Solve These Emergency Cases!!

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BEFORE YOU LEAVE

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CAN YOU SOLVE THIS CASE OF RESPIRATORY DISTRESS?

HISTORY

Five-year old male in southern Africa with five days of severe cough and rapid breathing. For three months he also has weight loss and intermittent diarrhea.

WHAT ARE YOUR QUESTIONS ABOUT THE HISTORY?

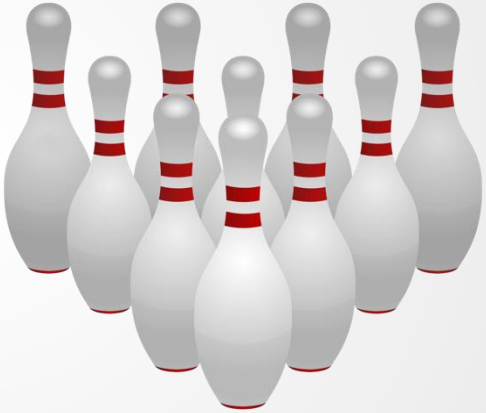
PHYSICAL EXAM

Child is alert and coughing frequently. Temperature is 38 degrees, pulse 100, respirations 30 and labored, capillary refill 2 seconds.

WHAT ARE YOUR QUESTIONS ABOUT THE PHYSICAL EXAM?

WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?

ACUTE PEDIATRIC RESPIRATORY INFECTION



Consider:

- Pneumonia
- Bronchitis
- Influenza
- Tuberculosis
- Pneumocystis pneumonia (PCP)

HOW CAN YOU NARROW THIS DIFFERENTIAL?

Consider:

- Pneumonia
- Bronchitis
- Influenza
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- Pneumocystis pneumonia (PCP)

FIRST CONSIDER GEOGRAPHY & EPIDEMIOLOGY

Note: Many developing nations do not have reliable health statistics

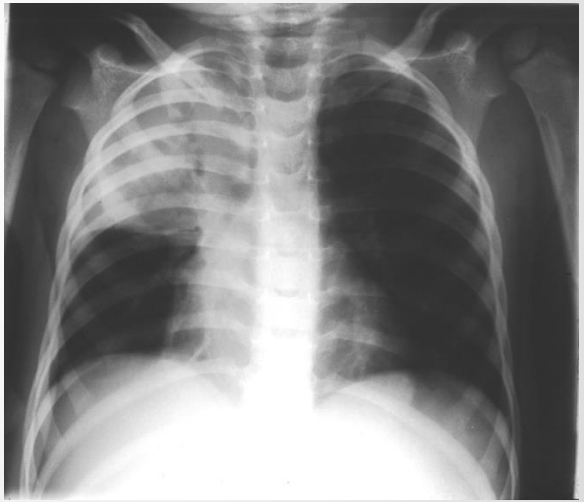
WHAT IS THE LEADING CAUSE OF LIFE YEARS LOST IN DEVELOPING NATIONS?

LEADING CAUSES OF DEATH – DEVELOPING NATIONS

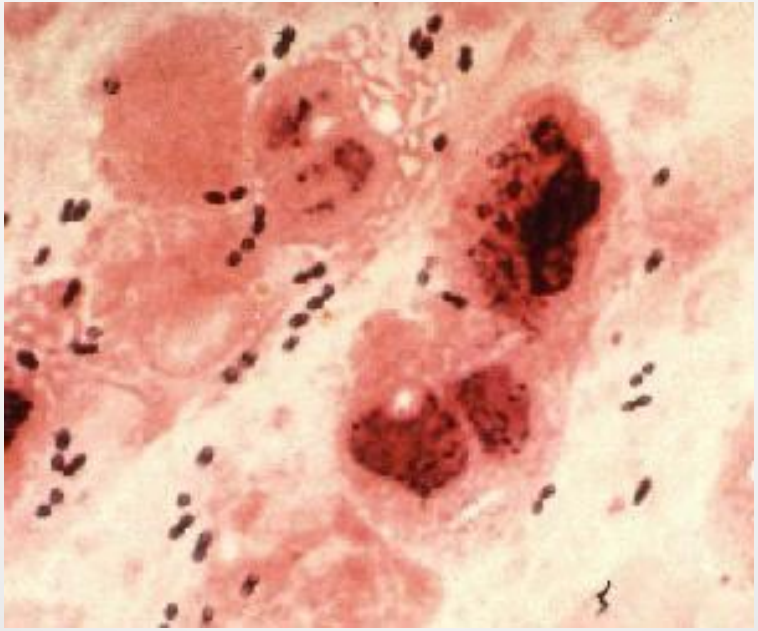
Disease or Injury	Percentage of Total DALYs Lost
Lower respiratory infection	9.7
Diarrheal diseases	6.9
Malaria	5.1
Preterm birth complications	5.1
HIV/AIDS	5.0
Birth asphyxia & birth injury	4.9
Congenital anomalies	3.2
Road injury	3.0
Neonatal sepsis & infections	2.7
Tuberculosis	2.5

PEDIATRIC PNEUMONIA & BRONCHITIS

Pneumonia and bronchitis are the leading cause of death for children up to age 5 years.

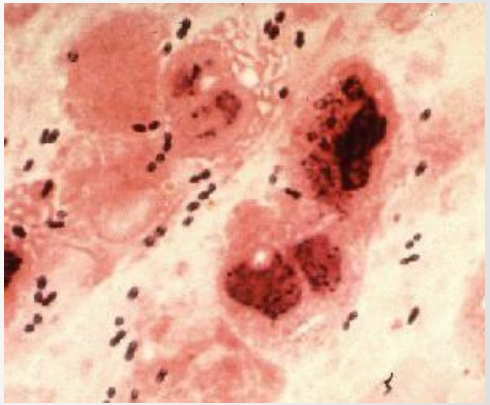


WHAT ORGANISMS CAUSE PNEUMONIA & BRONCHITIS IN DEVELOPING NATIONS?

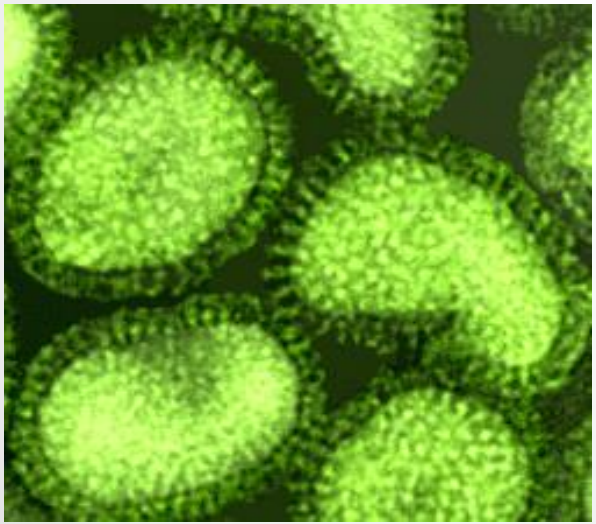


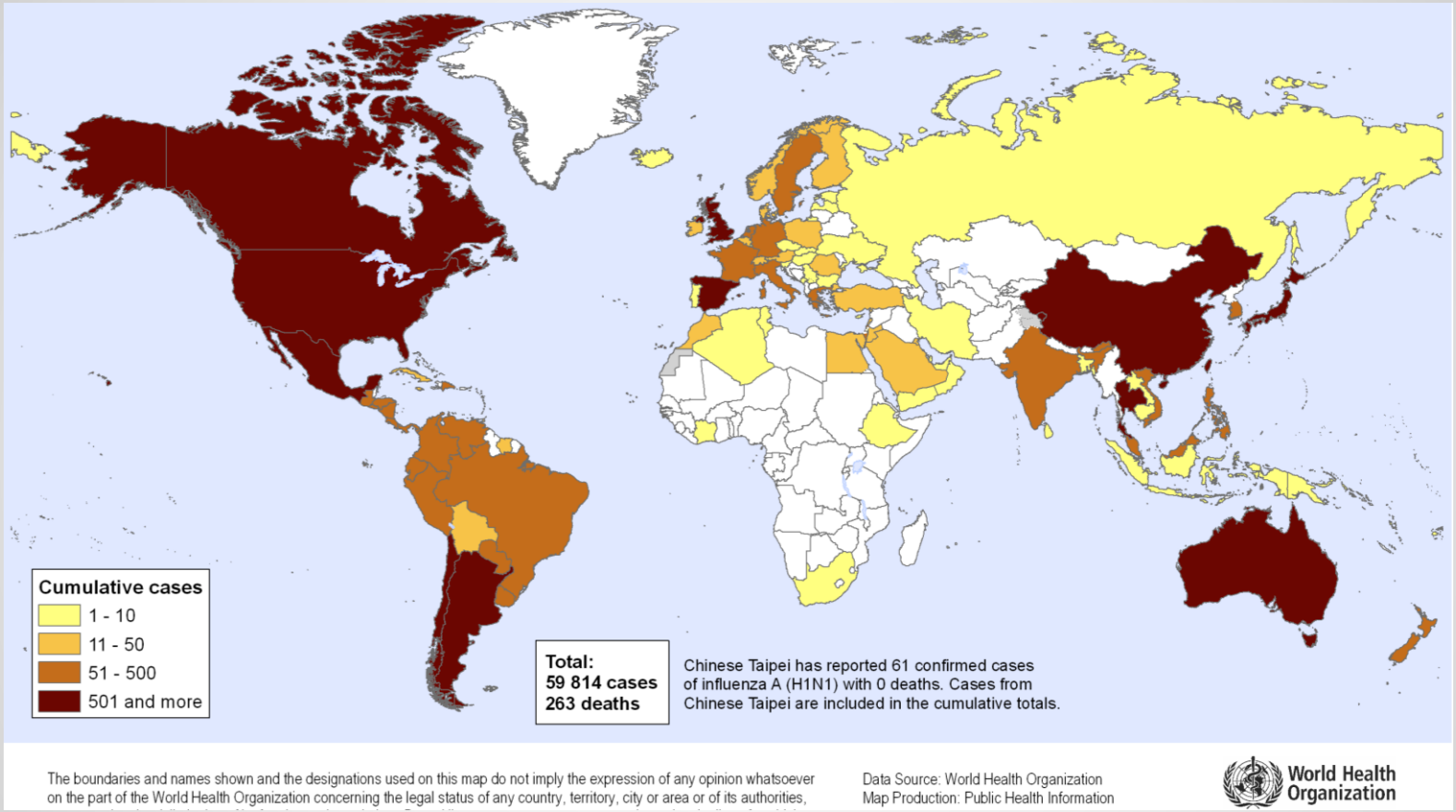
ORGANISMS CAUSING PNEUMONIA & BRONCHITIS

- Leading Bacteria: *Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus*
- Leading Viral: Influenza, parainfluenza, respiratory syncytial virus, adenovirus



WHAT IS THE EPIDEMIOLOGY OF INFLUENZA?



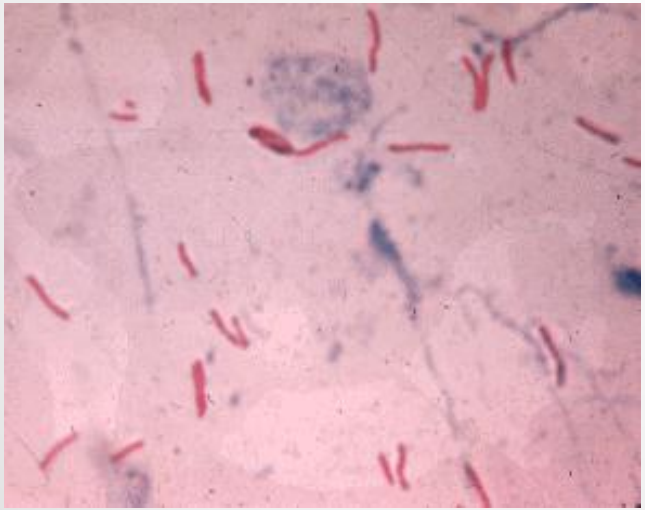

Cumulative cases
1 - 10
11 - 50
51 - 500
501 and more
Total:
59 814 cases
263 deaths
Chinese Taipei has reported 61 confirmed cases of influenza A (H1N1) with 0 deaths. Cases from Chinese Taipei are included in the cumulative totals.
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities,
Data Source: World Health Organization
Map Production: Public Health Information
World Health Organization

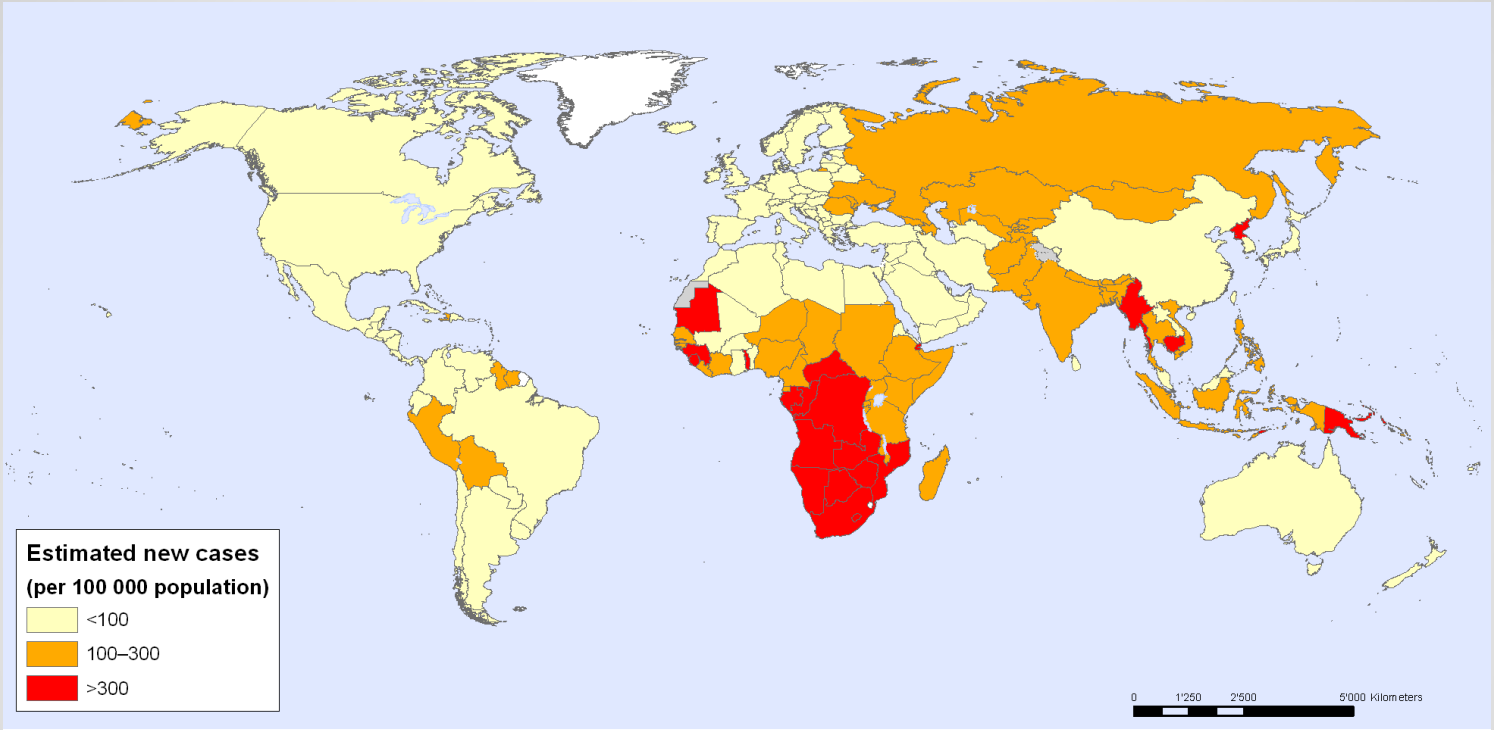
INFLUENZA

INFLUENZA PNEUMONIA

- Influenza pneumonia is a lethal complication of generalized influenza infection.
- Vaccination against influenza is critical to prevention.

WHAT IS THE EPIDEMIOLOGY OF TUBERCULOSIS?





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Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

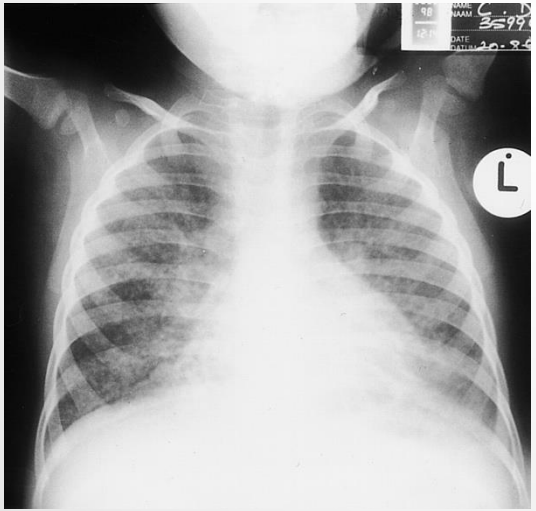
World Health Organization

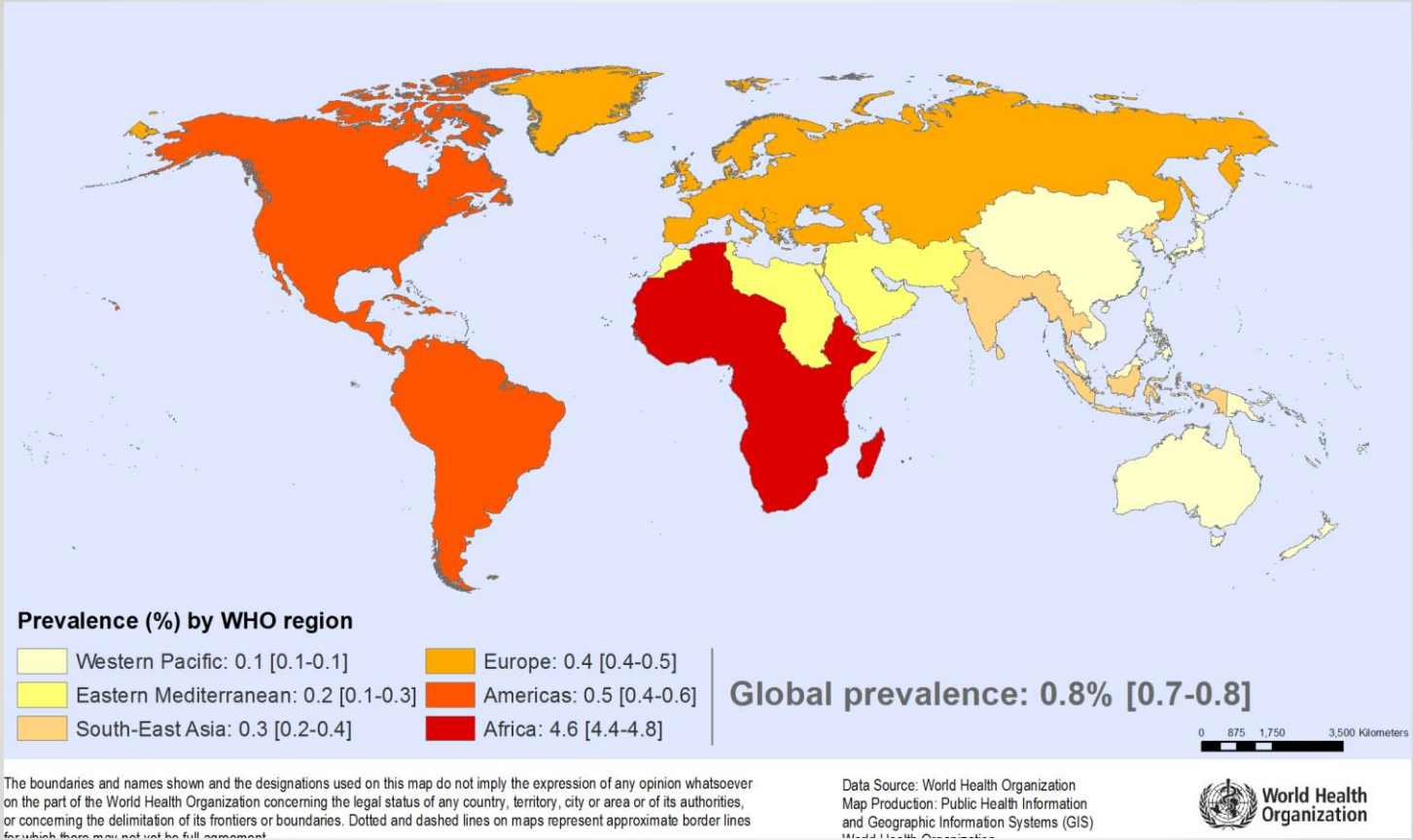
TUBERCULOSIS INCIDENCE

TUBERCULOSIS IN CHILDREN

- TB is among the top 10 causes of death among children worldwide.
- Pediatric TB is a low priority in most health programs.
- BCG vaccine is safe and protective in infants and children against TB meningitis and miliary TB.
- TB is especially virulent in HIV-positive children.

WHAT IS THE EPIDEMIOLOGY OF PNEUMOCYSTIS CARINII PNEUMONIA (PCP-PCJ)?





HIV PREVALENCE

PNEUMOCYSTIS CARINII PNEUMONIA

- A leading infection among those with immunodeficiency.
- Caused by a fungus *pneumocystis jirovecii.*
- Findings include fever, non-productive cough, shortness of breath, weight loss, night sweats, and minimal sputum.
- CXR shows diffuse pulmonary infiltrates.
- Diagnosis is by histological identification of the organism in bronchio-alveolar lavage.

HOW TO FURTHER NARROW THE DIAGNOSIS?

Consider:

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HOW TO FURTHER NARROW THE DIAGNOSIS?

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WHAT BASIC TESTS WOULD YOU RECOMMEND?

Consider:

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- Bronchitis
- Influenza
- Tuberculosis
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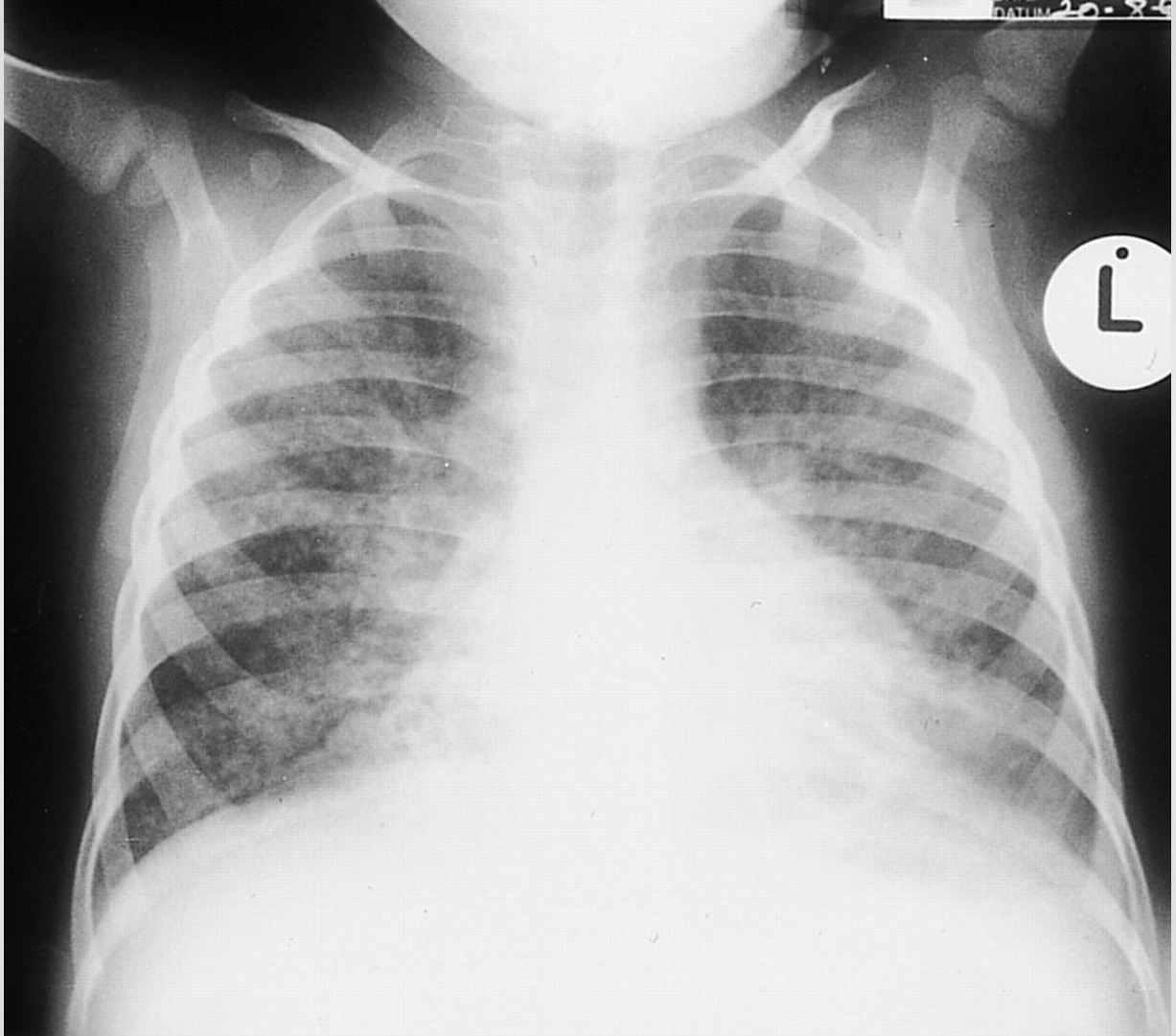
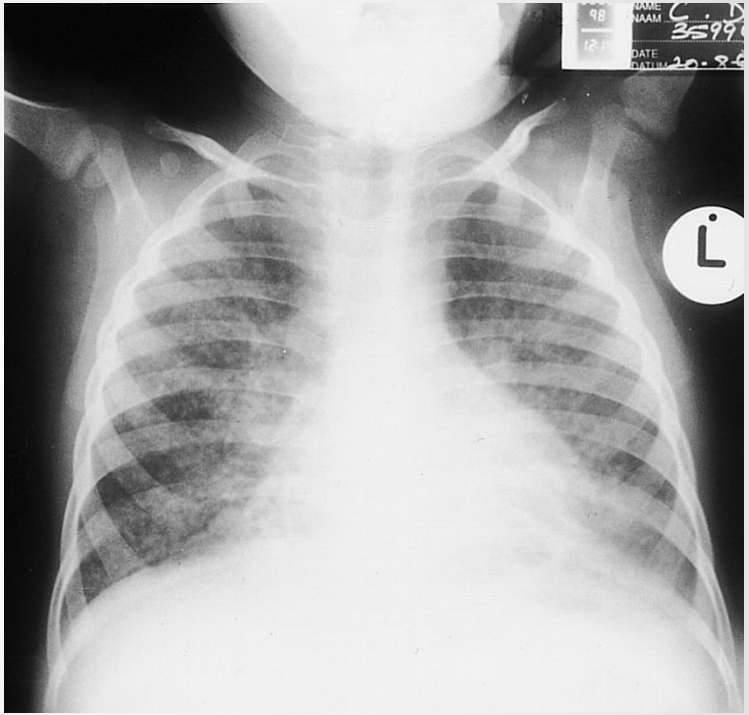

DATUM
L


R AP SUPINE

LABORATORY TESTS

- Hemoglobin 9, White blood cells 10,000, Bands 5, Polys 50, Lymph 40, Eos 5
- HIV antibody test positive
- Sputum sample is unobtainable
- PCP lab testing is not available

WHAT DO YOU KNOW ABOUT PEDIATRIC HIV INFECTION?



PEDIATRIC HIV INFECTION

- 2.3 million children worldwide are living with HIV, 90% in Sub-Saharan Africa.
- During 2019 160,000 children became newly infected with HIV
- 90% of all HIV-infected children acquired the disease from their mothers during pregnancy, at birth, or through breastfeeding.

HOW TO PREVENT HIV MOTHER-TO-CHILD-TRANSMISSION?

PREVENTION OF MOTHER-TO-CHILD HIV

Without intervention, what is the risk a baby will become HIV-infected during pregnancy, at birth, or through breastfeeding?

PREVENTION OF MOTHER-TO-CHILD HIV

Without intervention:

HIV pos mother has 20% chance of passing HIV to infant in pregnancy or at delivery. 40% if she breast feeds her infant.

PREVENTION OF MOTHER-TO-CHILD HIV

- Identify and treat HIV positive mothers.
- If not identified earlier, treat mother while in labor and newborn after delivery.
- Reduces risk of newborn infect down to to 2-8%.

QUESTION

Which ONE of the following statements about HIV prevention is TRUE?

A. Orphans of AIDS victims are at no increased risk of becoming HIV infected.

B. Barrier contraceptives are nearly 100% effective in reducing risk of acquiring HIV infection.

C. Prophylaxis of HIV-positive pregnant women greatly lowers risk of mother-to-child transmission.

D. Treatment of other Sexually Transmitted Infections (STIs) has no influence on the risk of acquiring HIV.

E. Without treatment, HIV infection has a 47% fatality rate.

ANSWER

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E. Without treatment, HIV infection has a 47% fatality rate.

WHEN TO INITIATE ART IN CHILDREN?

WHEN TO INITIATE ART IN CHILDREN?

- Infants and children: Start ART immediately upon diagnosis of HIV
- *Especially* in WHO clinical stage 3 or 4 or at onset of first opportunistic infection

HOW TO TREAT PCP IN CHILDREN?

HOW TO TREAT PCP IN CHILDREN?

- Maintain adequate oxygenation and hydration
- Benefit from corticosteroid therapy
- First line: trimethoprim-sulfamethoxazole (TMP-SMX) for 21 days
- Second line: pentamidine

QUESTION

An infant is born to an HIV positive mother, who wants to know whether her child is infected with HIV. Which ONE of the following is TRUE?

A. A HIV antibody test make a reliable diagnosis

B. A CD4 count of less than 25% confirms HIV.

C. PCR testing is reliable in adults but not in children

D. All of these

E. None of these

ANSWER

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C. PCR testing is reliable in adults but not in children

D. All of the above

E. None of the above

CAN YOU SOLVE THIS CASE OF ACUTE ABDOMINAL PAIN?

HISTORY

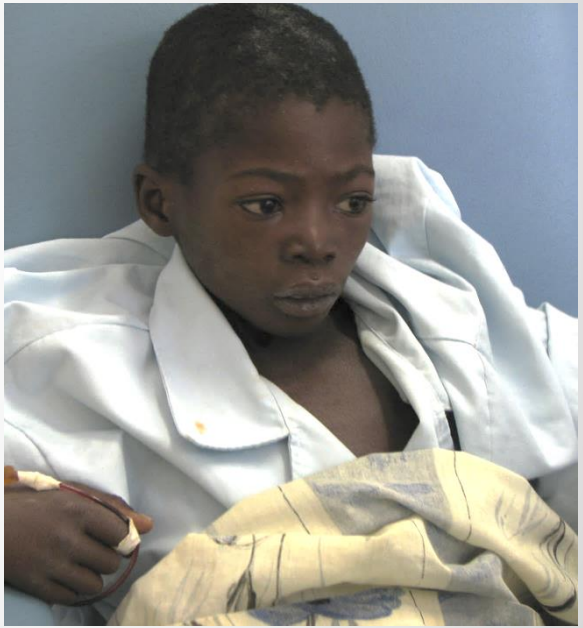
8-year-old African male with severe abdominal pain increasing for one day, with vomiting and subjective fever.

What are your questions about the history?

PHYSICAL EXAM

He is alert, trying not to move, BP is 92/55, pulse 125, respiration 30, temperature 38 degrees

What are your questions about the physical exam?



WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?

ACUTE ABDOMINAL PAIN IN A CHILD

Consider:

- Appendicitis
- Gastroenteritis
- Acid peptic disease
- Peritonitis
- Cholecystitis
- Mesenteric lymphadenitis
- Inflammatory bowel disease

HOW CAN YOU NARROW THIS DIFFERENTIAL?

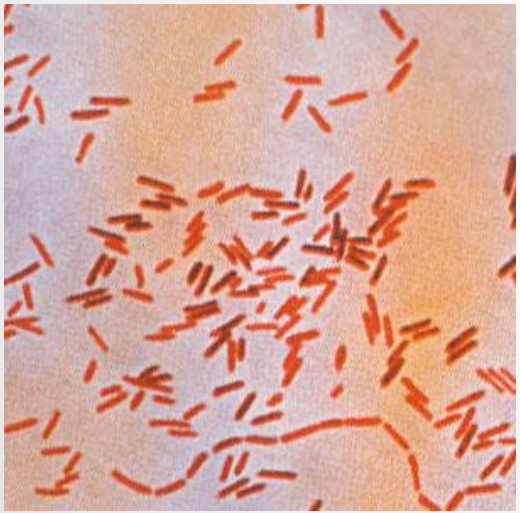
Consider:

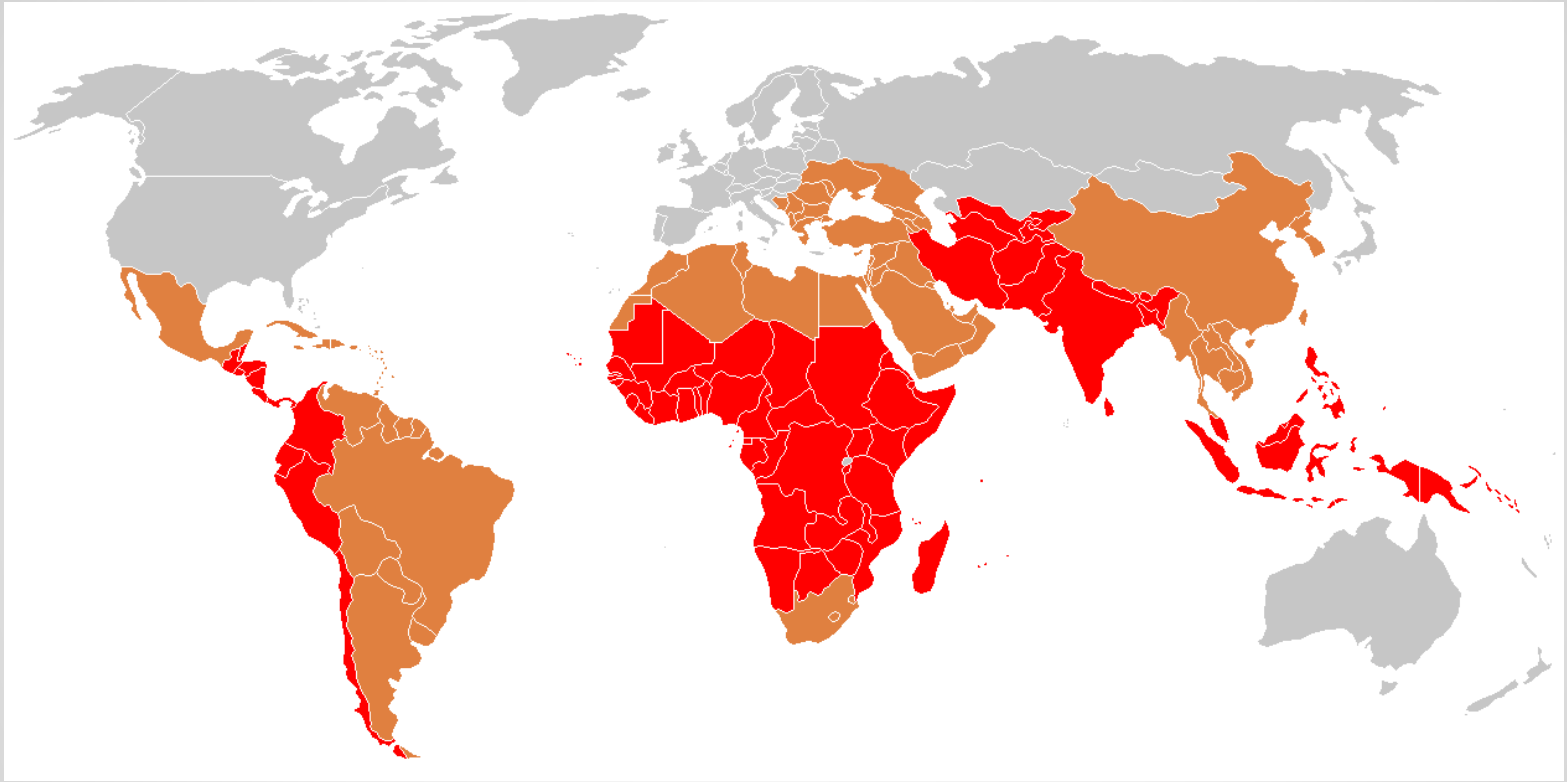
- Appendicitis
- Gastroenteritis
- Acid peptic disease
- Peritonitis
- Cholecystitis
- Mesenteric lymphadenitis
- Inflammatory bowel disease

BASIC LABS

- Hemoglobin: 10
- White blood cells: 18,000 with bands 15%, polys 70%, lymphs 15%,
- Platelets: 240,000
- Urine SpGr 1.035, trace protein
- Negative malaria smear

WHAT IS THE EPIDEMIOLOGY OF TYPHOID?





TYPHOID INCIDENCE

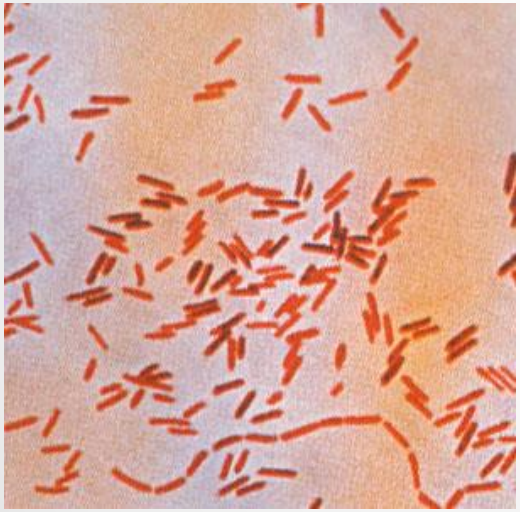
TYPHOID BACKGROUND

- An acute multisystem illness caused by *Salmonella typhi*.
- Transmitted by fecal-oral route through ingestion of contaminated food or water.
- Endemic where sanitation is poor.
- 16-30 million new cases worldwide each year, with some 216,000 deaths.
- Severely afflicts school-age children.
- Does not frequently cause diarrhea, but shares many of the risk factors associated with water-borne, diarrheal diseases

TYPHOID NATURAL HISTORY

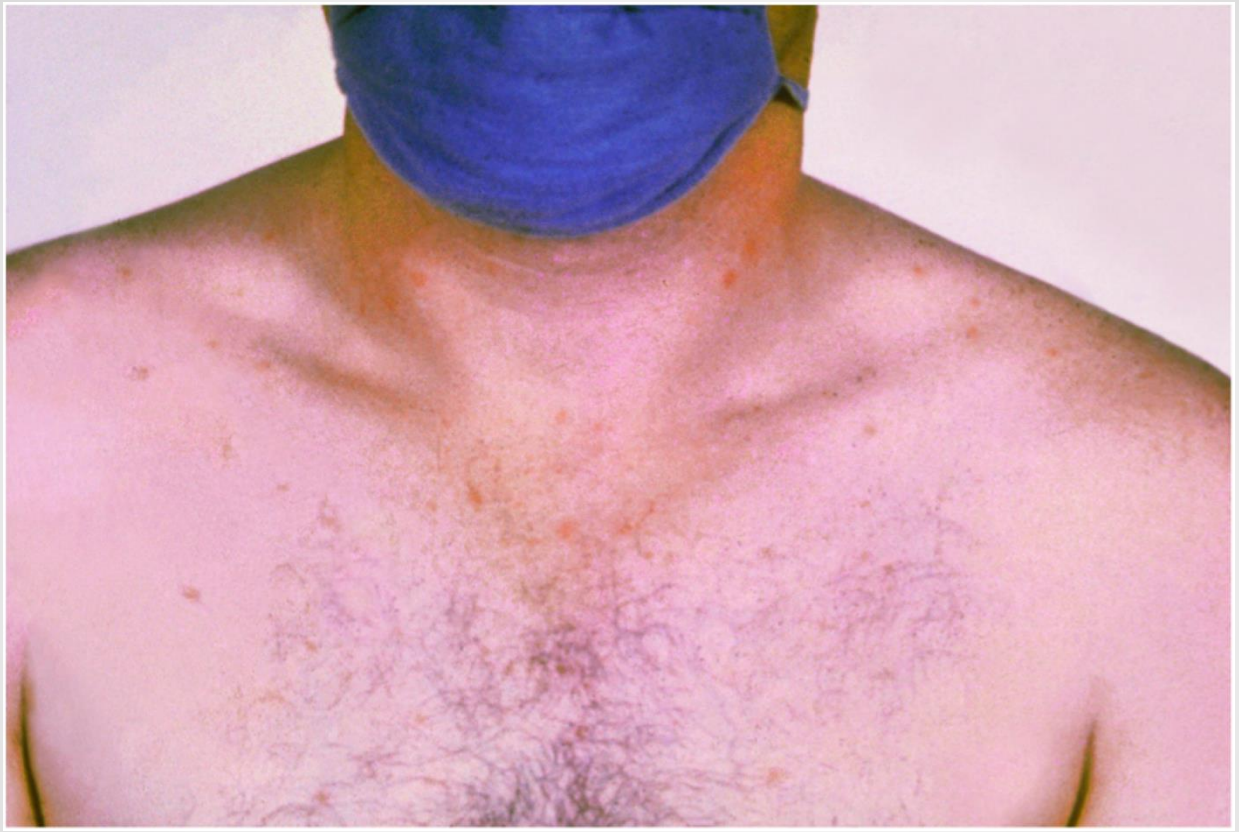
- Follow ingestion, incubation period is 7-21 days.
- Symptoms include fever, headache, fatigue, abdominal pain, diarrhea, cough, lethargy, and slow pulse.
- Untreated complications include intestinal perforation and hemorrhage, typhoid encephalopathy, meningitis, and DIC.
- Untreated mortality 12-30%.

HOW IS TYPHOID DIAGNOSED?



TYPHOID DIAGNOSIS

- Consider in high-risk persons with persistent, unexplained fever and GI symptoms.
- Physical findings may include bradycardia, cervical adenopathy, hepatosplenomegaly, and conjunctivitis.
- Differential diagnosis may include malaria, amoebiasis, viral hepatitis, mononucleosis, Shigellosis, tuberculosis, and brucellosis.

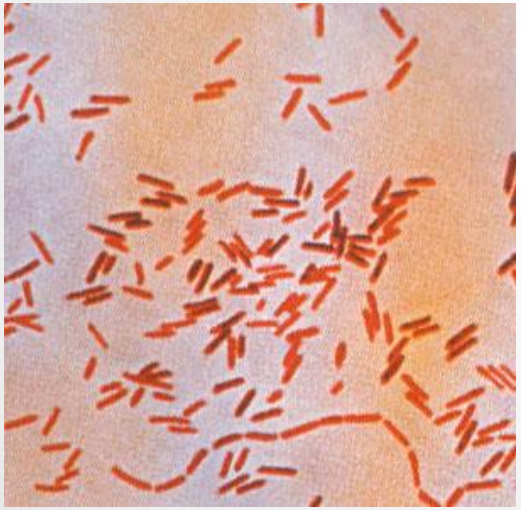


ROSE SPOTS OF *SALMONELLA TYPHI* INFECTION

TYPHOID TESTS

- Nonspecific anemia, leucopenia, thrombocytopenia, and elevated liver enzymes may occur in typhoid fever.
- Blood or bone marrow culture are the most reliable tests.
- ELISA blood test for antibodies to *S typhi*.
- The Widal test, a serologic cold agglutinin test, is nonspecific, requires acute and convalescent comparison titers.

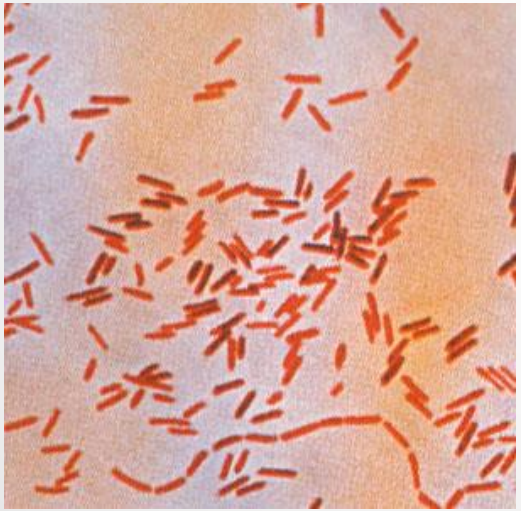
WHAT IS TREATMENT FOR TYPHOID?



TYPHOID TREATMENT

- Use enteric precautions.
- Assure adequate hydration, whether by oral rehydration solution or intravenous fluids.
- The antibiotic treatment of choice is a fluoroquinolone, third-generation cephalosporins, macrolide,
- Monitor for serious complications including intestinal perforation, endocarditis, and encephalitis resulting from hematogenous spread.

HOW CAN TYPHOID BE PREVENTED?



TYPHOID PREVENTION

- Typhoid spreads where human excrement contacts food or drinking water.
- Sanitation, safe drinking water, food hygiene, and personal hygiene are essential.
- Chlorination of drinking water has been followed by dramatic decreases in typhoid fever
- Two vaccines now available, one oral and one injectable. Both are 50-80 percent protective. Repeat dosing is recommended each five years for the oral vaccine and each two years for the injectable.

QUESTION

Typhoid fever is an acute multisystem illness. Which ONE of the following statements regarding typhoid fever is NOT true?

A Typhoid vaccination should be considered for travelers to endemic areas.

B Typhoid typically causes profuse diarrhea.

C Common complications include intestinal hemorrhage and perforation.

D Typhoid should be considered in persons who have persistent, unexplained fever and GI symptoms.

E Typhoid is endemic in some countries where sanitation is suboptimal.

ANSWER

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C Common complications include intestinal hemorrhage and perforation.

D Typhoid should be considered in persons who have persistent, unexplained fever and GI symptoms.

E Typhoid is endemic in some countries where sanitation is suboptimal.

CAN YOU SOLVE THIS CASE OF SEVERE DIARRHEA?

HISTORY

Eight-year-old female in southeast Asia with sudden onset of frequent, high volume watery diarrhea that is clear in color, along with abdominal cramps, and fatigue.

WHAT MORE WOULD YOU LIKE TO KNOW ABOUT THE HISTORY?

PHYSICAL EXAM

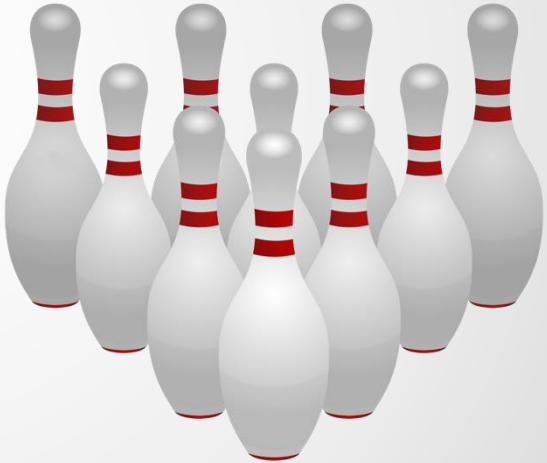
She is alert and uncomfortable appearing. Temperature is 37 degrees, pulse 110, respirations 28. Chest sounds are normal. Abdomen has mild diffuse is tender without peritoneal signs. Bowel sounds are hyperactive.

WHAT MORE WOULD YOU LIKE TO KNOW ABOUT THE PHYSICAL EXAM?

WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?

SYNDROMES OF SUDDEN ONSET SEVERE DIARRHEA

- Gastroenteritis
- Dysentery



GASTROENTERITIS

A diarrheal syndrome marked by over secretion of liquid by the gastrointestinal tract. The mucosa is noninflamed and the intestinal liquid *does not contain inflammatory cells*. This syndrome is usually self-limited.

GASTROENTERITIS FINDINGS

- Symptoms are usually mild diarrhea with minimal abdominal pain and minimal fatigue.
- Signs are usually normal vitals and unremarkable physical exam.
- Diarrhea is usually watery, without blood or pus.

GASTROENTERITIS ORGANISMS

Causative organisms include:

- Rotavirus, enterovirus, or enterotoxigenic E. coli
- Traveler's diarrhea, usually from enterotoxigenic E. coli
- *Giardia lamblia*, a protozoa.
- *Vibrio cholerae*, a bacteria.

QUESTION

While most enteric infections typically present with diarrhea, which of the following infections usually does not?

A. Campylobacter

B. Shigella

C. Giardia lamblia

D. Salmonella typhi

E. Rotavirus

ANSWER

While most enteric infections typically present with diarrhea, which of the following infections usually does not?

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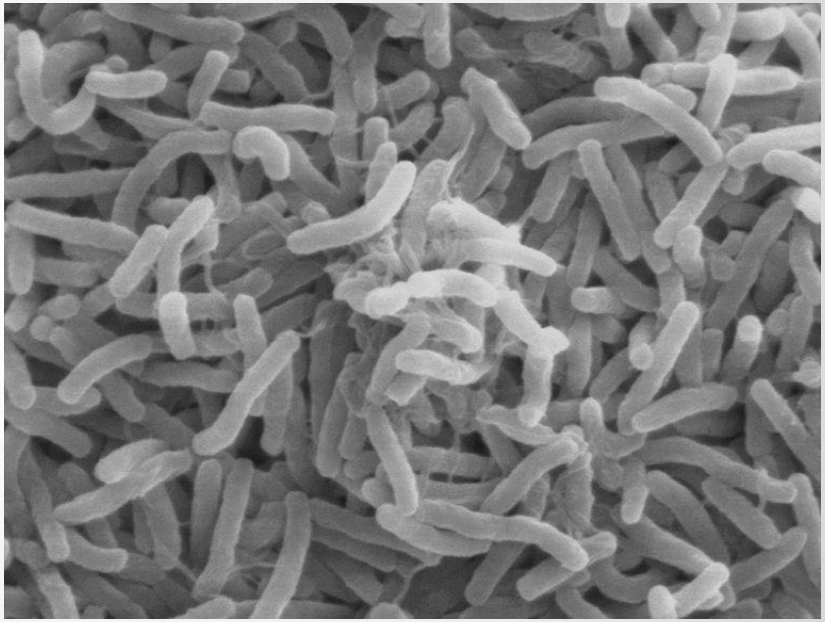
CHOLERA

Cholera may cause severe dehydration, hypovolemic shock, and death within 24-48 hours.



CHOLERA IN HAITI

WHAT IS THE MANAGEMENT OF GASTROENTERITIS?

DYSENTERY

A diarrheal syndrome marked by overt inflammation of the intestinal mucosa, resulting in *inflammatory cells within the intestinal liquid*. This syndrome is associated with more severe complications.

DYSENTERY FINDINGS

- Symptoms are usually more severe diarrhea with significant abdominal pain, cramps, painful defication, and greater fatigue.
- Signs are may include fever, tachycardia, abdominal tenderness and guarding.
- Diarrhea is more likely to be bloody, fowl smelling, with pus and mucus.

DYSENTERY ORGANISMS

Causative organisms include:

- *Shigella* and *Salmonella enteritidis*, both gram-negative bacilli
- *Yersinia enterocolitica*, a gram-negative, anaerobic bacteria
- *Campylobacter jejuni,* gram-negative bacilli
- Hemorrhagic *E. coli* (0157), gram-negative rod causing invasion of intestinal mucosa.

QUESTION

Each of the following organisms cause dysentery, EXCEPT which ONE?

A. Salmonella enteritidis

B. Yersinia enterocolitica

C. Enterotoxigenic E. coli (ETEC)

D. Campylobacter jejuni

E. Shigella

ANSWER

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C. Enterotoxigenic E. coli (ETEC)

D. Campylobacter jejuni

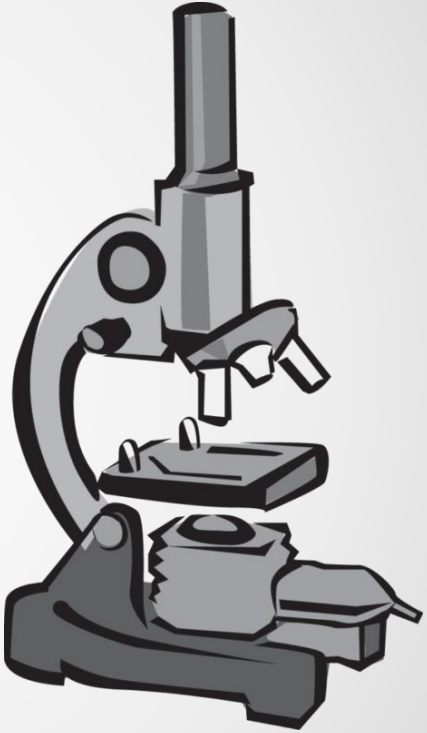
E. Shigella

WHAT IS THE MANAGEMENT OF DYSENTERY?

DYSENTERY MANAGEMENT

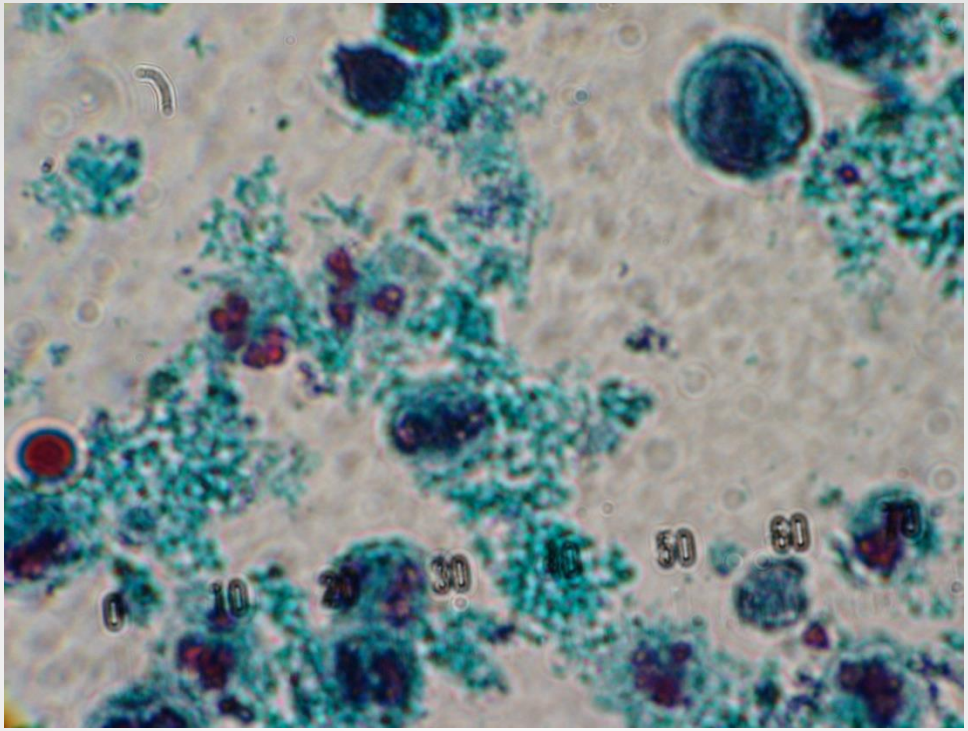
- Clinical monitoring
- Maintenance of hydration
- Symptomatic treatment
- Antimotility drugs with caution
- Antibiotic for severe disease: ciprofloxacin (E. coli, shigella), metronidazole (C. dif, giardia), azithromycin (E. coli, salmonella)
- Chronic dysentery should prompt search for other causes (Crohns, giardiasis, etc)

WHAT SIMPLE LAB TESTS CAN NARROW THE POTENTIAL CAUSES?

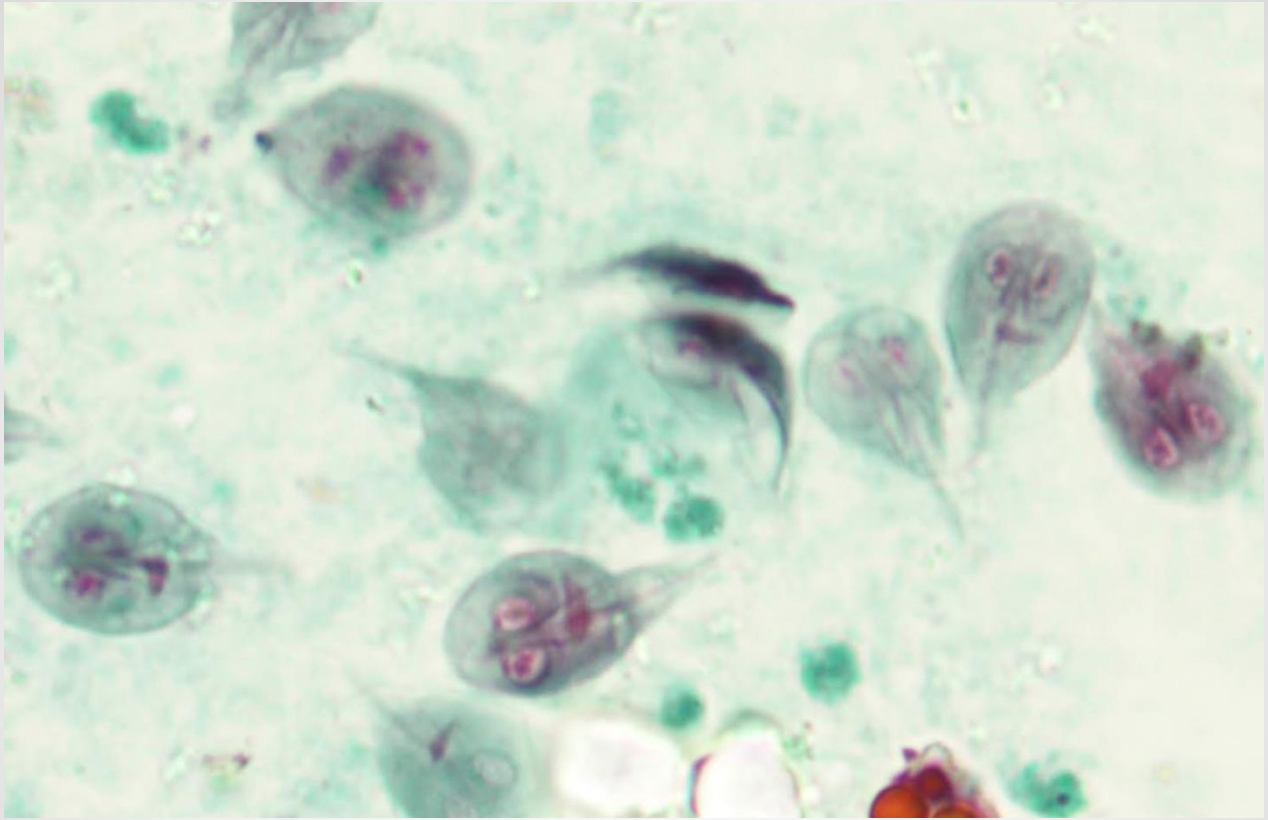


LABORATORY TESTS

Examination of a fresh stool for gross character (watery, mucoid, bloody) and presence of fecal leukocytes, ova and parasites may help to identify both the category of enteritis and the particular cause.



WHITE BLOOD CELLS IN STOOL STAINED WITH METHYLENE BLUE



GIARDIA LAMBLIA IN STOOL STAINED WITH METHYLENE BLUE OR IODINE

HOW TO DIAGNOSE IF YOU HAVE NO ACCESS TO LABORATORY?

WHAT IS HER DIARRHEAL SYNDROME?

HOW WILL YOU TREAT HER GASTROENTERITIS?

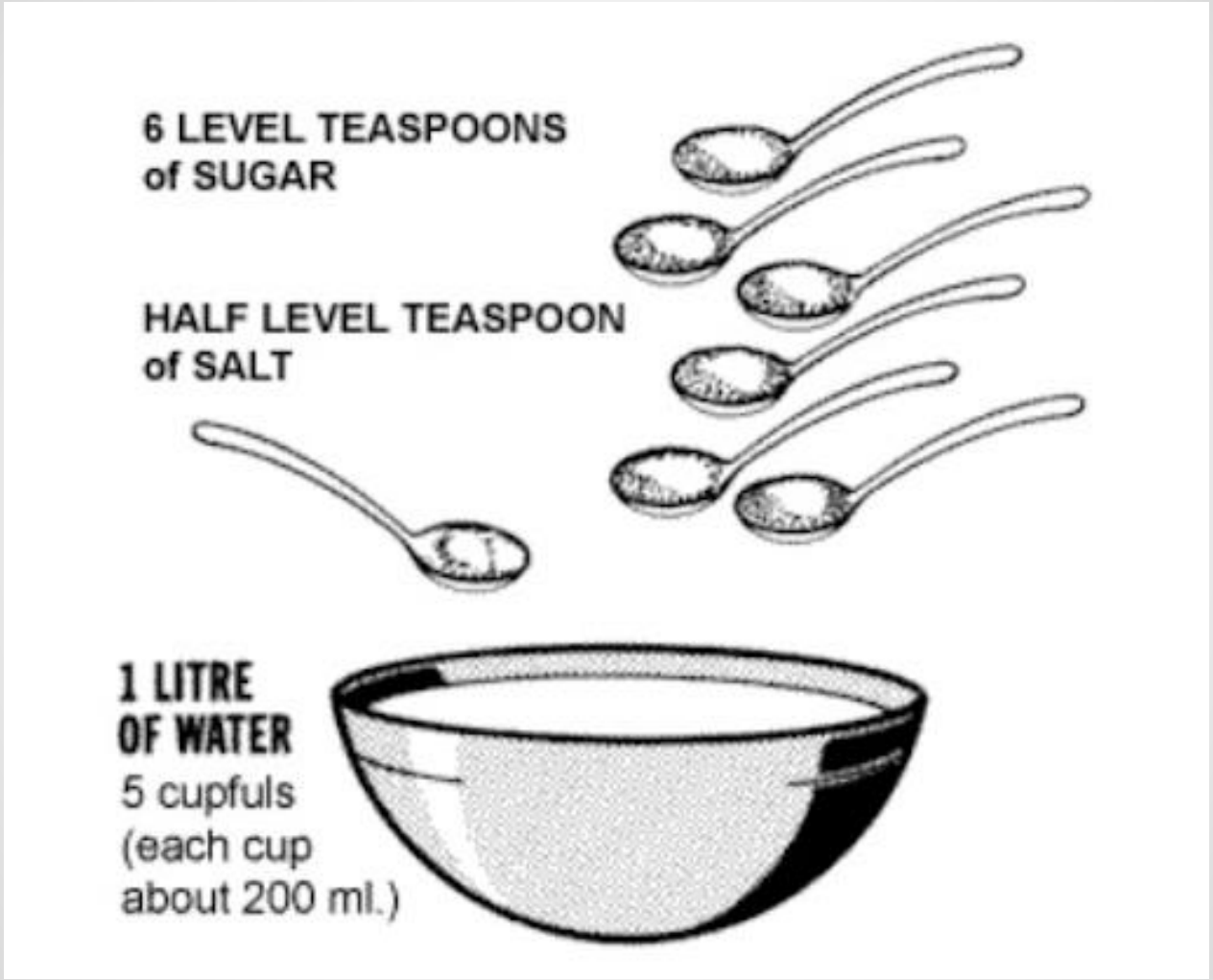
GASTROENTERITIS TREATMENT

- This illness is usually self-limited.
- The main goal of treatment is prevention of dehydration.
- Oral rehydration therapy is almost always sufficient, if started early in the course of the illness.

ORAL REHYDRATION THERAPY

The key to managing most enteric infections is early home therapy with oral rehydration solution. ORS is easy make from products available in most markets. It is also commercially produced in ready-to-mix packets.

WHAT ARE THE COMPONENTS OF ORAL REHYDRATION THERAPY?


6 LEVEL TEASPOONS
of SUGAR
HALF LEVEL TEASPOON
of SALT
1 LITRE
OF WATER
5 cupfuls
(each cup
about 200 ml.)

ORAL REHYDRATION SOLUTION (ORS) FORMULA

Add to 1 liter of potable water:

1. **Sugar - 30 ml (6 level teaspoons)**
2. **Salt - 2.5 ml (1/2 level teaspoon)**

Mix carefully. Too much sugar can worsen diarrhea. Too much salt can worsen dehydration.

WHAT ARE SOME SIGNS THAT HYDRATION IS NOT ADEQUATE?

HOW TO ASSESS THE DEGREE OF A CHILD'S DEHYDRATION?

DEHYDRATION ASSESSMENT

Dehydration	Mild 3-5%	Mod 6-10%	Severe >10%
Mental Status	Normal	Listless, irritable	Altered
Heart Rate	Normal	Increased	Increased
Pulses	Normal	Decreased	Thready
Cap Refill	Normal	Increased	Increased
BP	Normal	Normal	Decreased
Urine Output	Normal	Decreased	Oligouric

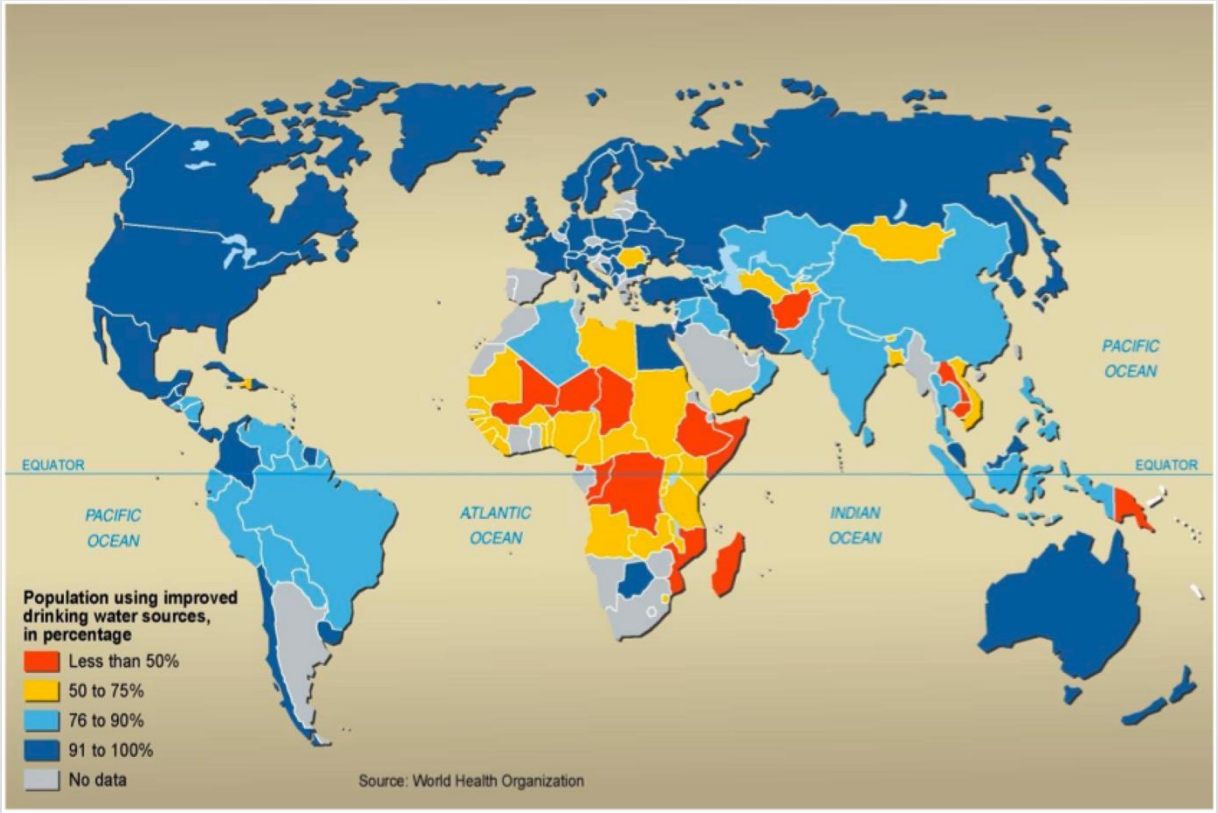
WHAT IS THE NATURAL HISTORY OF CHILDHOOD DIARRHEA?

DIARRHEAL DISEASES PROGNOSIS

Although most enteric infections are mild and self-limited, diarrhea may become severe and life-threatening as a result of lost fluids and electrolytes. Persistent diarrhea can also result in malabsorption of nutrients and failure to thrive, particularly among younger children.

WHAT IS THE LEADING RISK FACTORS FOR CHILDHOOD DIARRHEA?

UNSAFE DRINKING WATER

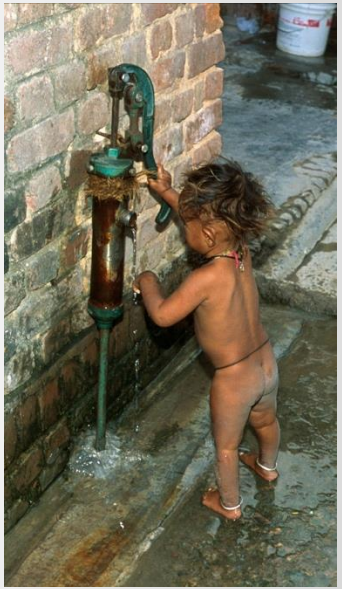


INTERVENTION AGAINST DIARRHEAL DISEASES

What are today's leading interventions against diarrheal diseases?

INTERVENTIONS AGAINST DIARRHEAL DISEASES

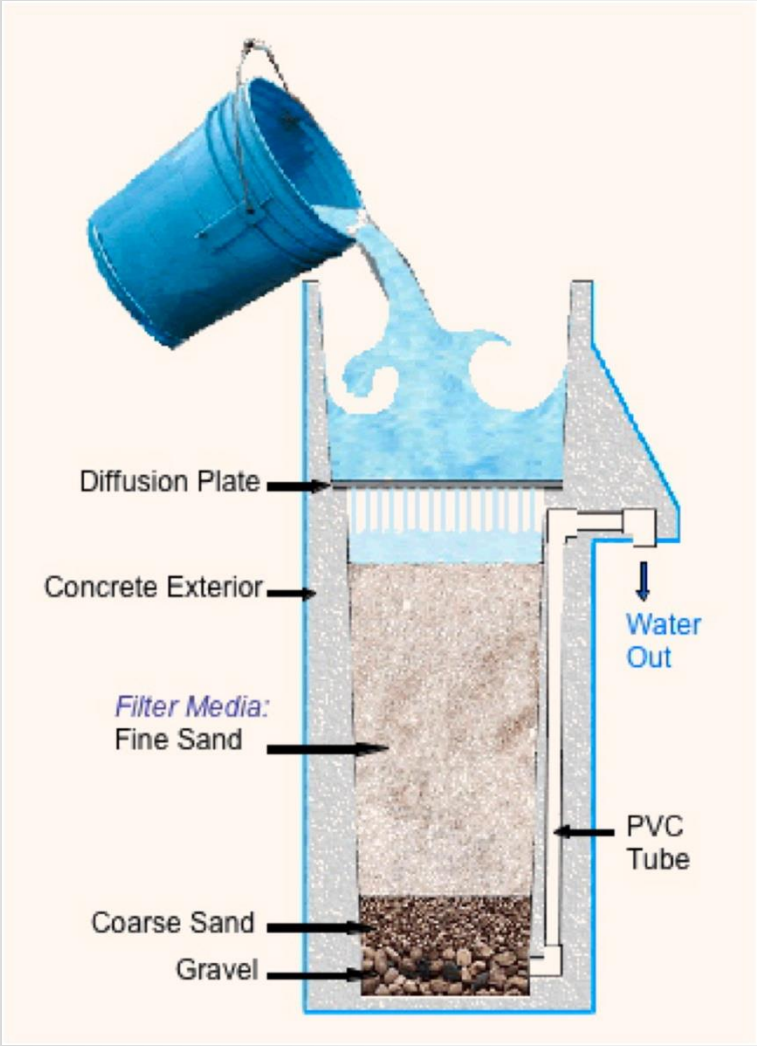
- Hand washing and hygiene
- Reduce fly population
- Promote breastfeeding and proper weaning
- Improve sanitation via latrines and sewers
- Assure safe drinking water



WHAT ARE SOME OF THE WAYS WATER BE MADE SAFE TO DRINK?

ASSURE SAFE DRINKING WATER

- Protected wells
- Protected springs
- Sand dams
- Bio-sand filters
- Portable water treatment systems
- Disinfection systems that utilize filtration, UV light, chlorine



BIO-SAND FILTER FOR LOW-COST SAFE DRINKING WATER

WHAT IS THE ROLE OF SANITATION IN DIARRHEA DISEASE PREVENTION?

LOW-COST SANITATION SYSTEMS

- Buried pit
- Unimproved pit latrine
- Ventilated improved pit latrine
- EcoSan system
- Pour flush latrine
- Septic system
- Sewer system and treatment ponds

EVERY PERSON CARED FOR IS ALSO AN OPPORTUNITY TO IMPROVE YOUR SKILLS

BRINGING OUT PEOPLE'S BEST

- Serving for forgotten people is a powerful means of personal development - cultivating humility, gratitude, and kindness
- A cure for vanity, pride, and selfishness

How can you best increase your practical healthcare skills for the world's forgotten?

INTERNATIONAL HEALTH ROTATIONS & LEARNING OPPORTUNITIES

EQUIP YOURSELF TO BETTER SERVE FORGOTTEN PEOPLE

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