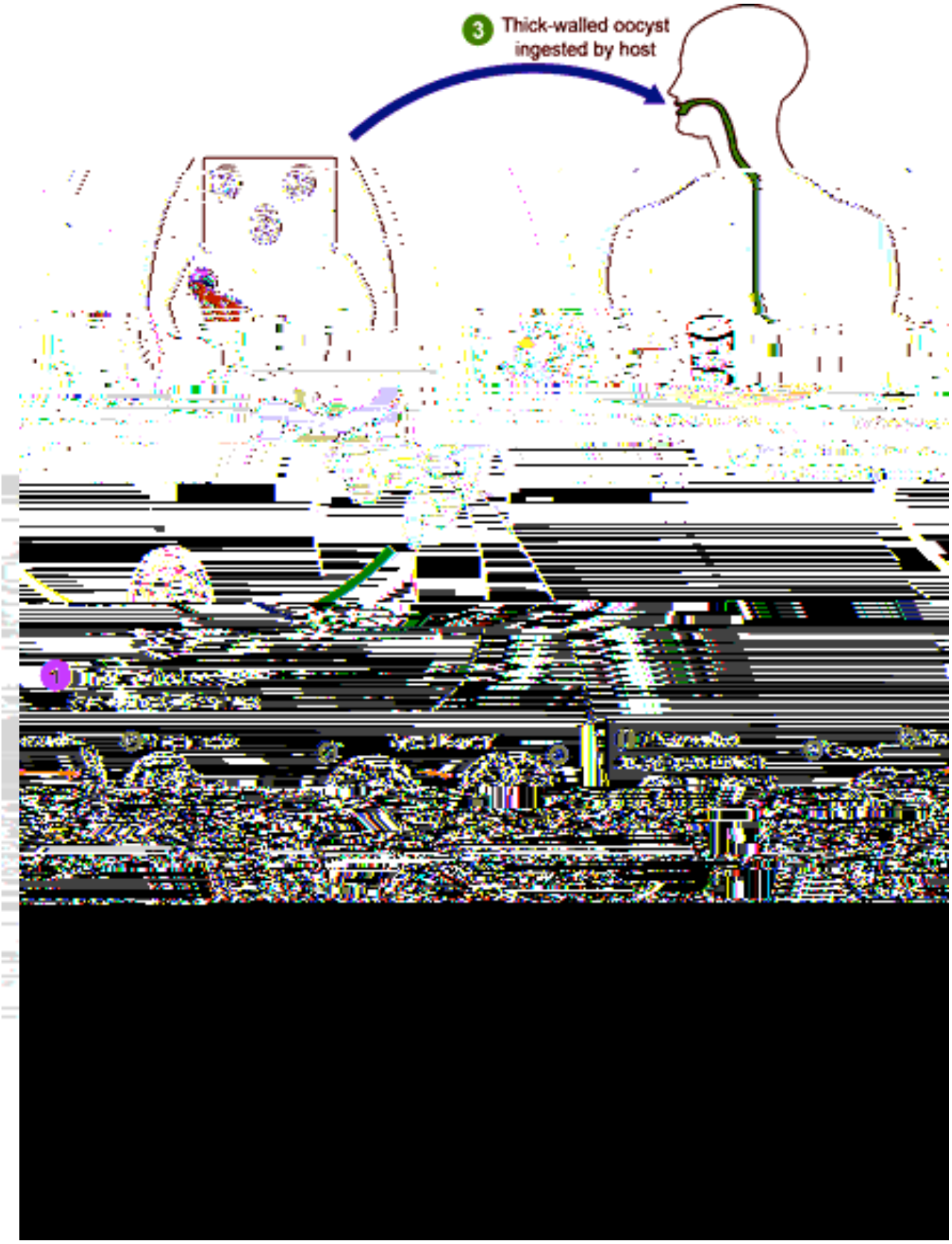
- Tinidazole 50 mg/kg (maximum 2 gm) single dose

Alternatives:

- Furazolidone 100 mg four times a day for 7 - 10

Pathogenesis and life

Figure IX: The life cycle of Cryptosporidium parvum



Source: CDC

Epidemiology

Cryptosporidiosis has a world wide distribution. In developing countries its prevalence is significantly high. Infection is acquired60 l490 60531 0 Tm (i) Tj 60 0 uTm (e) Tj

The pathogenesis and life cycle of Isospora belli are similar to that of *Cryptosporidium parvum*, except that oocyst maturation occurs in the external environment after sporulation before it becomes infective.

Figure X: The life cycle of Isospora

belli

Source: CDC

Epidemiology

Isospora belli is widely distributed in the tropical and subtropical countries.

Infection is acquired by consumption of infective oocysts through fecal-oral route.

Clinical Features

Acute infection begins abruptly with fever, abdominal pain and diarrhea. It is usually self limited, but its manifestations resemble that of cryptosporidiosis (with chronic, profuse o

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Epidemiology

There are a number of reservoir hosts capable of carrying schistosoma species, especially in the case of s. Japonicum. Snails are intermediate hosts in which the asexual stage (larval stage) develops. Snails are more likely found in stagnant than rapidly flowing water. The snail species are specific to each Schistosoma species i.e. Biomphalaria for S mansoni, Onchomelania for S. japonicum and Bulinus for S.hema

bladder calcification, genital involvement (urethral papillomatosis of men and boys and sterility of women) and cor-pulmonale.

Diagnosis

- It is essential to have a high index of suspicion for patients coming from endemic areas.
- Confirmation of the diagnosis is by detection of ova using direct microscopic examination of stool or rectal biopsy spec

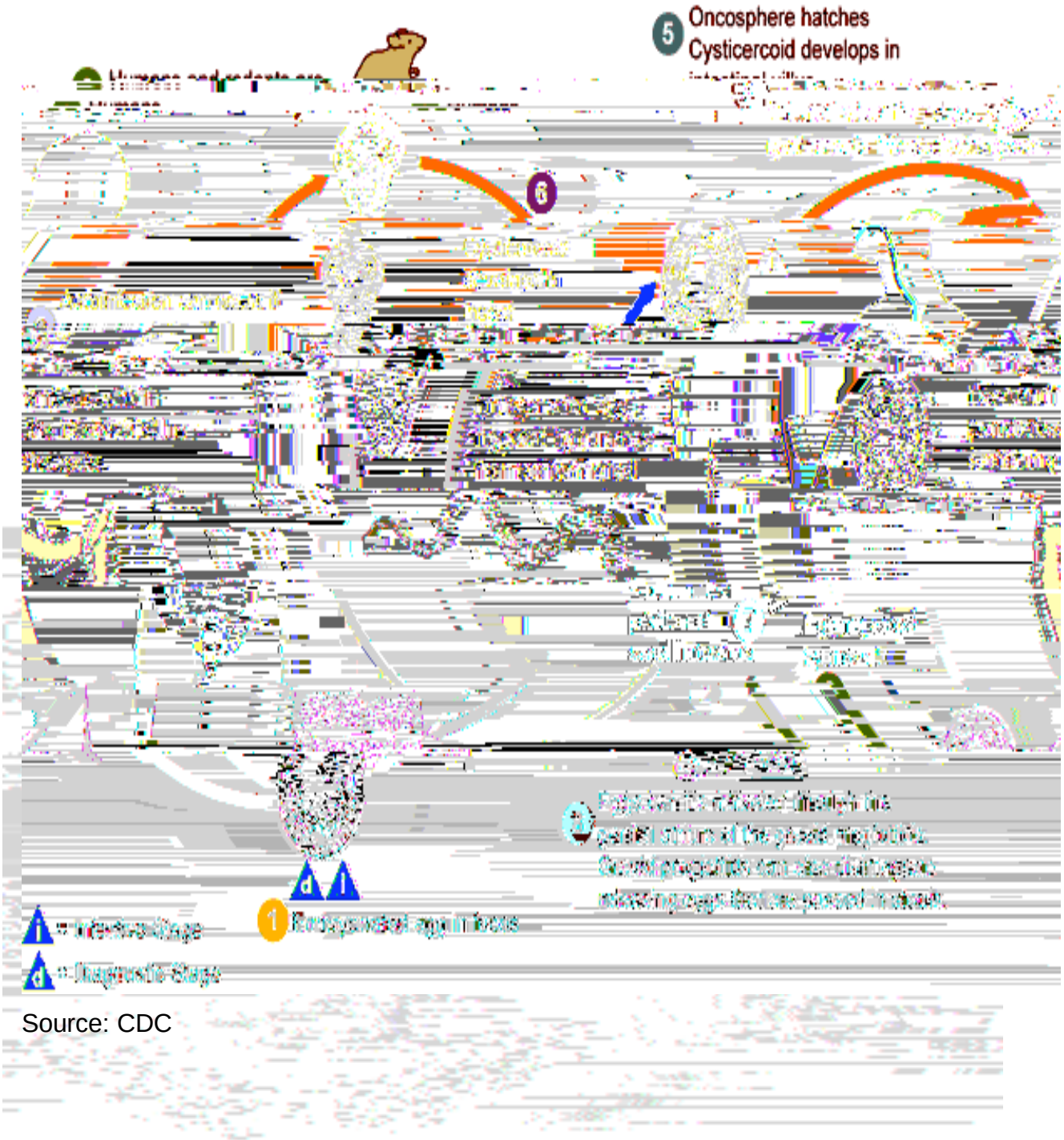
discharged in the feces by detaching from the adult tapeworm. Cattle (intermediate host for T.saginata) and pigs (intermediate host for T. Solium) become infected by ingesting eggs at pasture or in the case of pigs direct consumption of feces containing proglottids. The larval stage in cattle or pig muscle is known as a *cysticercus*. Humans become infected after eating uncooked or undercooked beef or pork containing cysticerci. After ingestion, the cysticerci attach to the intestinal mucosa and develop into adult worms.

Figure XII: Life cy

Epidemiology

T.saginata occurs wherever raw or uncooked beef is eaten and there is sub-sta

Figure XIII: The life cycle of Hymenolopis nana



Source: CDC

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2.9. Post-test

Instruction - choose the correct answer and write on your answer sheet

1. Which of the following is an intestinal protozoa?

a) Entamoeba histolytica
b) Ascaris lumbricoides
c) Hymenolepis nana
d) Schistosoma mansoni

2. What is the most common route of transmission for intestinal protozoa?

a) Ingestion of cyst with contaminated food
b) Insect bite
c) Eating raw meat
d) Skin penetration

3. Which of the following methods doesn't help for prevention & control of intestinal protozoa?

a) Safe water supply
b) Health education
c) Proper disposal of human excreta
d) Mass screening & treatment

4. Among intestinal protozoa, which one is commonly found in HIV/AIDS patients?

a) Cryptosporidium parvum
b) Giardia intestinalis (=lamblia)
c) Entamoeba histolytica
d) None of the above

5. The infective stage of Giardia intestinalis is

a) Cyst
b) Trophozoite
c) Both
d) None of the above

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b) Taenia saginata
c) Hymenolepis nana
d) D. latum
e) b and c

18. All of the following are features of cestode infections except:
a) Cough
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c) Diarrhea
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19. Which of the following drugs can effectively treat tapeworm infection?
a) Piperazine
b) Niclosamide
c) Mebendazole
d) Metronidazole
e) b and c

20. Which of the following is not the appropriate preventive or control mrm /F3.0 10 0 60 50 0 1

2.10. Key

PART THREE

SATELLITE MODULE ON INTESTINAL PARASITOSIS FOR HEALTH

3.3. Pretest questions

1. Which of the protozoan infections are highly associated with HIV/AIDS?
2. Compare amoebic and bacillary dysentery
3. Write the case manage

a

Hepatomegally and elevated diaphragm on chest x-ray are uncommon.

In this case aspiration for microscopy or culture is indicated.

II. Liver neoplasm:

Febrile and wasted patient with vague abdominal discomfort.

Patient may have palpable liver mass, rarely with bruit.

Complications of amoebic liver abscess

- Thoracic complications: -non-purulent pleural effusion commonly caused by leakage through diaphragmatic holes, rupture of liver abscess into bronchi can be accompanied by cough and expectoration of “Anchovy sauce” like sputum.
- Rupture of liver abscess into the abdominal cavity presents with signs of gene

- Serology - reaches peak by the second or third month.
- Stool microscopy - little value.

PROGNOSIS

- Good response to appropriate chemotherapy
- True relapses are uncommon
- Fulminant colitis

- Tinidazol

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Epidemiology: see

Eti

Management of Complications

- Partial intestinal obstruction: nasogastric tube insertion and Piperazine installation, Intravenous fluid administration.
- Complete obstruction and other acute abdomen: immediate surgery

3.5.2. Enterobiasis

Definition: e

Etiology: m6Tm (l) Tj 60 244 0 Tm (m) Tj 60 244 9 0 rm (mi) Tj 60 0 01Tj3600 Tm (Tm (d) T

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Epidemiology: see core module

Diagnosis: see core module

Treatment

- Drug of choice: Benzimidazoles: similar to ascariasis
- Alternative : Pyrantel pamoate 11mg/kg po maximum 1.0 gram po daily for 3 days
- Dietary therapy: supplementation of iron, protein and other vitamins.

3.5.4. Trichuriasis

Definition: see core module

Etiology: see core module

Pathogenesis: see core module

Life cycle: see core module

Epidemiology: see core module

Diagnosis: see core module

Treatment

- Drug of choice: benzimidazoles

Mebendazole

Adults and children >10 kg = 100 mg po bid for 3days

Children < 10 kg = 50 mg po bid for 3 days

Albendazole

Adults and children >10 kg = 400 mg po daily for 3 days

Children <10 kg = 200 mg po daily for 3 days

3.5.5. Strongyloidiasis

Definition: see core module

Etiology: see core module

Pathogenesis: see core module

Life cycle: see core module

Epidemiology: see core module

Diagnosis: see core module

Treatment

1. Drug of choice: Ivermectin 200µg/kg/d po for 3days

manifests with ascites, esophageal varices with or without bleeding and enlarged spleen.

Patients usually do not have schistosoma eggs in feces because of previous treatment and/or attrition of adult worms without subsequent reinfection.

2. Pulmonary hypertension:

It may occur due to obliteration of pulmonary arterioles by granulomatous inflammation induced by embolized and shunted schistosoma eggs. This may cause cor pulmonale.

3. Glomerulonephritis: this may manifest with proteinuria and rarely cause renal failure.

4. Large intestinal polyps: this is due to an exudative granulomatous response to focal dense deposits of schistosoma eggs. Major presentation is bloody diarrhea sometimes associated with protein losing enteropathy and anemia.

Treatment

3. Selective group chemotherapy: only group that has high prevalence and high intensity of infection is treated. It is a variant of selective popul

3.8. POST TEST

1. Which protozoan infections are highly associated with HIV/AIDS?
2. Compare amebic and bacillary dysentery
3. Write the case management of strongyloidiasis
4. What are the possible presentations of ascariasis?
5. List common cestodes causing human infections and describe their routes of transmission
6. List the preventive and control measures for intestinal schistosomiasis

3.9. ROLES and TASK ANALYSIS

1. Take history, do physical examination and indicate the necessary lab investigations.
2. Confirm diagnosis by (1)
3. Treat the patient with appropriate drugs
4. Health education on the preventive methods and repeat follow up to confirm effectiveness of the drug given and possible side effects
5. Design preventive and control measures.

3.10. KEYS TO PRETEST and POST TEST

1. Cryptosporidiosis, isosporidiosis, cyclosporiasis, microsporidiasis

2. **Amebic dysentery:** the diarrhea is bloody or mucoid; gradual onset; toxic in infants and children, but usually non-toxic in adults; dehydration is common in children, but unusual in adults. It is associated with severe tenesmus.

Bacillary dysentery: the diarrhea is bloody or mucoid; has sudden onset. The patient is usually more

PART FOUR

SATELLITE MO

4.2. Pretest Questions

Instruction: Circle the appropriate answer(s) from the alternatives given.

1. The identifi

C. Brine floatation technique

D. Zinc sulphate centrifugal floatation

4.3. Learning objective: after completing this satellite module, the student will be able to:

- Collect the right specimens for the identification of different parasites
- Demonstrate the different laboratory techniques for microscopic identification of intestinal paras

- Pathological odor: offensive, non offensive
- Pale colored and fatty stool specimen can be found in giardiasis and other infections associated with malabsorption.

5. Examine the saline preparations using the 10x objective for motile forms, cyst and oocyst of intestinal protozoa and for any o

1.2. Modified Ziehl-Neelsen technique (Acid-fast stain)

Modified Ziehl-Neelson staining of fecal smear helps to detect oocysts of cryptosporidium, cyclospora and isospora belli.

Materials and reagents –

- Carbol fuchsin stain
- 0.25 % Malachite green (or Methylene blue)
- 1% acid alcohol
- Slides
- Oil immersion
- Microscope

Procedure

1. Prepare a thin fecal smear on a slide, then air dry.
2. Fix the smear with methanol for 2 - 3 minutes.
3. Stain the smear with cold carbol fuchsine for 5 - 10 minutes.
4. Wash off the stain with clean tap water
5. Decolorize with 1% acid alcohol for 10 - 15 sec. until color ceases to flow out of the smear
6. Rinse in tap water and counter stain with 0.5% malachite green (or methylene blue) for 30 sec.
7. Wash off the stain with tap water
8. Stand the slide on a draining rack fn

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cestodes, infertile ascaris ova and larvae of nematodes are not concentrated, because they have greater specific gravity than the suspending medium.

A zinc sulfate solution which is used for the concentration of parasite has a specific gravity (relative density) of 1.180 -1.200. Feces is emulsified in the solution and the suspension is left undisturbed for the eggs and cysts to float to the surface where they are collected on a cover glass or can be collected by Pasteur pipettes.

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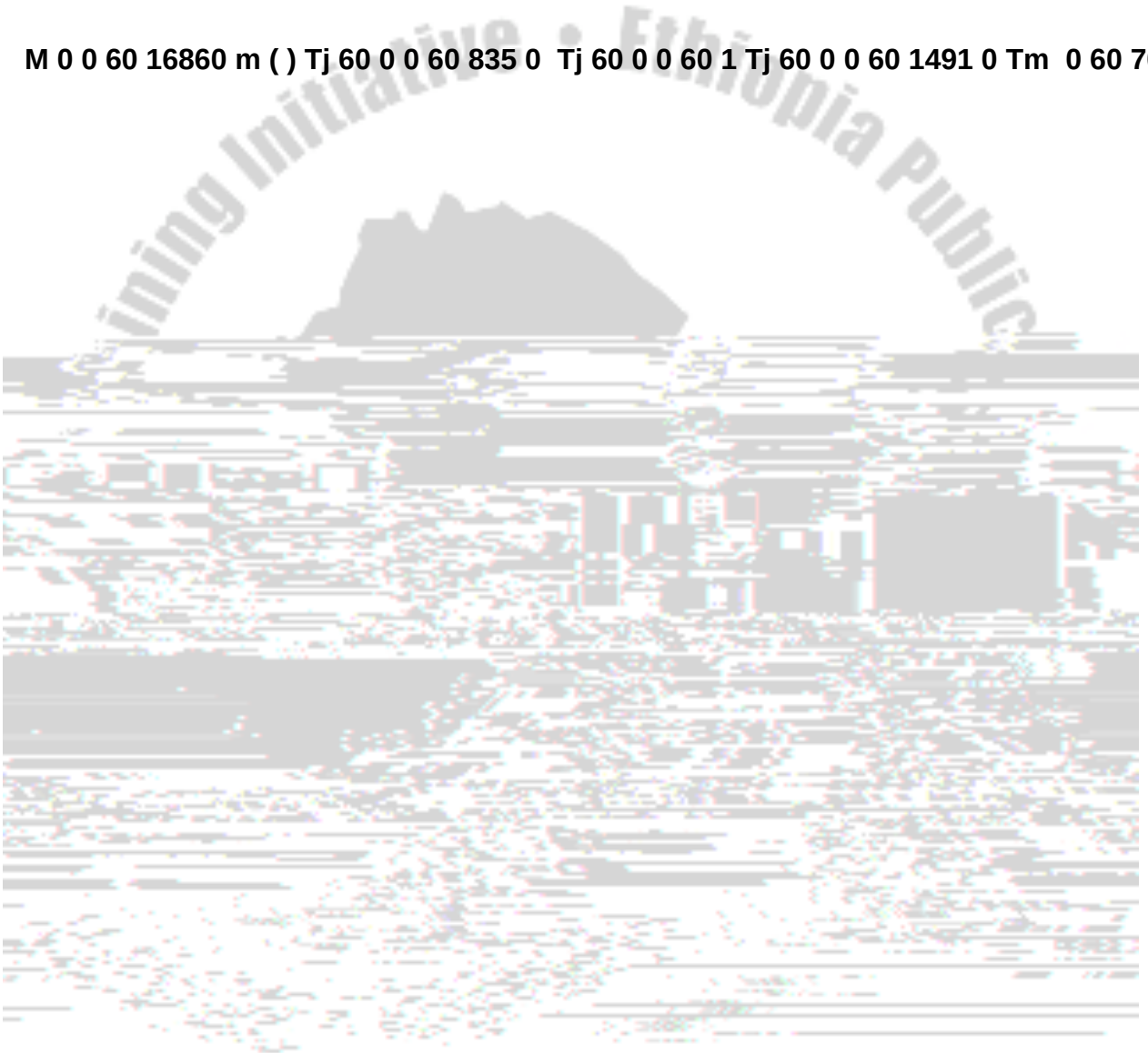

9. Examine first the entire preparation using the 10x objective and then run a drop of iodine solution under the cover glass and use the 40x objective to identify the cysts.

Other floatation methods include:

- Brine (saturated NaCl) floatation
- Saturated sugar floatation
- $ZnS0_4$ centrifugal floatation

4.4.2.2. Sedimentation techniques

In this technique **cysts and eggs of parasites are concentrated at the bottom** since they have greater density than the suspension medium. The cysts and eggs can be sedimented by natural gravity or by accelerating the process by centrifugation.

- **Formalin - Ether centrifugal sedimentation technique**

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11. G

- Parasites are present intermittently or in too few numbers to be easily detected in the specimens.
- The technique used to detect parasites is complex or time consuming.

uneven peripheral chromatin may also be seen. Although the karyosome and peripheral chromatin appearance may vary, most trophozoites maintain the more typical features described. The invisible nucleus in unstained preparations becomes apparent when stained. Stained preparations may reveal lightly staining fibrils located between the karyosome and the peripheral chromatin. The E. histolytica trophozoite contains a finely granular cytoplasm, which is often referred to as being “ground glass” in appearance. Red blood cells in the cytoplasm are considered diagnostic since E. histolytica is the only intestinal ameba to exhibit this characteristic. Bacteria, yeast, and other debris may also reside in the cytoplasm, but their presence, however, i t

ii. Giardia lamblia

The specimen of choice for detection of *G.lamblia* trophozoite and cyst is stool. Multiple samples collected at different times are required since the cyst is excreted intermittently. The stool is usually offensive, bulky, pale, mucoid (fatty) and diarrheal without blood.

Morphology

Trophozoites: The typical *Giardia lamblia* trophozoite ranges from 8 to 20 µm in length by 5 to 16 µm in width. The average *G. lamblia* trophozoite, however, measures 10 to 15 µm long. The *G. lamblia* trophozoite is described as pear or teardrop in shape. The broad anterior end of the trophozoite characteristically exhibits motility that resembles a falling leaf. The trophozoite is bilaterally symmetrical, containing two ovoid to spherical nuclei, each with a large ktoct

which may be seen in iodine wet preparations as well as

Morphology

Noooooooooooo

4.4.7 Laboratory diagnosis of intestinal nematodes

i. Laboratory diagnosis of ascariasis is by:

- Finding ascaris eggs in feces
- Identifying aduli

Eggs can be collected from skin around the anus or from clothing by applying clear adhesive tape. The eggs are detected microscopically by sticking the tape directly on a slide.

Clear Adhesive Tape Technique

1. Take a strip of about 20 cm of clear cellulose or vinyl adhesive tape (e.g. cellophane tape, scotch tape), which measures about 20 mm in width.
2. Apply the clear cellophane tape to the perineal region. Remove and spread the tape on a slide, sticky side down, for microscopic examination.
3. Look for the presence of pinworm eggs.

NB. Because the female usually deposits h 9(e) Tj 6 Tj 60 04987c04 00 0 0 6(

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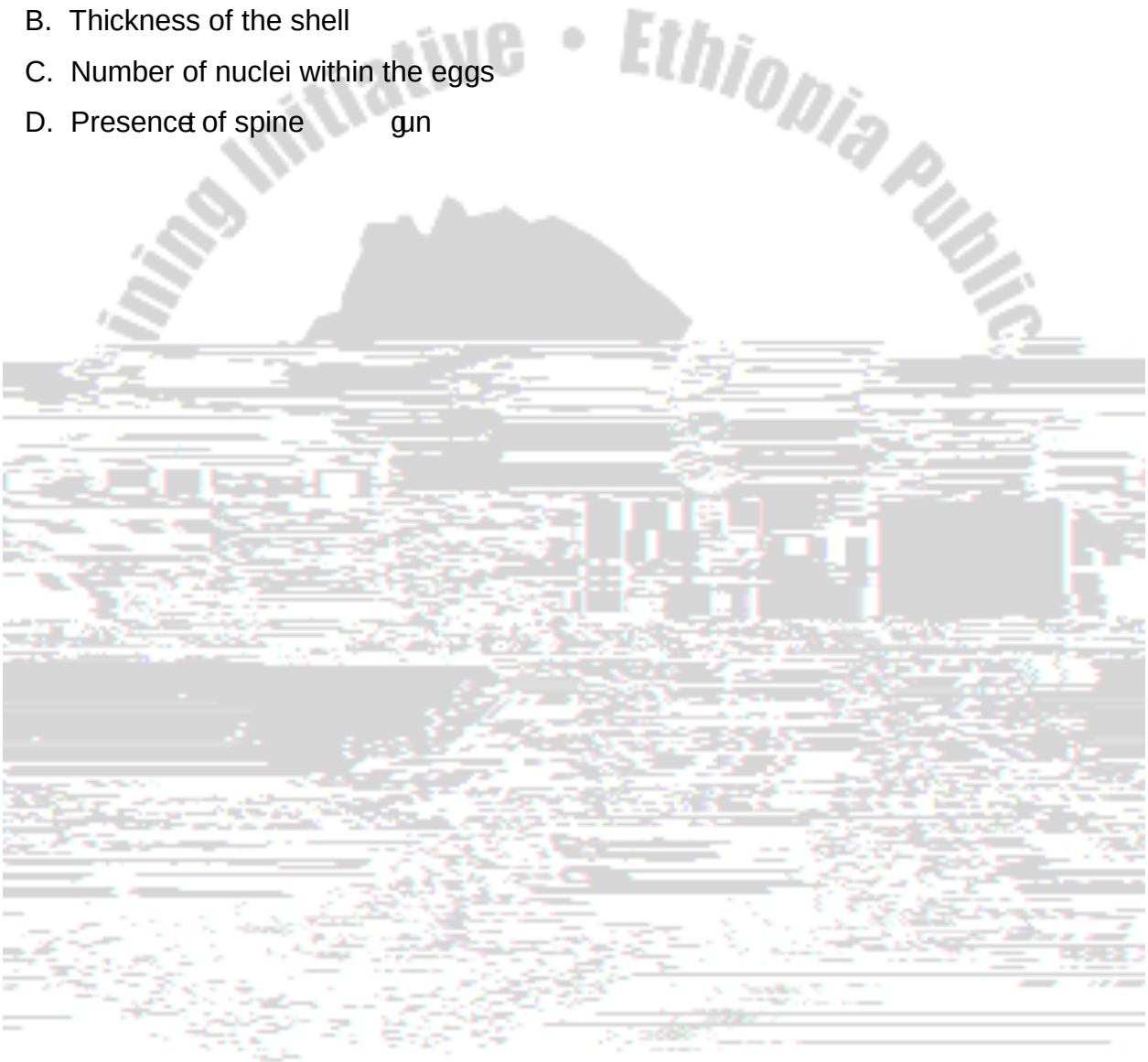
4.5. POST TEST

Instruction: Circle the appropriate answer(s) from the alternatives given.

1. The identification of helminthic eggs should take into account all of the following **except**:

A. Size and shape of the egg
B. Thickness of the shell
C. Number of nuclei within the eggs
D. Presence of spine gun



B. Zinc sulphate floatation technique
C. Brine floatation technique
D. Zinc sulphate centrifugal floatation

4.6. Roles & Task Analysis

4. Collect the required laboratory specimen and transport (when it is necessary)
5. Do the right types of tests
6. Identify cysts/trophozoites/ ova/ larvae or adult worms of a parasite and help to make the diagnosis
7. Document the results

PART FIVE

SATELLITE MODULE ON

INTESTINAL PARASITOSIS FOR NURSE S

5.2. Pre-test Choose the correct answer and circle the letter

1. Which of the following is not a subjective data about intestinal parasitosis?
   A. Abdominal cramps
   B. Pale conjunctiva
   C. Malaise
   D. Nausea

2. Which of the following is not included under nursing diagnosis?
   A. Dehydration
   B. Abdominal pain
   C. Potential for infection
   D. Altered nutrition
   E. Altered skin integrity

3. Which of the following information is irrelevant during the collection of specimens for the diagnosis of intestinal parasites?
   A. Time
   B. Quantity
   C. Type
   D. Place

4.

D. Normal vital sign

5.3. Learning Objectives

After reading the satellite module the learner will be able to:

- Discuss nursing assessment of clients with intestinal parasitosis.
- Describe potential and actual nursing diagnosis
- List a plan of care
- Use nursing process to prevent complications of intestinal parasitosis
- Apply standard criteria to evaluate clients with intestinal parasitosis

5.4. Case management

5.4.1. Nursing Assessment

5.4.1.1 Subjective Data

The nurse should assess a patient with intestinal parasitosis for:

Stool - frequency:

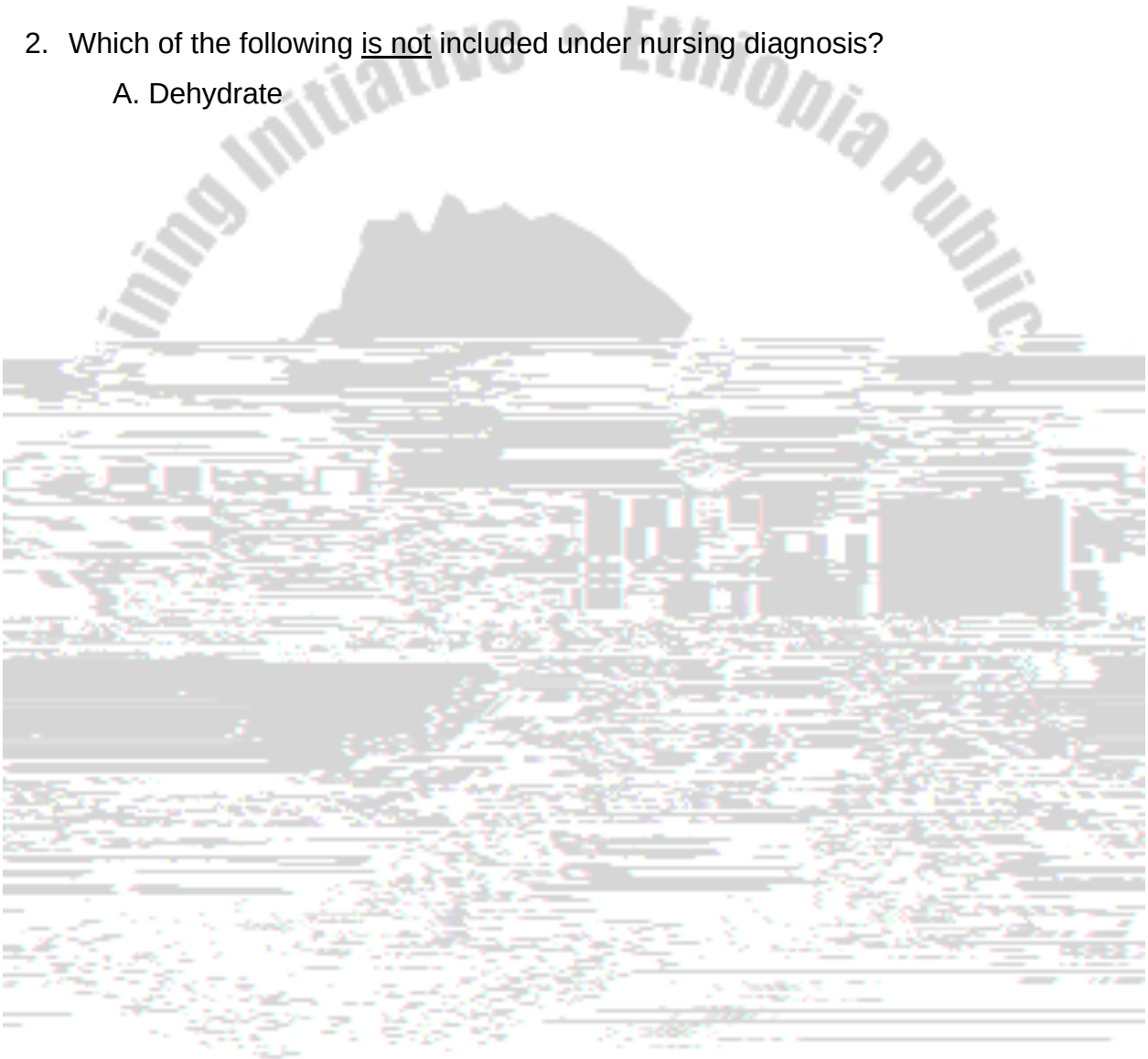
- Look for conjunctiva: pale or pink
- Look for mucosa for dehydration: buccal, tongue and lips
- Assess abdomen for:
    - Distension
    - Listen for (using stethoscope) borborygmi (Hyper active bowel sounds)
    - Palpate the liver for enlargement
- Assess anorec 0 Tm (g) Tj 60 0s1 cs 3

- Monitor intake and output
- Increase oral fluid intake to at least 2000 ml per 24 hours
- Give ample information about medications, their dosage, and side effects
    - Some drugs need purging and be chewed e.g. Niclosamide.
    - Some drugs need to be taken prior to a meal with an empty stomach, e.g. Piperazine, levamisole and the like.
    - And some drugs need to be taken after a meal e.g. Mebendazole, Niclosamide
- Give health education on how to prevent parasitic infection on:
- Personal hygiene
- Breast feeding
- Environmental sanitation
- Boiling

5.5. Post-test Choose the correct answer & circle the corresponding letter

1. Which of the following is not a subjective data about intestinal parasitosis?
    A. Abdominal cramps
    B. pale conjunctiva
    C. Malaise
    D. Nausea

2. Which of the following is not included under nursing diagnosis?
    A. Dehydrate



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5.7. Keys to pretest & posttest questions

1. B
2. A
3. D
4. E
5. B

PART SIX

SATELLITE MODULE ON

INTESTINAL PARASITOSIS FOR

ENVIRONMENTAL HEALTH STUDENTS

6.1 Introduct

roles of environmental sanitation, especially safe and adequate water supply and proper excreta disposal, have been shown to be effective in the prevent

6.2. Pre – Test: <u>Instruction</u> - Choose the best answer and circle the letter.

1

5. Which of the following *is <u>not true</u>* about the prevention and control of intestinal nematode infection?

A. Provision of adequate latrines and their proper use
B. Avoiding unsanitary vegetables from the diet
C. Preventing skin penetration of larvae by wearing shoes
D. Washing hand before eating and after visiting the toilet
E. Treatment of infected individuals
F. None of the above

6. Which of the following preventive measure is most effective in controlling all intestinal cestodes?

A. Hand washing before eating
B. Use of latrine
C. Avoiding eating raw meat
D. Inspection of carcasses of beef and pork

7. Which of the following environmental facto

C. Multi-sectoral approach in the eradication of the intermediate hosts & treatment of patients.

D. All of the above

B) Water supply: The protection of water supplies from faecal contamination is very important because the cysts may survive for several days and weeks in water and external environment.

Prevention is possible through:

- Sand filtration of the water to remove cysts
- Boiling of drinking water to kill cysts
- Chlorination of water (disinfection of water)

The cysts are not killed by chlorine in amounts used for water disinfection. Therefore, the concentration of chlorine should be increased; especially for emergency water supplies. Treat water with chlorine or iodine, by using 0.1 to 0.2 ml (2 to 4 drops) of household bleach or 0.5 ml of tincture of iodine per liter of water for 20 minutes or longer if the water is cold.

C) Food hygiene: Environmental measures should also include the protectit

I) Case control and treatment

- Isolation is not required, but known cyst passers should be treated and thoroughly indoctrinated on the need for very careful post defecation hand washing; such positive actions should be taken especially when cyst-passer's occupation is a potential risk to the public such as food handling. m (a) Tj 60 0 0 60 445 0 Tm (t) Tj 60 0 0 60 462 0 T

- Avoiding the use of untreated sewage and raw faces as fertilizer
- Proper disposal of children's stools.

2. Preventing eggs from being ingested
    - Avoid over crowding in residential areas (E. vermicularis)
    - Washing hands before eating and after visiting a toilet.
    - Washing the peri-anal skin each morn

6. Educate the public to prevent fecal contamination of soil, water and human and animal food; about the modes of transmission of Cestodes and about the importance of having latrine and its proper use.
7. Treatment of cases.

6.5.4. Intestinal trematodes

Definition-

The portal of exit of both the trematodes under discussion is through infected human feces. When this infected feces get accesses to water bodies (rivers, streams...) harboring the proper snails (intermediate hosts), the life cycles of the worms can be completed, i.e., the infections can be transmitted. This also indicates that the continuation of the generations of the parasites can be interrupted here, as they cannot develop/exist without getting access to water bodies containing the proper snail host. Therefore, if this connection is interrupted, the tra

The introduction of other snail species that either compete for food and other life conditions of the snails or those that are predators of other mollusks are another way of decreasing their longevity as well as density. For example, Marisa compatriotism (snail species) eliminates the snail genera Biomphalaria (intermediate host for Schistosoma mansoni) and the snail family Lymnacidae (Intermediate host for F. hepatica).

Chemical control (molluscicides)

This option is recommended when the other options can not be used due to different reasons (resource, skill, etc), because.

- Most molluscicides are highly toxic and thus dangerous to other aquatic life and humans
- Some of the chemicals persist for a long time in the environment (non biodegradable)

6.6. Post Test - Instruction - Choose the best answer and circle the letter.

1. Which of the following stages of E.histolytica is responsible for its transmission?

A. A Trophozoite
B. B Larvae
C. C Cysts
D. D Eggs
E. E Adult

2. Which of the following are possible source(s) of fecal contamination of food and water?

A. Night soil fertilization
B. Defective piping
C. Flies
D. Soiled fingers
E. All of the above

3. Which of the following is *not true* about the prevention of Intestinal protozoan infection?

A. Hand washing after defecation and before eating
B. Sanitary disposal of human feces
C. Protection of food against fly contamination by screening
D. Health education of food handler about personal hygiene
E. None of the above

4. Which of the following is the possible mode of transmission of intestinal nematodes?

A. Through a contaminated finger
B. Through contaminated food
C. Through contaminated clothing or toys
D. All of the above

5. Which of the following *is <u>not true</u>* about t

B. the integrated work of veterinarians and sanitarians

C. Multi-sectoral approach in the eradication of the intermediate hosts & treatment of patients.

D. All of the above

6.7. Task Analysis

The environmental health experts is expected to

1. Undertake periodic inspe ction and assessment of the sanitary conditions of bars, abattoirs, and other public catering p

6.9. References