CHILD HEALTH CASE STUDIES

INMED

Nicholas Comninellis, MD, MPH, DIMPH
President & Professor
Institute for International Medicine

COURSE EVAL AND CONTINUING EDUCATION CREDIT CLAIMS

Forgotten People

Syrians seeking refuge

Turkey-Syria Earthquake

Ebola in Congo


Le Bon Samaritain

“WE WANT TO DO THE SAME!”

Record Interest Among Healthcare Students & Professionals

“BUT WE HAVE QUESTIONS LIKE…”

- Where to serve?
- What organization to choose?
- How to prepare?
- What skills are needed?
- How to pay for this?
- Where does family fit in?
- What about language?
- Isn’t all this dangerous?

INMED | INSTITUTE FOR INTERNATIONAL MEDICINE

A graduate school equipping healthcare professionals & students to serve the forgotten since 2003

May 29-30, Kansas City, MO

Students: Register Just $20 Coupon Code: *equip20*


Information
HOPE
TEAM IN


MEDICINE
COMMUNITY DEVELOPMENT
DISCIPLESHIP
REACH BEYOND
V+H
GOD'S LOVE


Despite Free Medication, Socioeconomic and COVID-19 Pandemic-Related Barriers Limit HIV Care in Rural Western Kenya
Kansas City University
Julianna Eisele, OMS 3
Nicholas Eisele, OMS 3
Gautam J. Desai, DO, FACOFP
Cameron L. Smith, DO, FACOFP
Abstract
Objectives
Introduction
Data and Methods
COVID-19 Pandemic-Related Barriers to HIV Care
Results
Discussion and Conclusions
ATTENDEE

8-WEEK GRADUATE CERTIFICATE COURSE SUBJECTS

- Diseases Of Poverty
- Maternal-Newborn Health
- HIV medicine
- International Public Health
- Cross-Cultural Skills
- Disaster management
- Health Leadership
- Health Professions Education

INMED GRADUATE CERTIFICATE IN

International Medicine & Public Health

By the authority vested in the Institute for International Medicine and upon recommendation of the faculty of the institute, be it known to all whom these letters may come that

Sean Mark

MD, DIMPH

In recognition of knowledge and skills achieved in diseases of poverty, maternal-newborn care, international public health, disaster management, cross-cultural skills, health leadership, and healthcare education, has completed and is awarded the INMED professional certificate in international medicine & public health. Witness the signatures hereto affixed this 15 day of July 2023.

NICHOLAS COMNINELLIS MD, MPH, DIMPH
PRESIDENT

DONALD PHILGREEN, MD
VICE PRESIDENT

HANDS-ON SKILLS COURSES

Newborn Resuscitation

Wound Care

Fracture and injury care

SUPERVISED SERVICE-LEARNING IN MEDICINE, NURSING AND PUBLIC HEALTH

Africa

- Angola
- Cameroon
- Ethiopia
- Ghana
- Kenya
- South Africa
- Tanzania
- Uganda
- Zambia

Asia

- Bangladesh
- China
- India
- Macau
- Pakistan
- Philippines
- Russia
- Papua New Guinea

Kudjip Nazarene Hospital
Papua New Guinea

SUPERVISED SERVICE-LEARNING IN MEDICINE, NURSING AND PUBLIC HEALTH

The Americas

- Dominican Rep.
- Ecuador
- Guatemala
- Haiti
- Honduras
- USA

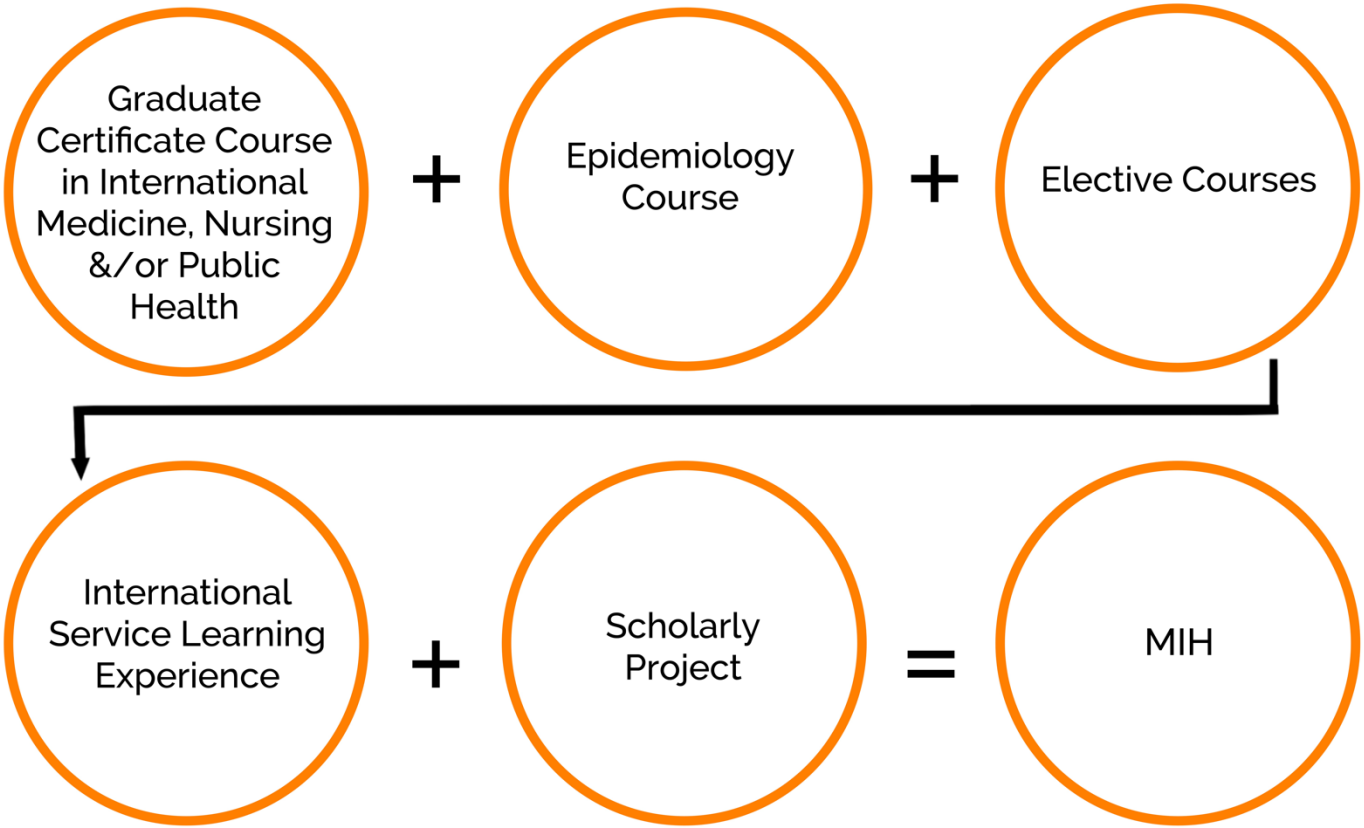
Middle East

- Jordan
- United Arab Emirates

Clinica Evangelica
Morava, Honduras


INMED
MIH
Master's in International Health

Master's Degree in International Health



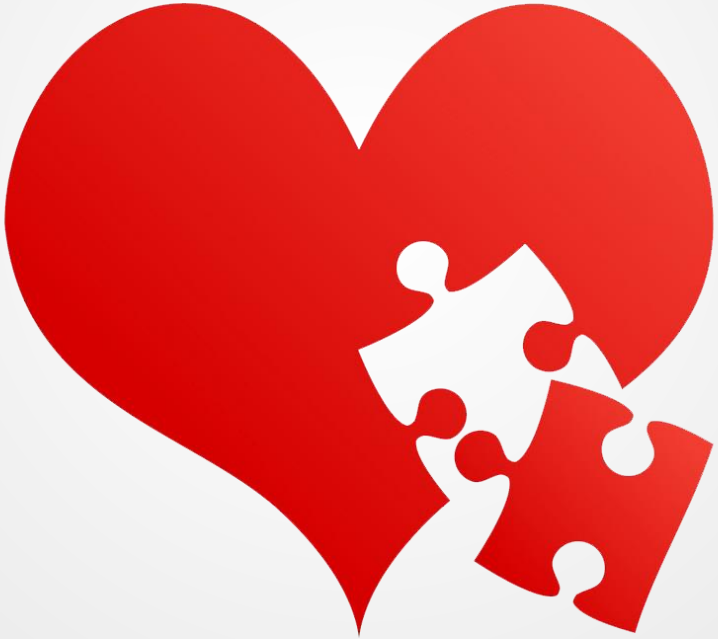
PREPARED TO SERVE WITH DISTINCTION

- International government agencies
- National health agencies
- Global charitable foundations
- Faith-based health organizations
- Universities and research institutions
- Banking and industry
- Disaster relief and refugee care agencies

INTERNATIONAL HEALTH OPPORTUNITIES

HOW DO YOU DEFINE A *DIAGNOSIS*?

DIAGNOSIS: A RECOGNIZED PATTERN OF DISEASE



IDENTIFYING A DIAGNOSIS:

Searching for clues that match a recognized pattern of disease


CAN YOU SOLVE
THIS CASE OF
TROPICAL FEVER?

HISTORY

This seven-year-old girl is brought to you in remote eastern Honduras. Her parents explain that five days ago she suddenly developed fever, vomiting, severe headache, and pain on moving her eyes.

HISTORY

Several other children in the neighborhood have been similarly ill since the onset of the rainy season with its customary heat and onslaught of mosquitoes.

WHAT ARE YOUR QUESTIONS ABOUT THE HISTORY?

PHYSICAL EXAM

Child is lethargic but arousable. Temperature is 39 degrees, pulse 70, respirations 30 and shallow, capillary refill 4 seconds, chest clear to auscultation.

PHYSICAL EXAM

Heart has a soft systolic murmur, abdomen is mildly distended with enlarged liver and spleen, and without tenderness or fluid wave. She has a fine macular, blanching rash on her extremities.

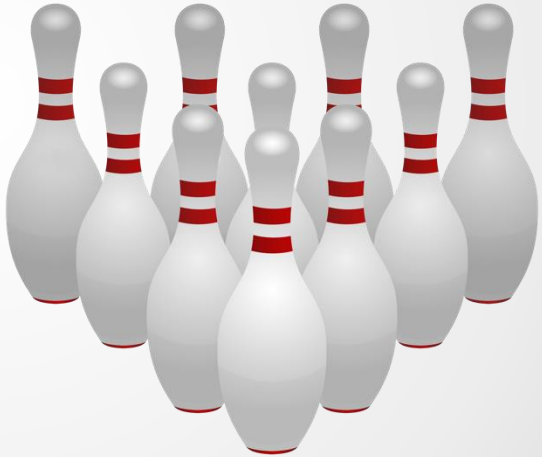
WHAT ARE YOUR QUESTIONS ABOUT THE PHYSICAL EXAM?

WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?

ACUTE TROPICAL FEVER DIFFERENTIAL DIAGNOSIS

Consider:

- Influenza
- Dengue
- Typhoid fever
- Yellow fever
- Measles
- Malaria
- West Nile Virus



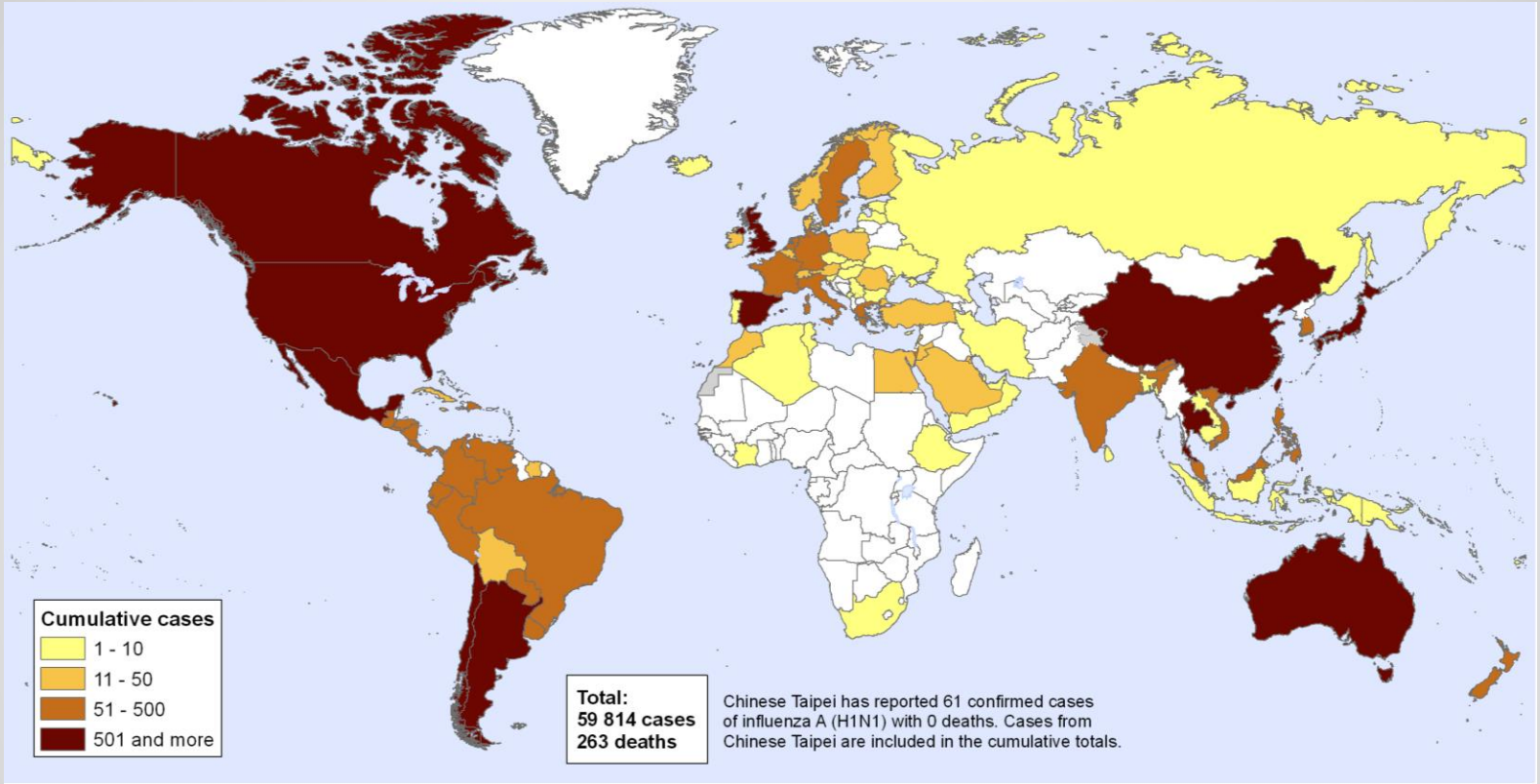
HOW CAN YOU NARROW THIS DIFFERENTIAL?

Consider:

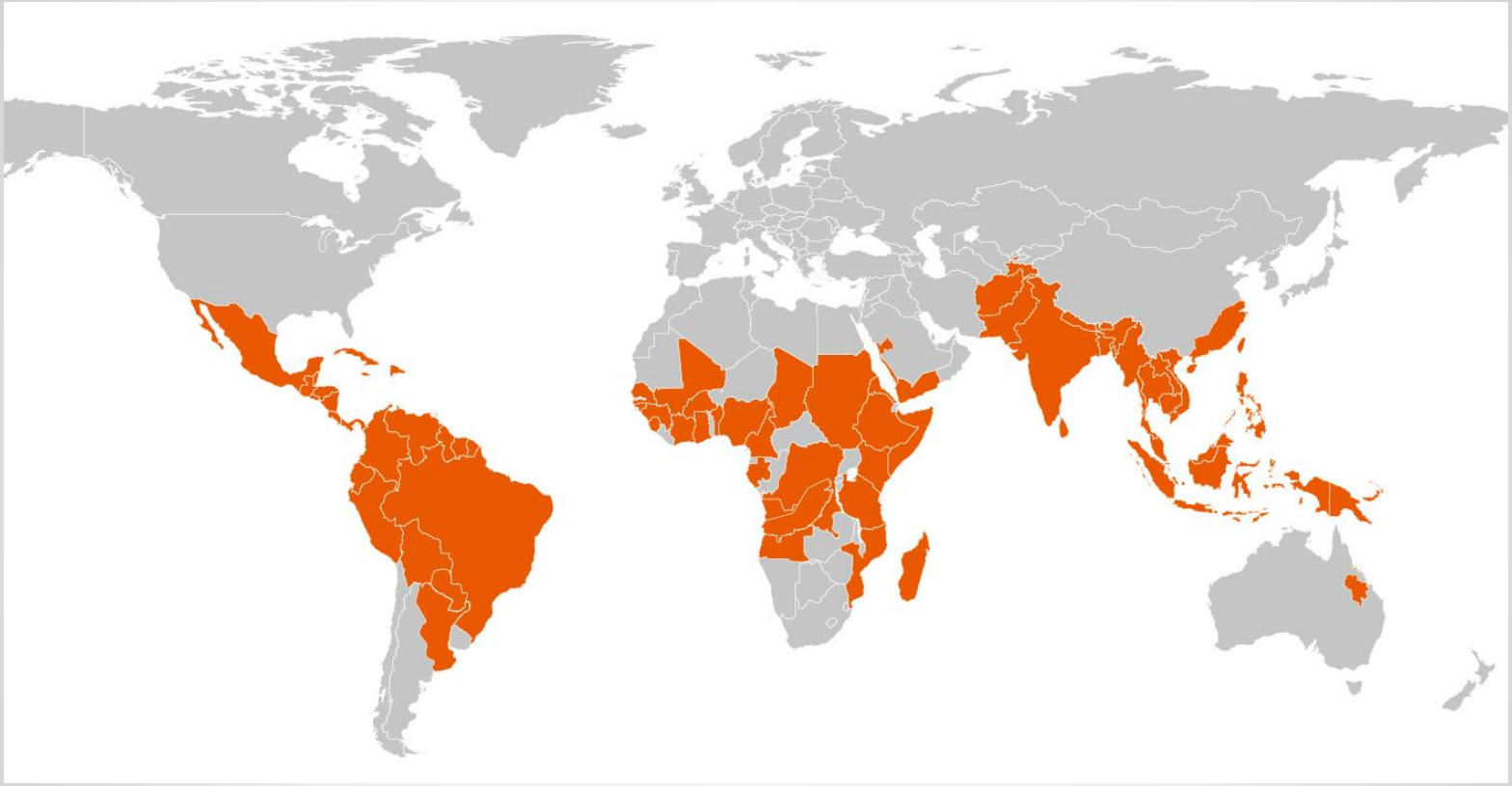
- Influenza
- Dengue
- Typhoid fever
- Yellow fever
- Measles
- Malaria
- West Nile Virus

FIRST CONSIDER GEOGRAPHY & EPIDEMIOLOGY

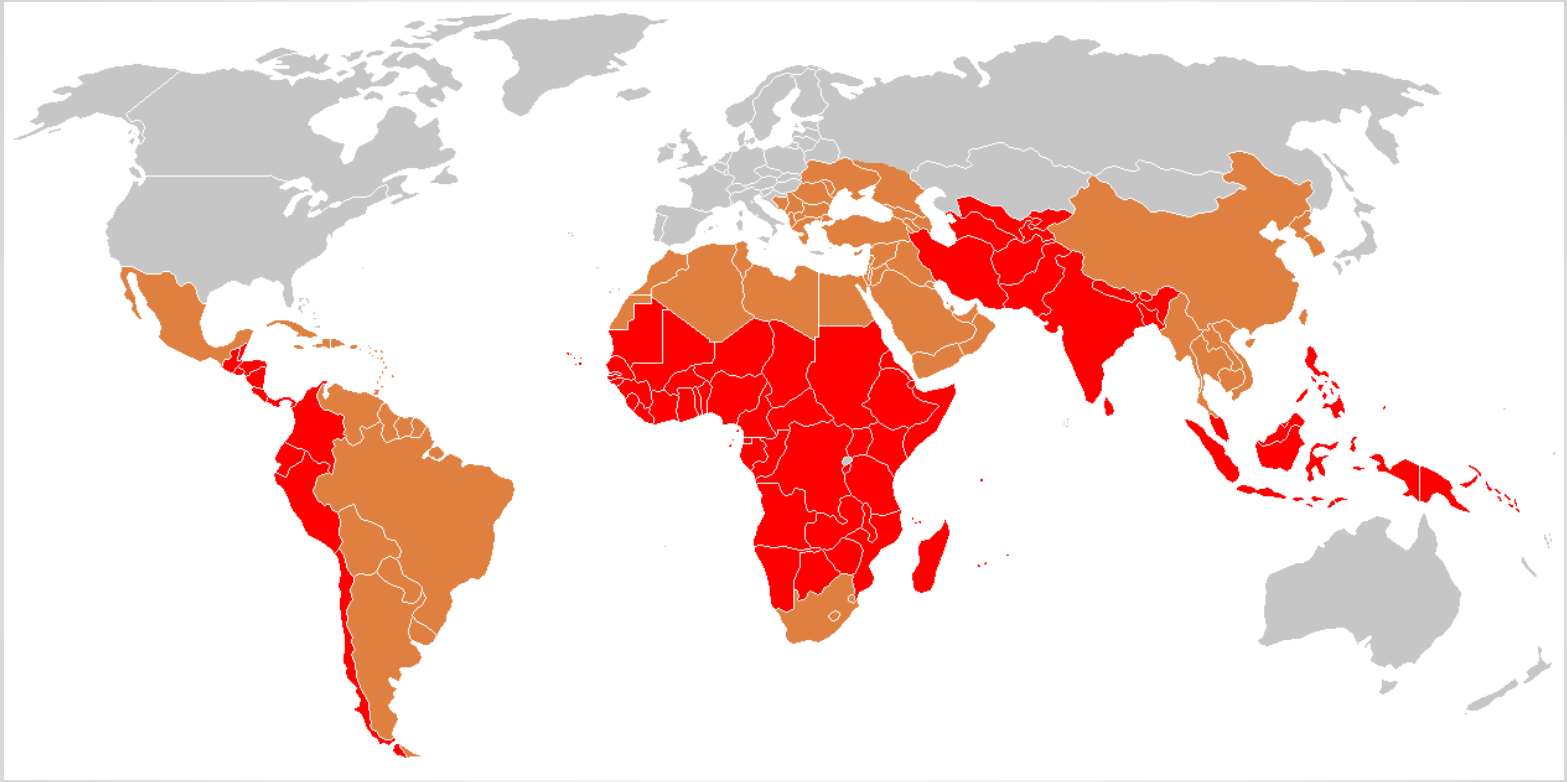
Note: Many developing nations do not have reliable health statistics



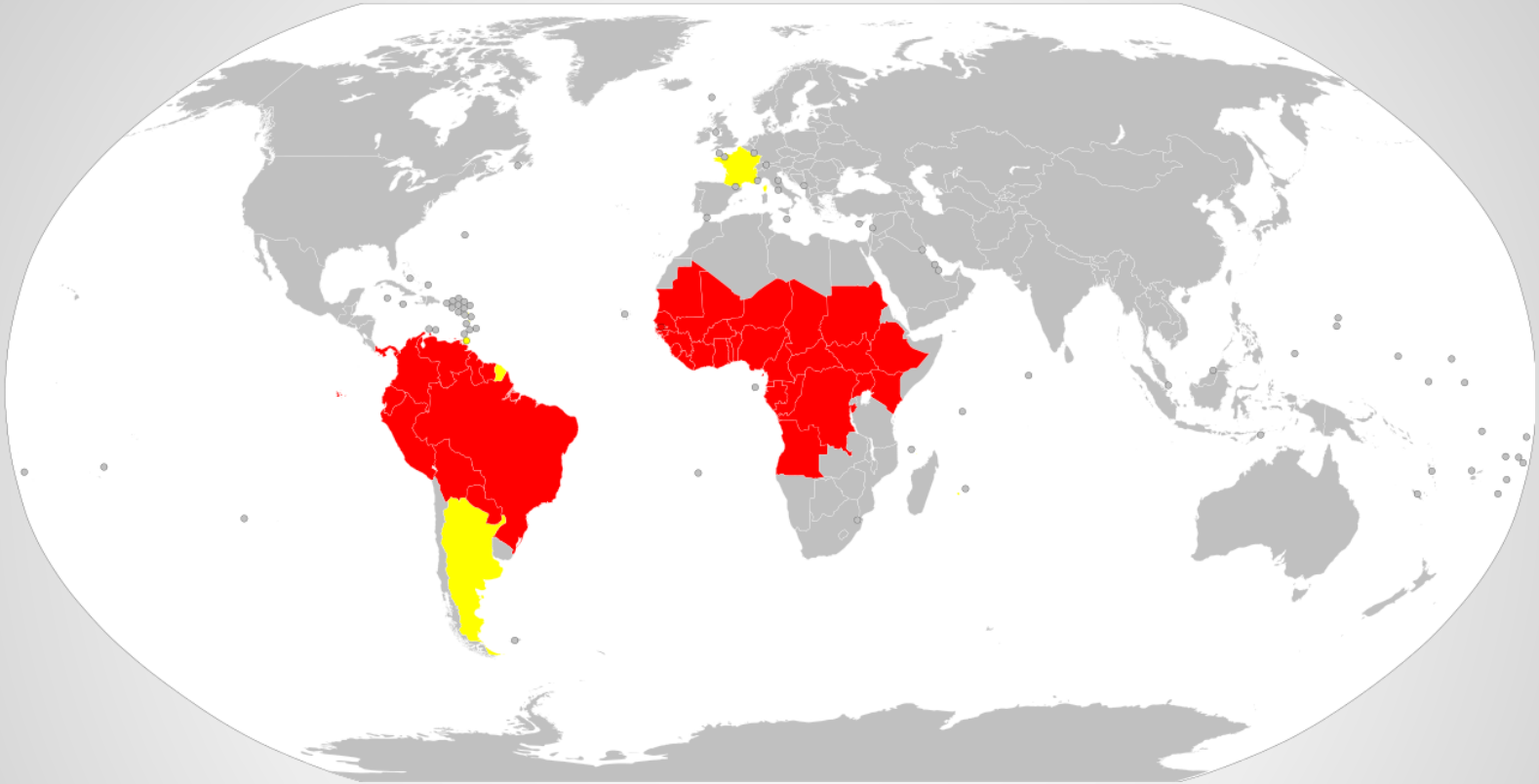
INFLUENZA INCIDENCE



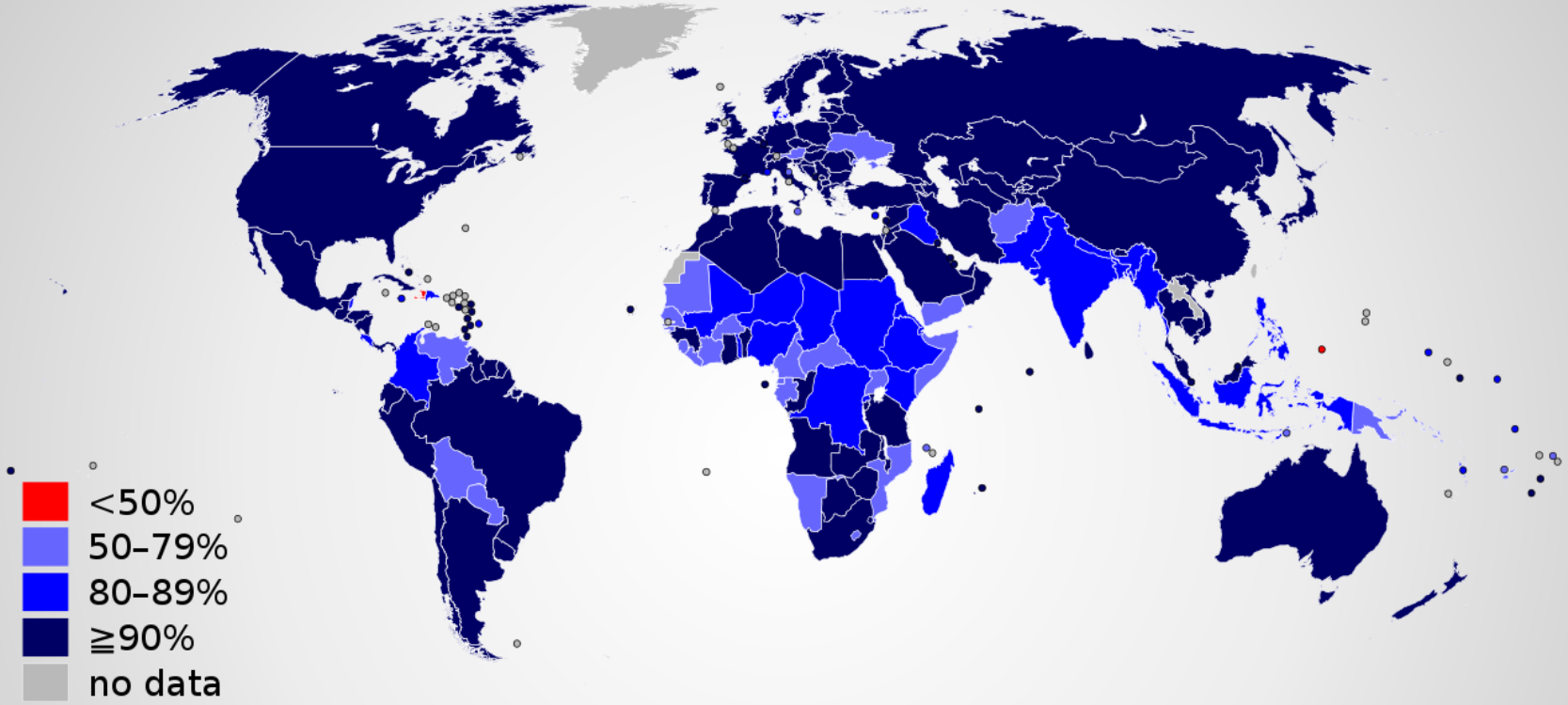
DENGUE INCIDENCE



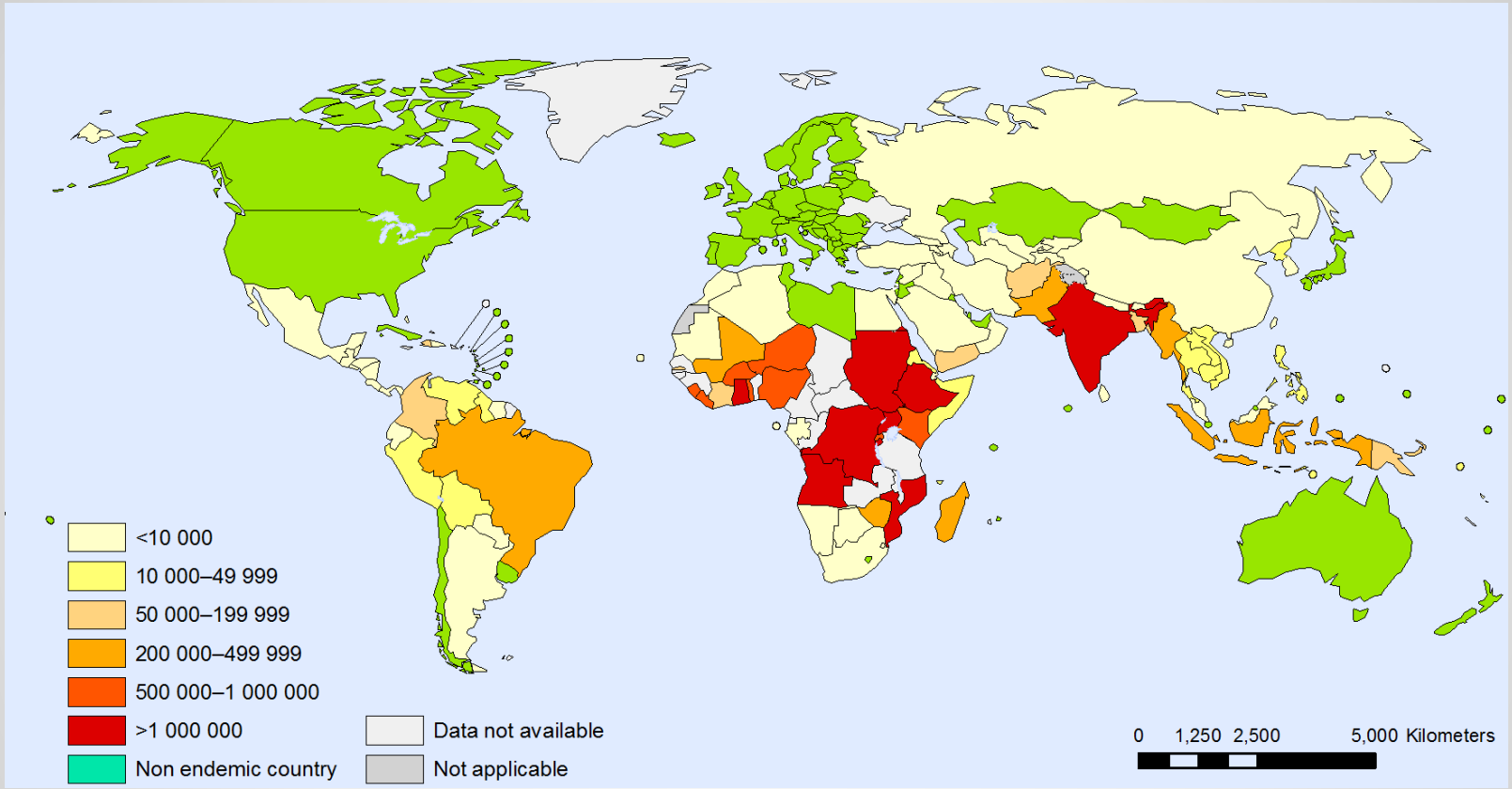
TYPHOID INCIDENCE



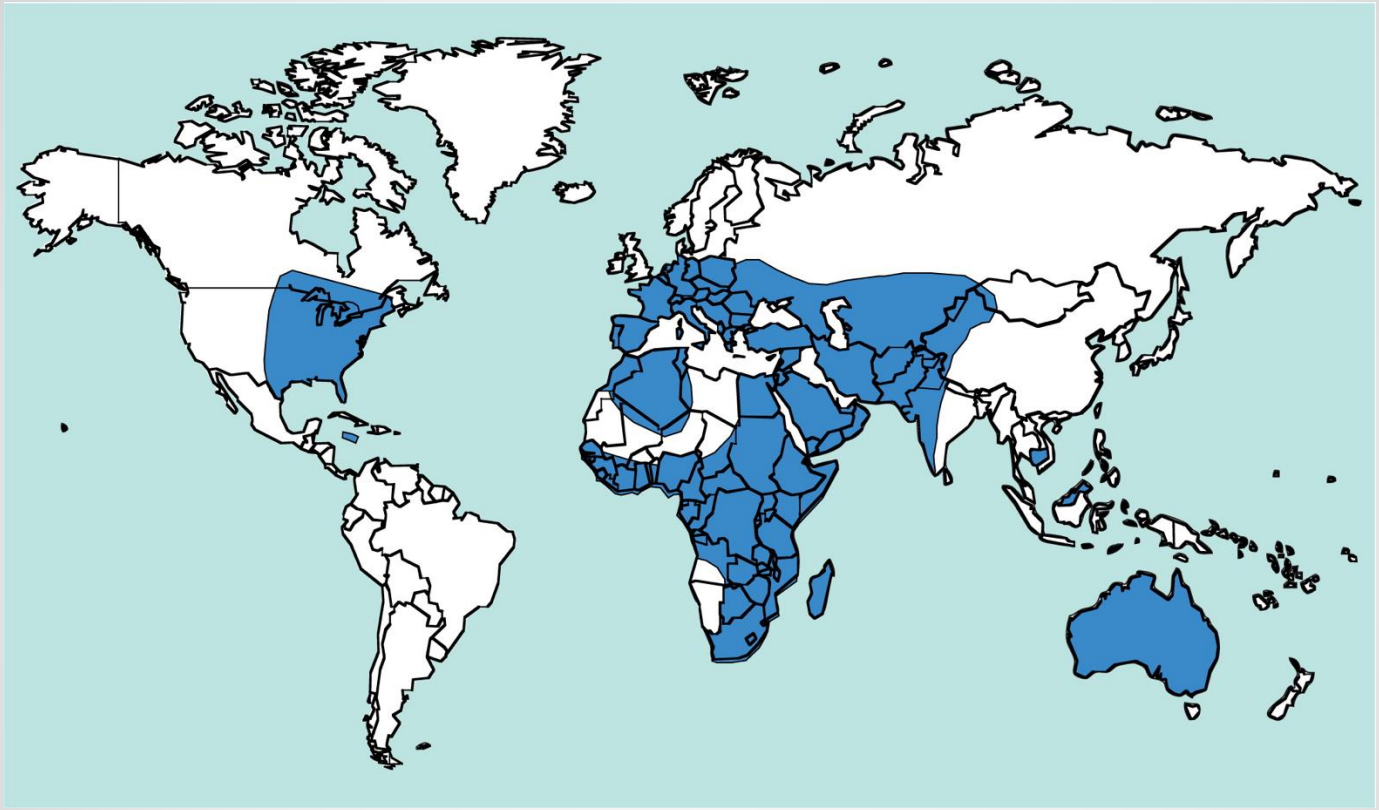
YELLOW FEVER INCIDENCE



MEASLES VACCINE COVERAGE



MALARIA INCIDENCE



WEST NILE VIRUS INCIDENCE

BASED ON GEOGRAPHY THIS DIFFERENTIAL IS NARROWED:

Consider:

- Influenza
- Dengue
- Typhoid fever
- ~~Yellow fever~~
- ~~Measles~~
- Malaria
- ~~West Nile Virus~~

HOW TO FURTHER NARROW THE DIFFERENTIAL?

Consider:

- Influenza
- Typhoid fever
- Malaria
- Dengue

WHAT BASIC TESTS WOULD YOU RECOMMEND?

Consider:

- Influenza
- Typhoid fever
- Malaria
- Dengue

WHAT ARE TESTS FOR INFLUENZA?

INFLUENZA TESTS

- Viral culture of nasophayrnx is the most reliable test, but rarely indicated.
- Rapid antigen tests are 50-70% sensitive, >90% specific, but not often available
- ELISA has better sensitivity and specificity, but rarely available.
- CBC with nonspecific lymphocytosis, leukopenia, and/or monocytosis.

WHAT ARE TESTS FOR TYPHOID?

TYPHOID TESTS

- Blood culture is the best test, but rarely available in low-resource facilities.
- ELISA for antibodies to *salmonella typhi*
- The Widal test, a serologic cold agglutinin test, is nonspecific, requires acute and convalescent titers.
- Anemia, leucopenia, low platelets, and elevated liver enzymes may occur in typhoid fever, but are nonspecific.

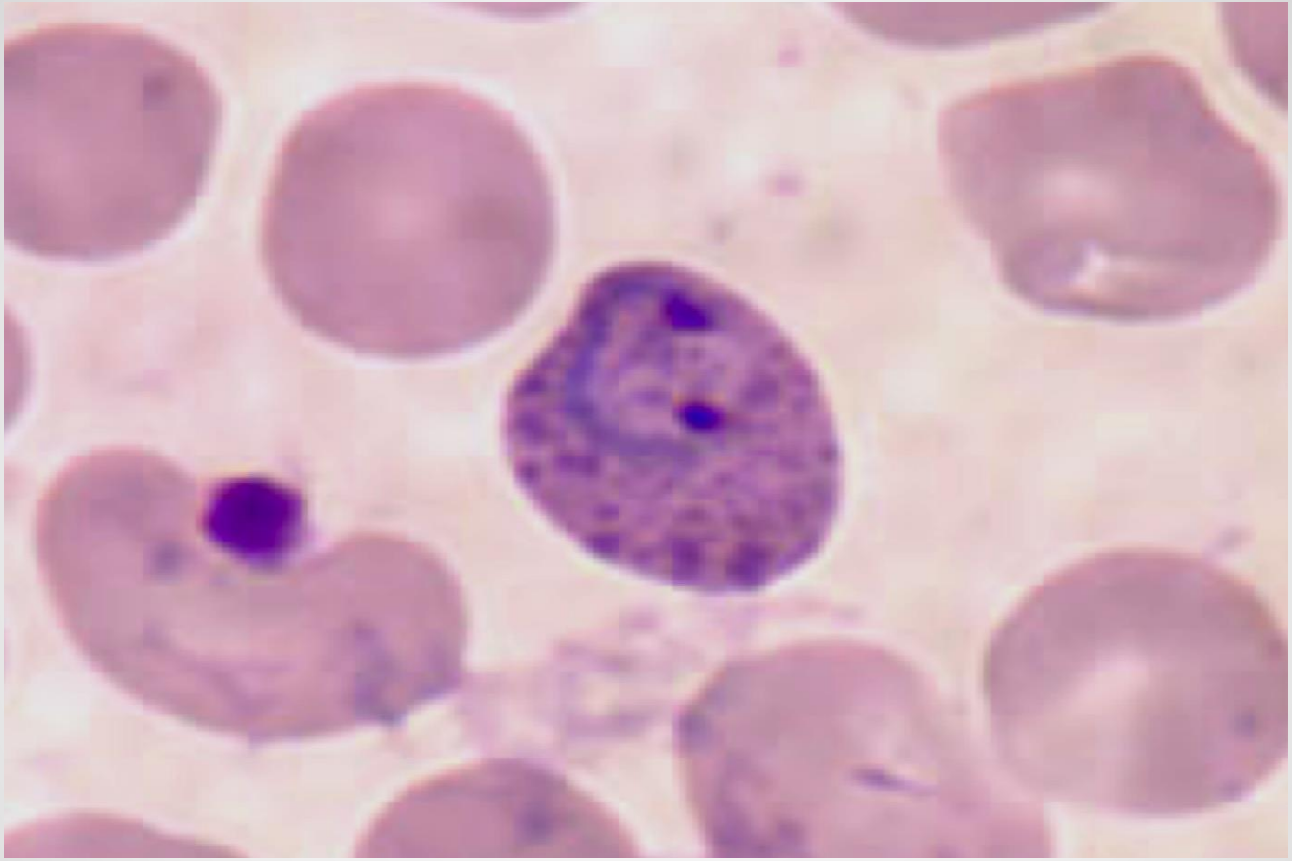
COMPLETE BLOOD COUNT

- Hemoglobin: 9
- White blood cells: 12,000 with bands 10%, polys 45%, lymphs 35%, eos 10%
- Platelets: 45,000

WHAT ARE TESTS FOR MALARIA?

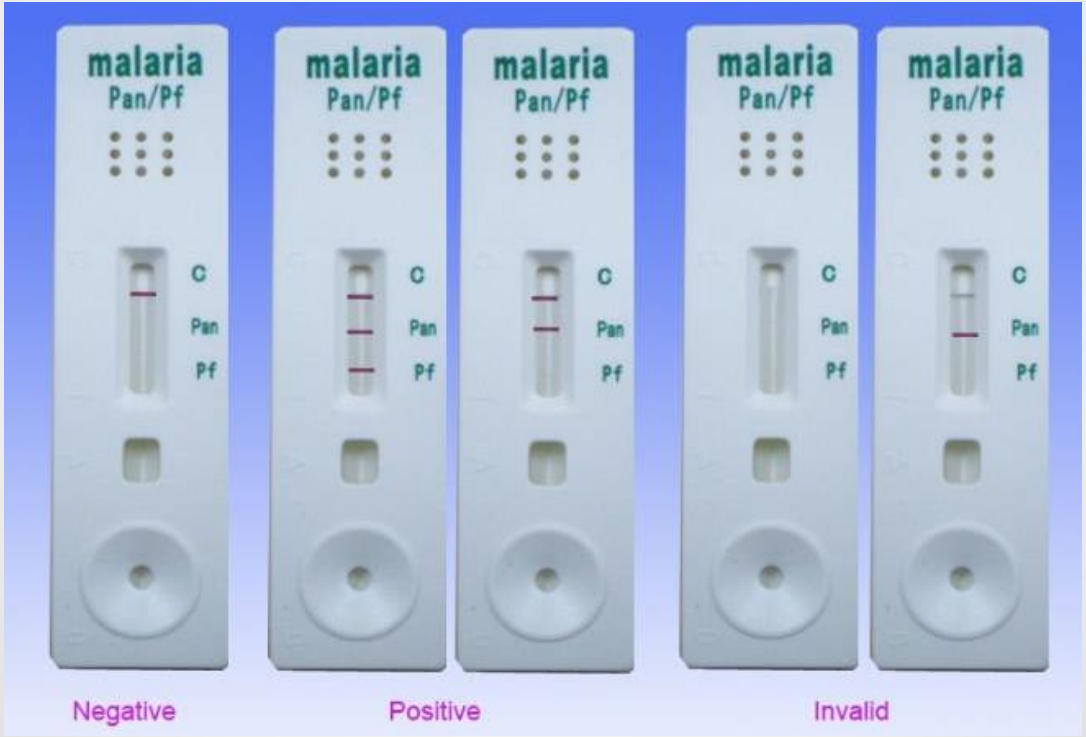
MALARIA TESTS

- Identification of ring-like *Plasmodium* protozoa within red blood cells on Giemsa-stained smear of whole blood.
- Thick blood films are more sensitive in detecting malaria protozoa. Thin blood smears permit identification of the *Plasmodium* species.
- Malaria smears should be obtained *at least* every 12 hours to diagnosis and to evaluate treatment response.



PLASMODIUM PROTOZOA

WHAT ARE PROS & CONS OF RAPID MALARIA TESTS?



RAPID MALARIA TESTS

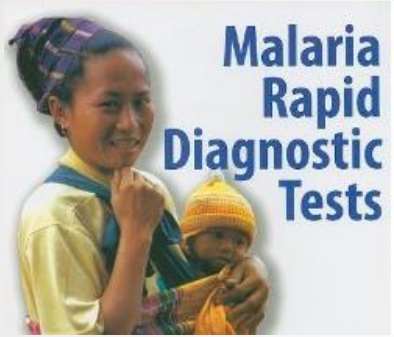
Pros:

- Low cost (US $ 0.25 - 0.60) each
- Results in minutes
- Useful where microscopy is not available

Cons:

- Gives only *P. falciparum* or non-*P. falciparum* infection results
- Less reliable in low malaria burden
- Does not quantify parasitemia

RAPID DIAGNOSTIC TESTS



Newer rapid diagnostic tests for Chaga's disease, schistosomiasis, hepatitis, HIV, leptospirosis, syphilis, leishmaniasis, typhoid, trypanosoma, and more

MALARIA TEST

You perform repeated periodic thick and thin blood smears with Giemsa stain, but you *do not* identify any ring-like *Plasmodium* parasites within red blood cells.

WHAT ARE TESTS FOR DENGUE?

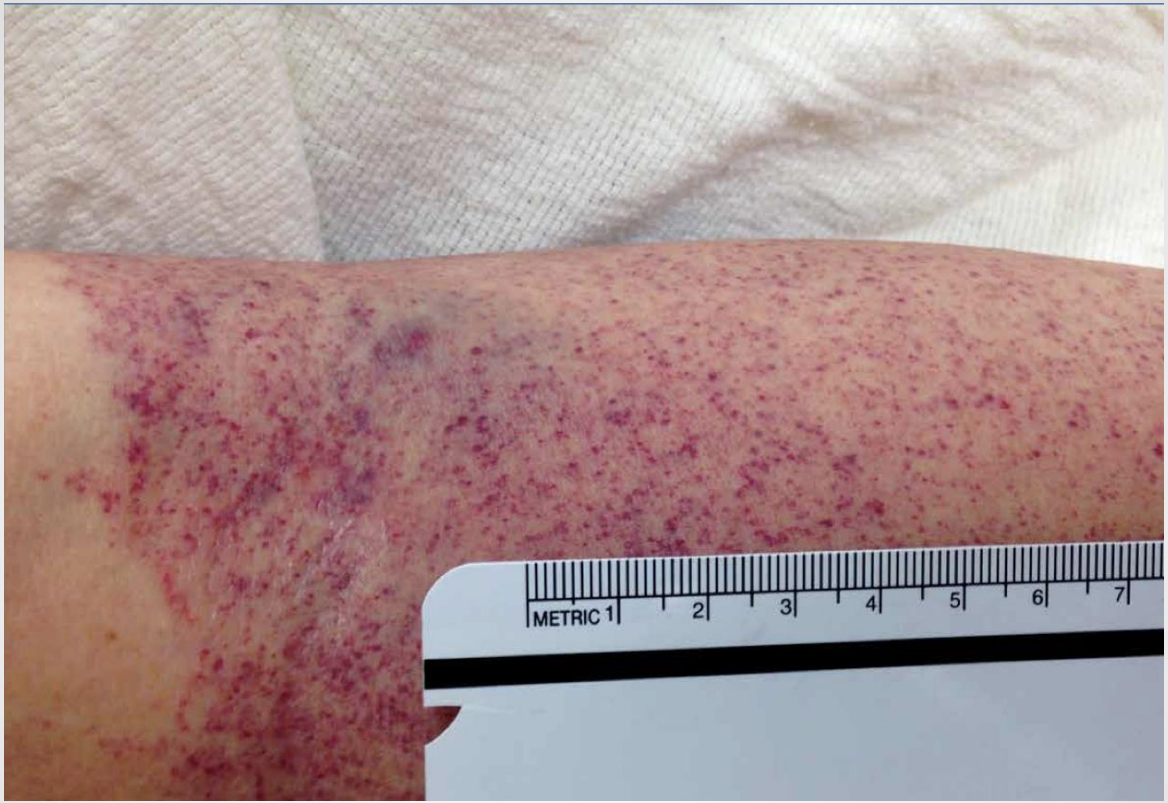
DENGUE TESTS

- Dengue-specific tests include virus culture, nucleic acid detection by PCR, viral antigen detection, or serology for specific antibodies.
- CBC: nonspecific neutropenia, lymphopenia, atypical lymphocytosis, thrombocytopenia, and rising hematocrit.
- Urinalysis: nonspecific proteinuria and hematuria.
- Nonspecific elevated liver enzymes
- What other test may be useful?

TOURNIQUET TEST

Also known as *capillary fragility test*, determines a patient's hemorrhagic tendency.

- A blood pressure cuff is inflated for 5 minutes between the systolic and diastolic pressures.
- The test is positive if 20 or more petechiae per square inch
- A positive test result is 94% specific for dengue. A negative test is 41% sensitive.
- Ebola and thrombocytopenia cause positive test. Yellow fever does not.



POSITIVE TOURNIQUET TEST

TOURNIQUET TEST

You perform a tourniquet test and 15-20 petechiae per square inch appear distal to the BP cuff

WHAT DO YOU KNOW ABOUT DENGUE FEVER?

DENGUE BACKGROUND

- Caused by an arbovirus with four serotypes. Infection with one serotype of dengue virus provides immunity to only that serotype.
- The vector of dengue virus infection is the *Aedes aegypti* mosquito, which feeds during the day, is adapted to the human habitat, often bites indoors, and breeds in small pools of water.

DENGUE SIGNS & SYMPTOMS

- Abrupt onset of fever and chills
- Severe frontal headache, pain on eye movement, and musculoskeletal and lumbar pain
- Anorexia, nausea and vomiting
- Initial examination is usually nonspecific with scleral injection, generalized lymphadenopathy and bradycardia relative to fever.

WHAT IS THE TREATMENT FOR DENGUE FEVER?

DENGUE TREATMENT

- No specific treatment.
- Treat symptoms with rest, fluids, and analgesics. Aspirin and non-steriodal anti-inflammatory drugs (NSAIDs) should not be used.
- Severe dengue fever requires close monitoring plus aggressive fluid and blood product replacement as needed to maintain blood pressure and urine output.

Bleeding from Dengue Hemorrhagic Fever

HOW IS DENGUE FEVER PREVENTED?

DENGUE PREVENTION

- Protective clothing
- Insect repellent
- Eliminate mosquito breeding sites
- Apply larvicides to bodies of water
- Indoor spraying with mosquito adulticides
- Bed nets

DENGUE VACCINE

- Dengvaxia, 3 doses, for children 9–16 years old who have lab confirmed previous dengue infection and are living in an endemic area. Available in Puerto Rico
- Qdenga, 2 doses, is children aged 6–16 years in settings with high dengue transmission intensity. Not available in the USA.

QUESTION

Which ONE statement about dengue fever is NOT true?

A. Dengue antiserum is highly effective.

B. Vector for dengue is the *Aedes aegypti* mosquito.

C. Dengue most commonly occurs in Southeast Asia and Latin America.

D. Treatment is supportive with attention to hemodynamic status.

E. May progress to hemorrhage and shock.

ANSWER

Which ONE statement about dengue fever is NOT true?

A. Dengue antiserum is highly effective.

B. Vector for dengue is the *Aedes aegypti* mosquito.

C. Dengue most commonly occurs in Southeast Asia and Latin America.

D. Treatment is supportive with attention to hemodynamic status.

E. May progress to hemorrhage and shock.

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?

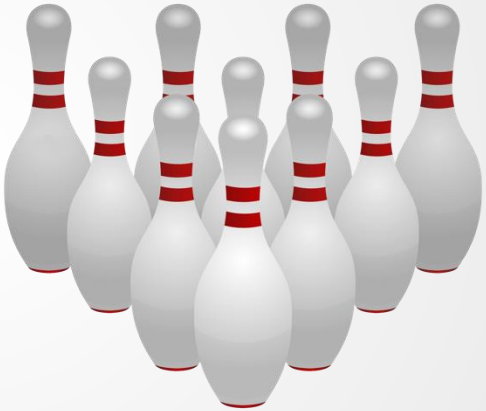
PHYSICAL EXAM

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
- Tuberculosis
- Pneumocystis pneumonia (PCP)

FIRST CONSIDER GEOGRAPHY & EPIDEMIOLOGY

Note: Many developing nations do not have reliable health statistics

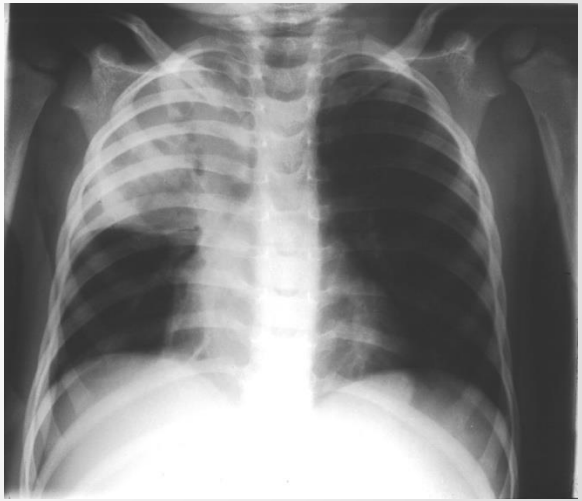
WHAT IS THE LEADING CAUSE OF LIFE YEARS LOST IN DEVELOPING NATIONS?

LEADING CAUSES OF DEATH – DEVELOPING NATIONS

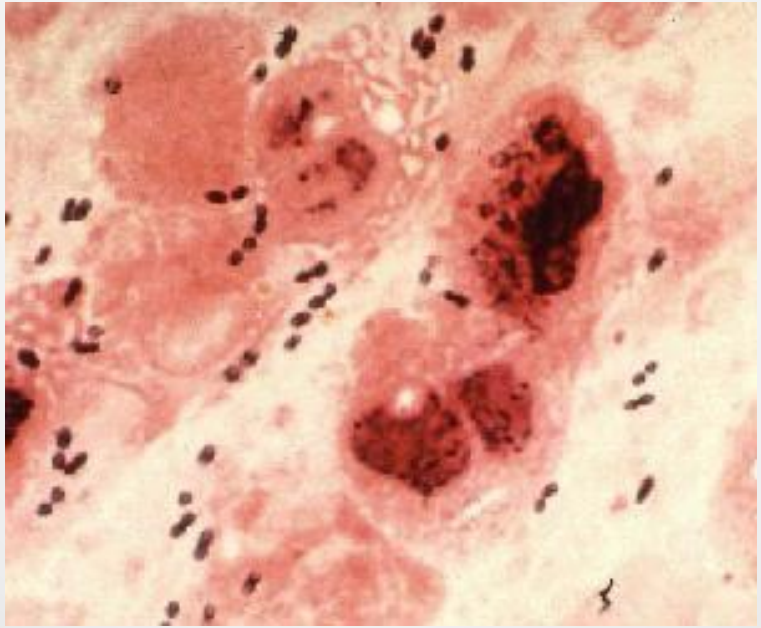
Disease or Injury	Percentage of Total DALYs Lost
Lower respiratory infection	9.7
Diarrheal diseases	6.9
Malaria	5.1
Preterm birth complications	5.1
HIV/AIDS	5.0
Birth asphyxia & birth injury	4.9
Congenital anomalies	3.2
Road injury	3.0
Neonatal sepsis & infections	2.7
Tuberculosis	2.5

PEDIATRIC PNEUMONIA & BRONCHITIS

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

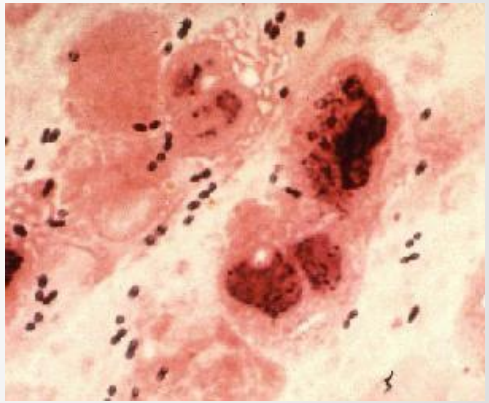


WHAT ORGANISMS CAUSE PNEUMONIA & BRONCHITIS IN DEVELOPING NATIONS?

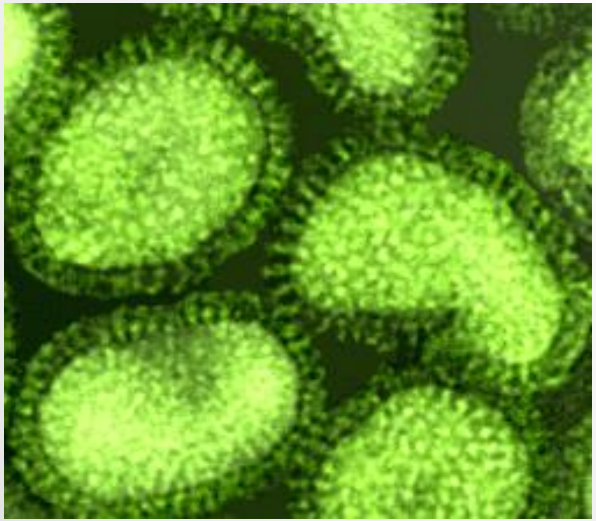


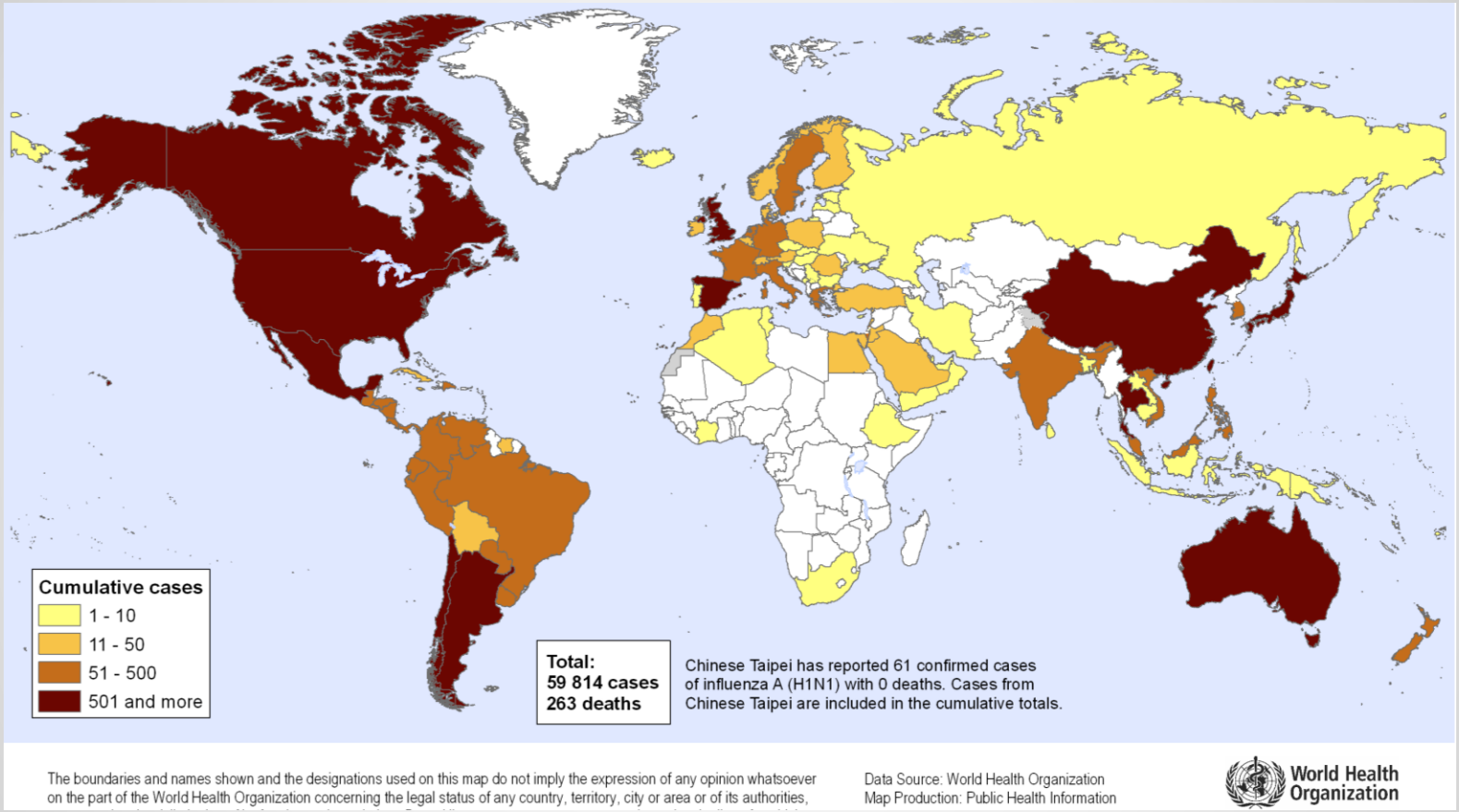
ORGANISMS CAUSING PNEUMONIA & BRONCHITIS

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



WHAT IS THE EPIDEMIOLOGY OF INFLUENZA?



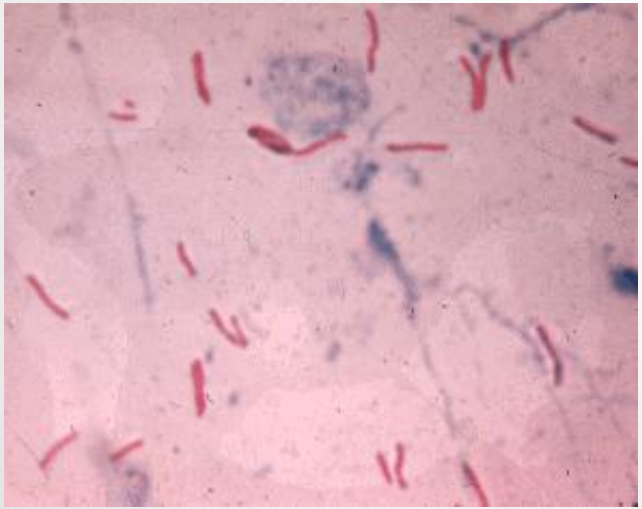

Cumulative cases
1 - 10
11 - 50
51 - 500
501 and more
Total:
59 814 cases
263 deaths
Chinese Taipei has reported 61 confirmed cases of influenza A (H1N1) with 0 deaths. Cases from Chinese Taipei are included in the cumulative totals.
The boundaries and names shown and the designations used on this map 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

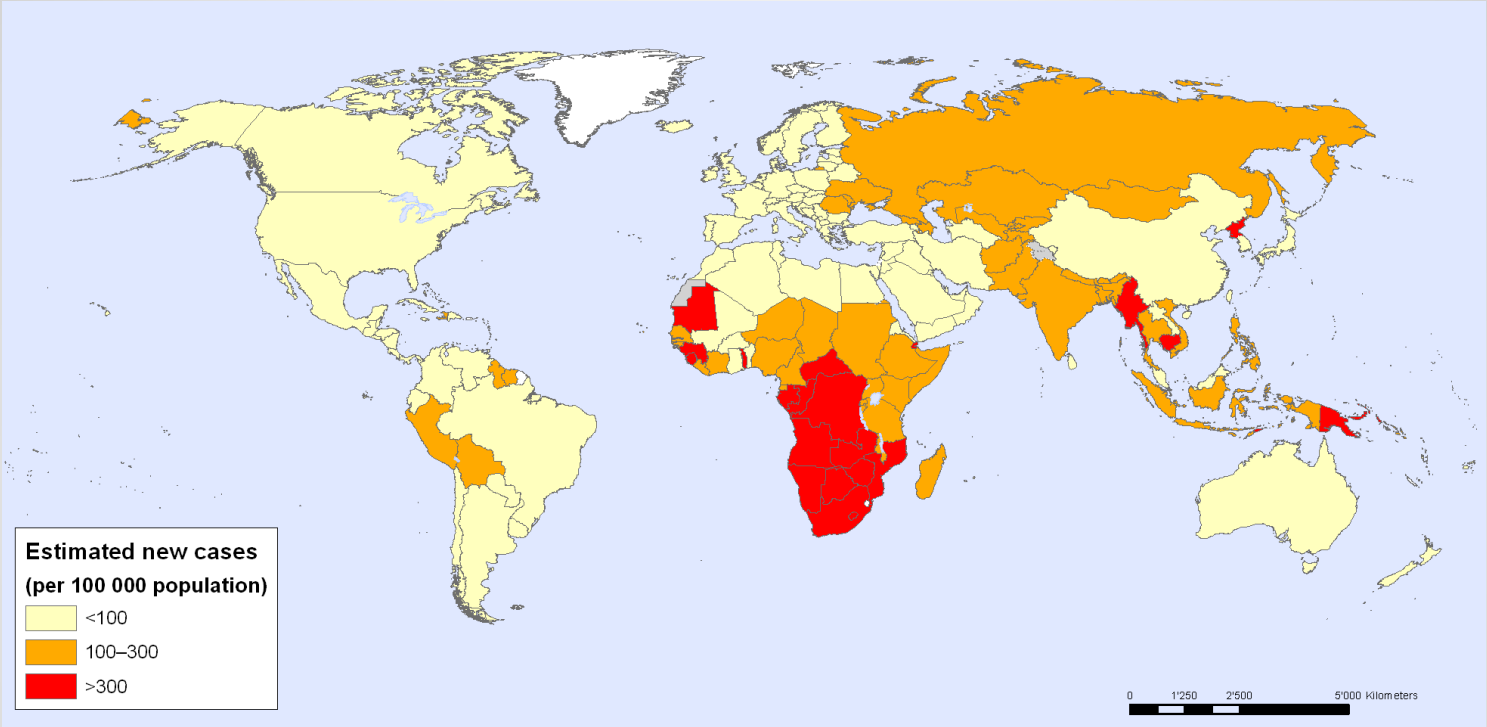
INFLUENZA

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?





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, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

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

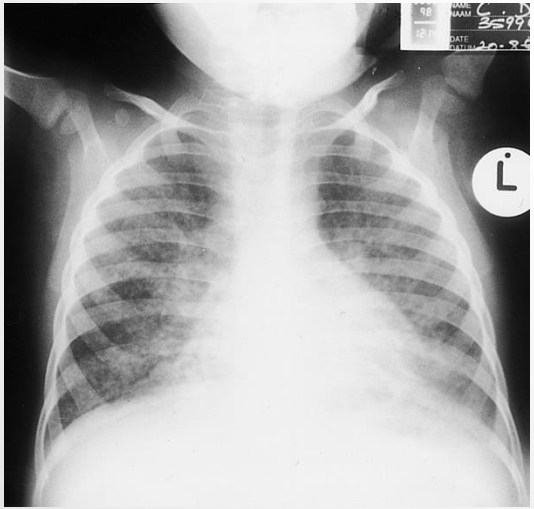
World Health Organization

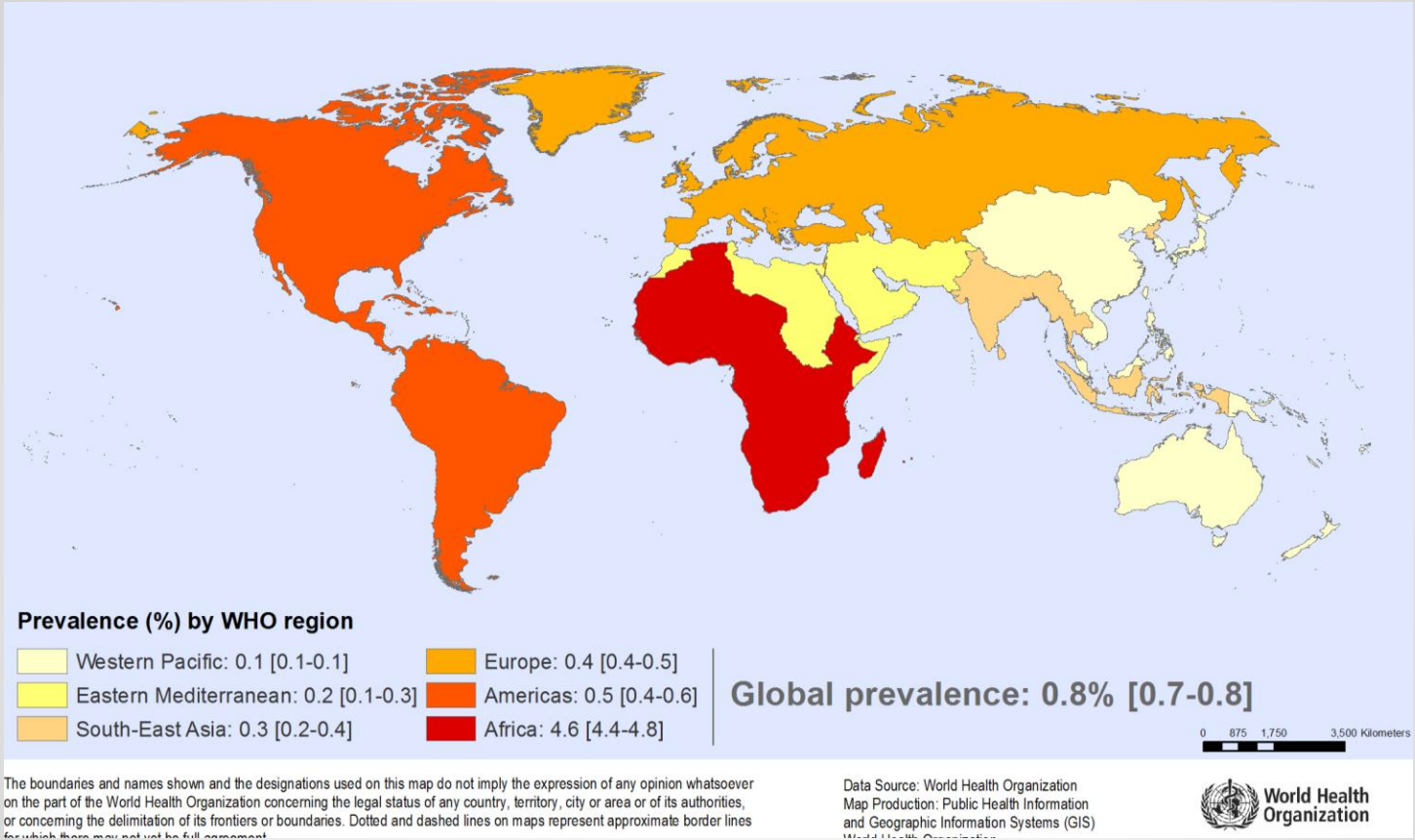
TUBERCULOSIS INCIDENCE

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:

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

HOW TO FURTHER NARROW THE DIAGNOSIS?

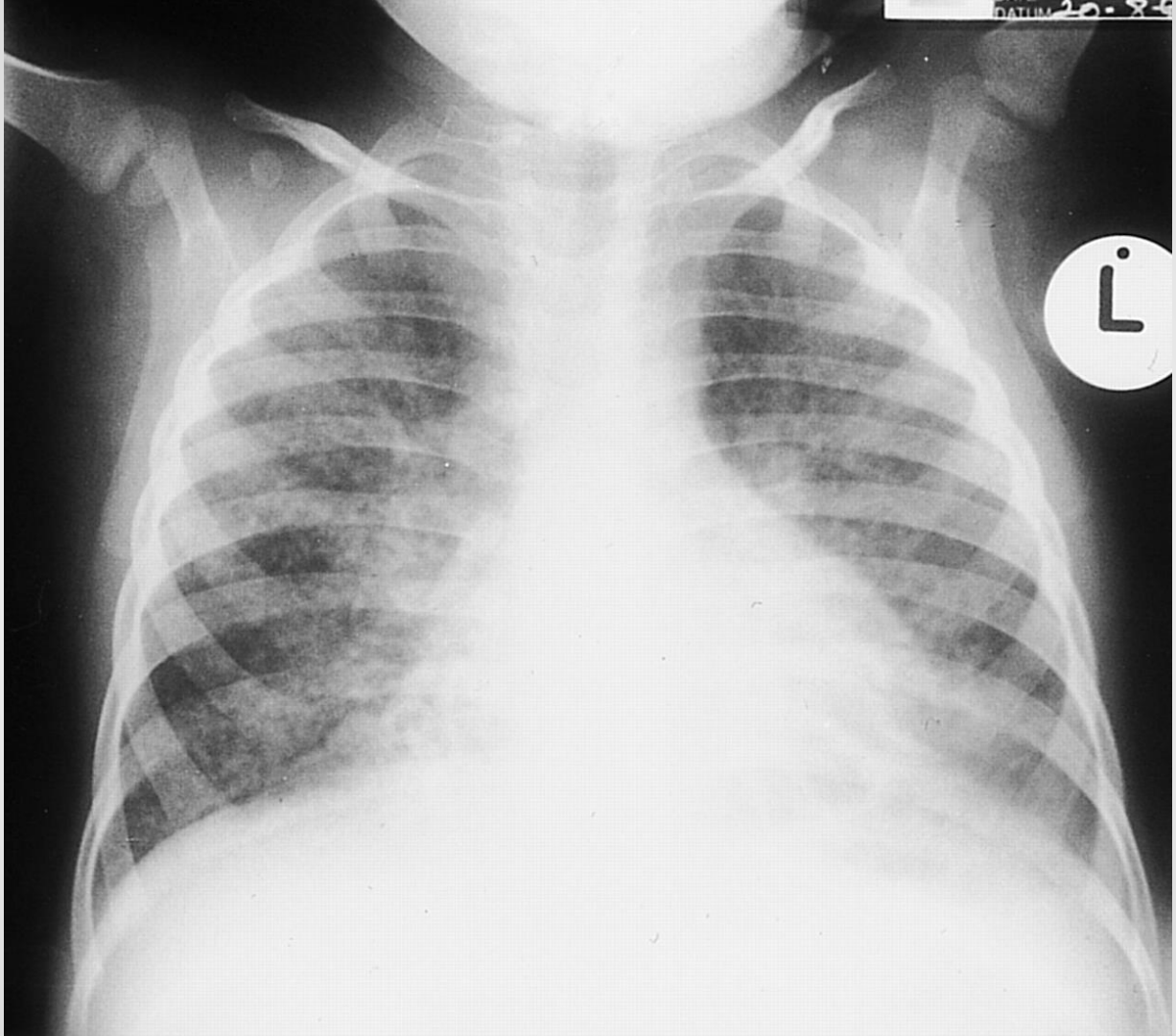
Consider:

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

WHAT BASIC TESTS WOULD YOU RECOMMEND?

Consider:

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

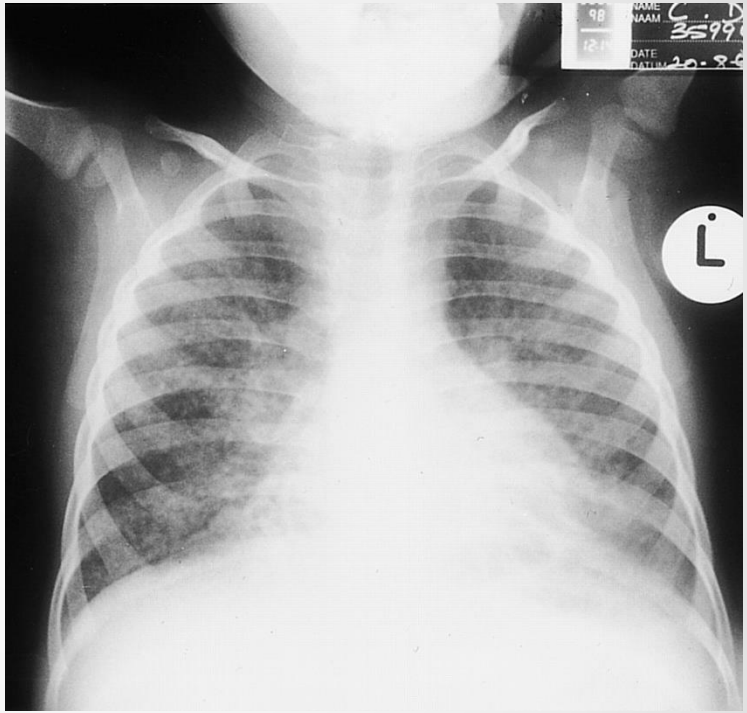

L


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

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.

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

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 the above

E. None of the above

COURSE EVAL AND CONTINUING EDUCATION CREDIT CLAIMS

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

EQUIP YOURSELF TO BETTER SERVE FORGOTTEN PEOPLE

INMED | INSTITUTE FOR INTERNATIONAL MEDICINE

Nicholas Comninellis, MD, MPH, DIMPH
+1 816-444-6400, nicholas@inmed.us

www.inmed.us