

CHILD HEALTH CASE STUDIES



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President & Professor
Institute for International Medicine



**COURSE EVAL AND CONTINUING
EDUCATION CREDIT CLAIMS**



Forgotten People



Syrians seeking refuge



Turkey-Syria Earthquake



JOHN MOORE/GETTY IMAGES EUROPE/GETTY IMAGES

Ebola in Congo



“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?



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MEDIA

MEDICINE

COMMUNITY DEVELOPMENT

DISCIPLESHIP

REACH BEYOND

SO THAT THEY CAN

HEAR ABOUT JESUS,
SEE

AND



Despite Free Medication, Socioeconomic and COVID-19 Pandemic-Related Barriers Limit HIV Care in Rural Western Kenya

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Abstract

Western Kenya has a relatively high burden of HIV (12.4% in 2017) and a rural Western Kenyan community identified significant socioeconomic barriers to receiving HIV-related care (1). The surveyed 10 rural Kenyan patients in this study identified the following barriers to receiving HIV-related care: lack of transportation, lack of money for transportation, lack of money for medication, lack of money for food, lack of money for housing, lack of money for clothing, lack of money for education, lack of money for health care, lack of money for other needs, and lack of money for other needs. We found that socioeconomic barriers were common barriers, and transportation barriers were common barriers. Also, most respondents reported they had increased difficulty receiving HIV care during the COVID-19 pandemic, with the majority experiencing multiple barriers to care.

Objectives

This study aimed to identify trends in socioeconomic barriers that contribute to HIV (syndromic treatment) use. Additionally, we aimed to identify trends in COVID-19 pandemic-related barriers that contribute to HIV (syndromic treatment) use. This study also aimed to identify any other barriers that occurred during the COVID-19 pandemic, which contributed to HIV use adherence. Our hypothesis was that HIV socioeconomic barriers identified in the 2017 study period and that the COVID-19 pandemic has exacerbated existing barriers and created new barriers to HIV adherence in this community.

Introduction

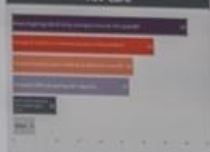
A previous study performed by KCU students in 2017 at the Mary Wabura Memorial Health Center in Mary Wabura, Kenya found that socioeconomic barriers, including illness/fatigue, weather/transport problems, and food insecurity were the largest barriers to HIV adherence for HIV-positive patients in this community (1). Additionally, a 2010 study of 100 HIV-positive patients living in an urban informal settlement within Nairobi, Kenya found that patients experienced decreased ability to access and take their ART and sometimes avoided healthcare facilities due to fear of contracting COVID-19 (2). The Mary Wabura community is a rural community with high prevalence of HIV. The HIV patients living in this community are an ideal population to study for trends in patient perceived socioeconomic barriers to HIV adherence and impacts of the COVID-19 pandemic on care.

Data and Methods

After obtaining KCU IRB approval, we developed a retrospective patient survey in order to identify barriers to HIV use adherence including transportation, financial, social stigma, and work/family responsibilities. The survey also contained questions regarding impacts of the COVID-19 pandemic on HIV adherence. Surveys were offered to patients presenting to Mary Wabura for either HIV clinic or normal sick clinic who were between HIV+ and at least 18 years of age. Surveys were administered in English or Kiswahili depending on patients' preferred language.



COVID-19 Pandemic-Related Barriers to HIV Care



Results

We asked participants what challenges they have had in obtaining and taking their ART, and the most common challenge reported was lack of money (50.0%, n=10). Patients reported that lack of money for transportation (50.0%, n=10), and money for medication (40.0%, n=8) were the most common challenges. Although ART itself is offered for free in Kenya (3), only 75.0% (n=15) of respondents reported they did not pay for treatment, and 34.0% (n=7) of respondents said their treatment was free expense.

When asked about responsibilities that made it difficult to get HIV-related care, 50.0% (n=10) of respondents reported they had issues with transportation or weather. 50.0% (n=10) reported they could not leave their children, and 50.0% (n=10) reported they could not leave their children. The most common transportation method reported was walking (70.0%, n=14), riding a bike (30.0%, n=6), and taking a taxi (10.0%, n=2). 57.0% (n=11) of respondents reported being 5-10 km from the clinic, 34.0% (n=7) reported being 5-10 km from the clinic, 34.0% (n=7) reported being 11-20 km from the clinic, and 11.0% (n=2) reported being more than 20 km from the clinic.

We asked several questions in relation to the impact of the COVID-19 pandemic on ability to receive HIV care and ART. 84.0% (n=17) reported that the COVID-19 pandemic made it more difficult to receive care (medication, 71.0% (n=14) reported they felt afraid to seek HIV care or ART at clinic because of concerns for falling sick with COVID-19. The most common reasons cited as challenges that made receiving HIV care and ART medications more difficult during the COVID-19 pandemic were: afraid of becoming ill with COVID-19 by coming to clinic (70.0%, n=14), feeling isolated or alone during the pandemic (50.0%, n=10), financial difficulty making it hard to afford care/ART medications (40.0%, n=8), and difficulty obtaining ART medications regularly (34.0%, n=7).

Main Recommendations: 18
Patients Recommended: 18
Declined or Non-Reply: 2

87.0% (n=17) had at least one child
12.0% (n=2) had no children



Discussion and Conclusions

Impacted by the 2017 study of the same community, our study found socioeconomic barriers and some new barriers. In the 2017 study, the three largest socioeconomic barriers identified were food security, lack of money for ART up medication, and transportation/health concerns. Our study found that socioeconomic barriers remained the same across both studies. Multiple respondents reported they need a formal education support program for HIV patients. HIV clinic staff reported that although having HIV was not a negative thing, with proper follow-up, most HIV patients do not qualify. The Kenyan Ministry of Health's National ART & HIV Testing Programme includes a national window office (4), but it seems that not all Mary Wabura community has reached that level of support for HIV patients.

A significant difference between our study and the 2017 study was with reporting of stigma related to HIV. In the 2017 study, 50.0% (n=10) of respondents reported they felt afraid to seek HIV care or ART at clinic because of concerns for falling sick with COVID-19. In the 2017 study, 50.0% (n=10) of respondents reported they felt afraid to seek HIV care or ART at clinic because of concerns for falling sick with COVID-19. In the 2017 study, 50.0% (n=10) of respondents reported they felt afraid to seek HIV care or ART at clinic because of concerns for falling sick with COVID-19.

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

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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

NICHOLAS COMNINELLIS MD, MPH, DIMPH
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Donald Philgreen

DONALD PHILGREEN, MD
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HANDS-ON SKILLS COURSES





Newborn Resuscitation



Wound Care



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- Pakistan
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SUPERVISED SERVICE-LEARNING IN MEDICINE, NURSING AND PUBLIC HEALTH

The Americas

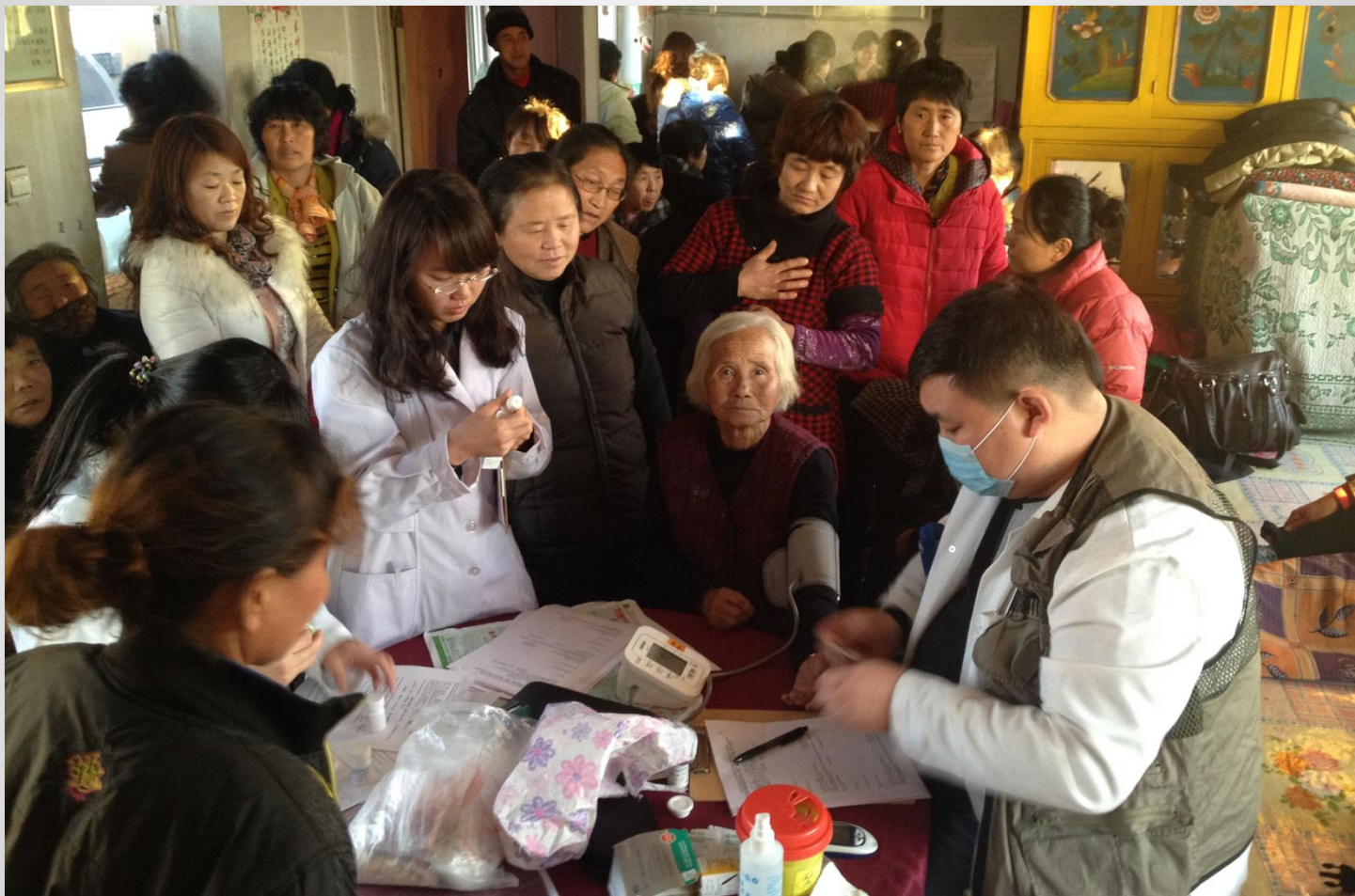
- Dominican Rep.
- Ecuador
- Guatemala
- Haiti
- Honduras
- USA

Middle East

- Jordan
- United Arab Emirates



Clinica Evangelica
Morava, Honduras







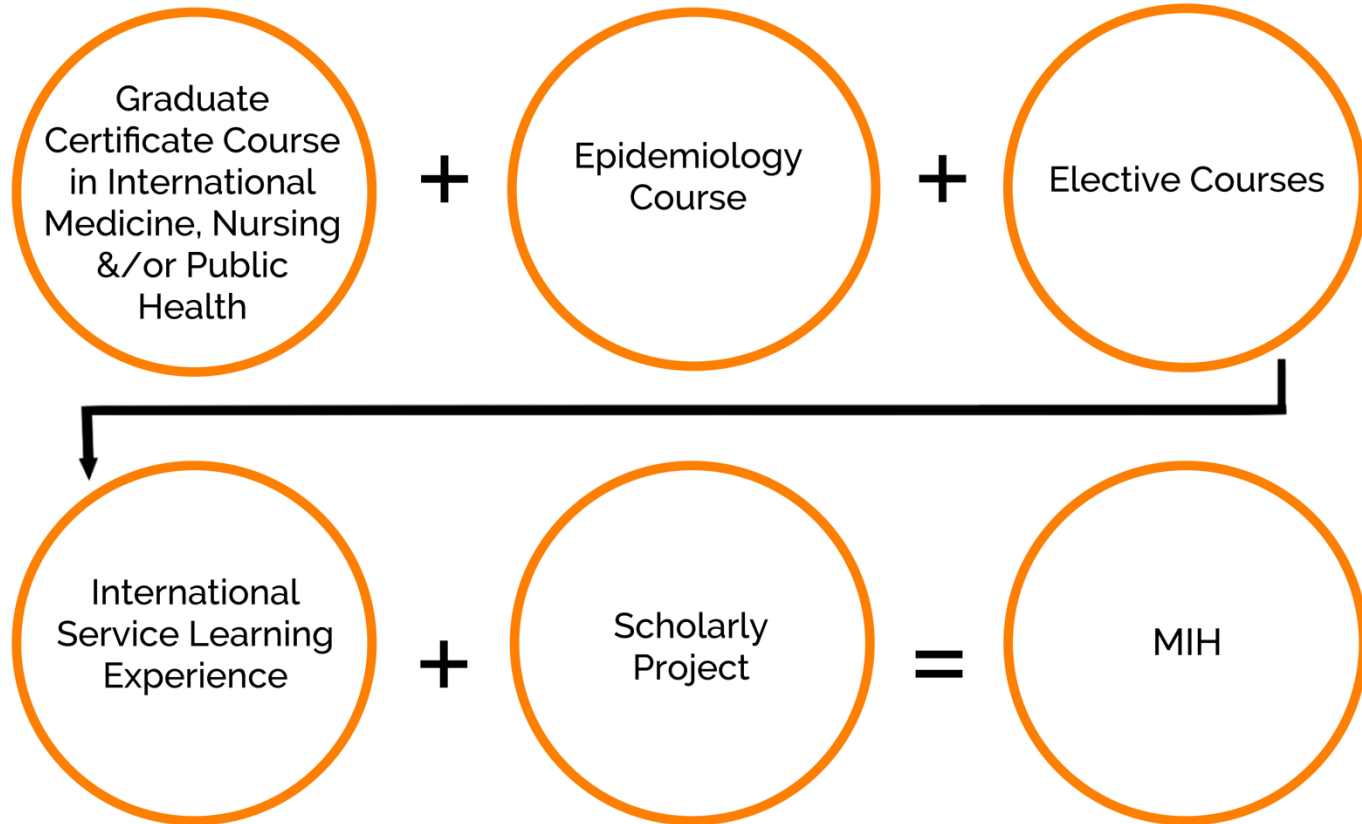




MIH

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

A person is lying in a bed, appearing to be asleep or resting. They are wearing a white t-shirt and white shorts with three dark stripes down the side. A red cloth is wrapped around their head like a headband. The background is a bright yellow wall with green palm tree silhouettes on either side. The overall scene suggests a tropical or vacation setting.

**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?



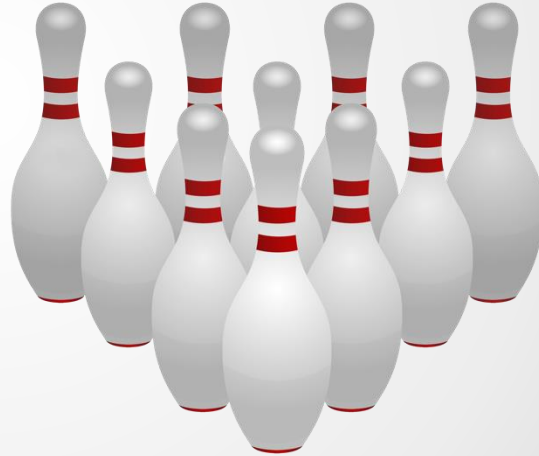
WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?



ACUTE TROPICAL FEVER DIFFERENTIAL DIAGNOSIS

Consider:

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



HOW CAN YOU NARROW THIS DIFFERENTIAL?

Consider:

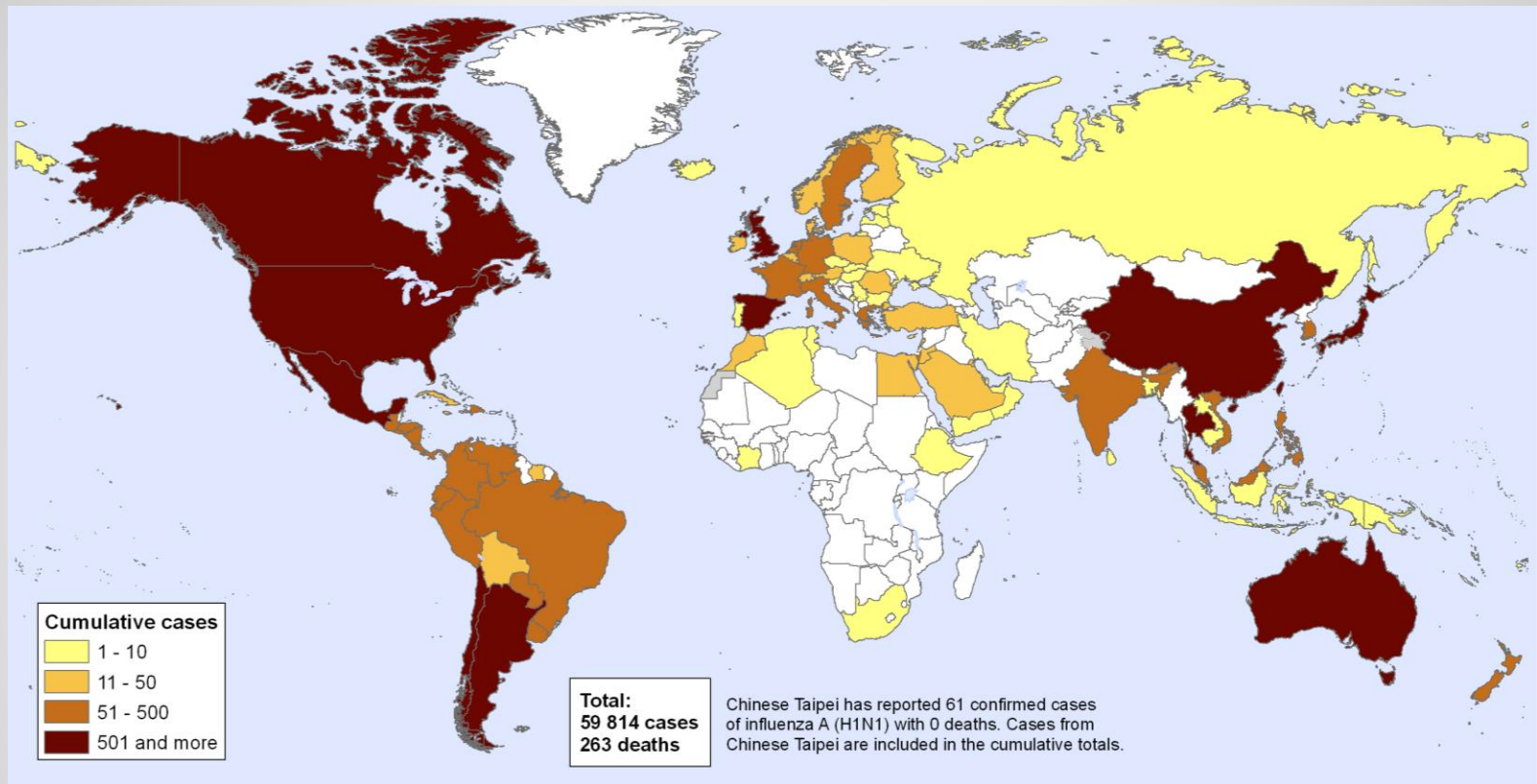
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- Malaria
- West Nile Virus



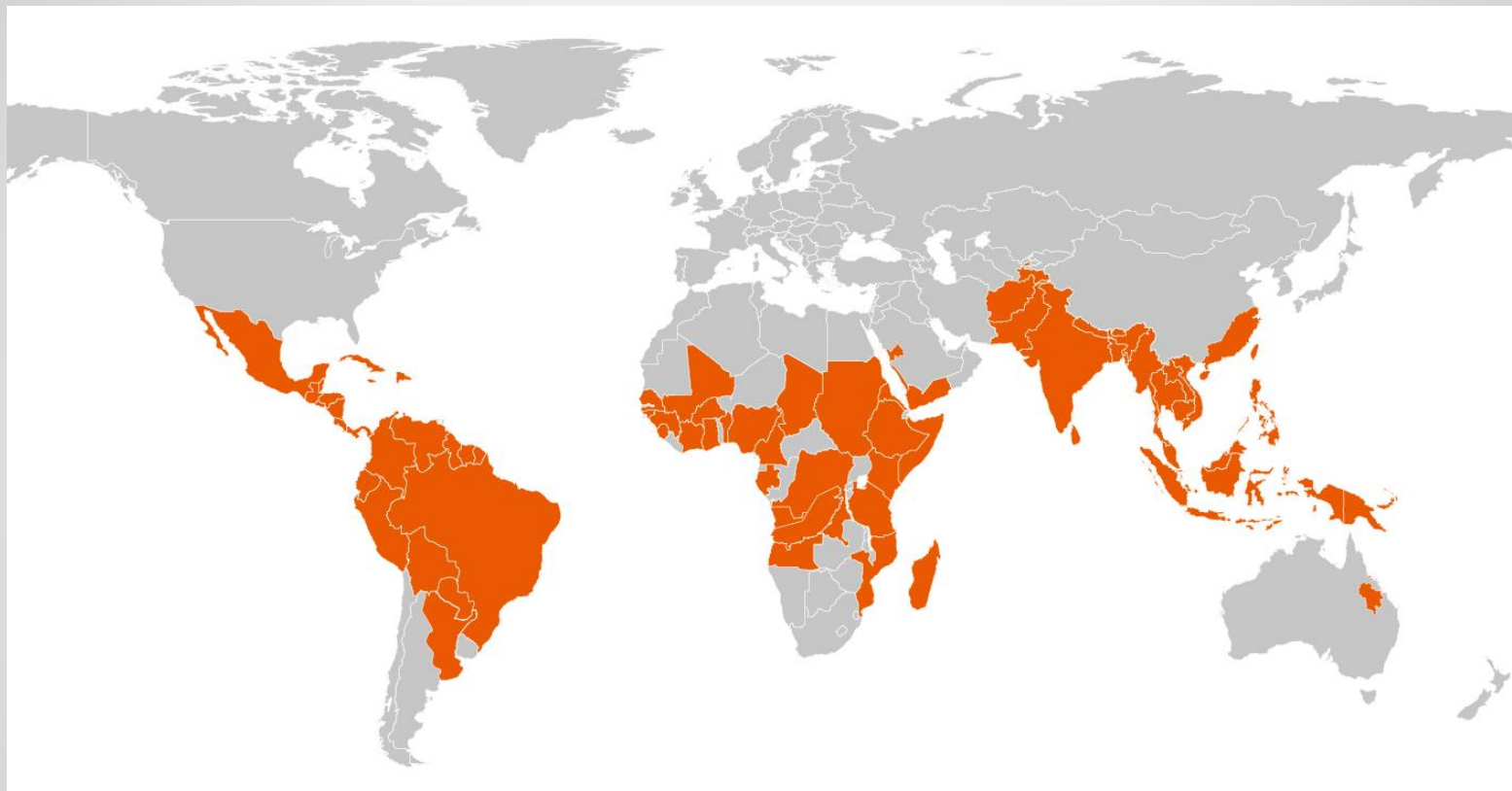
FIRST CONSIDER GEOGRAPHY & EPIDEMIOLOGY



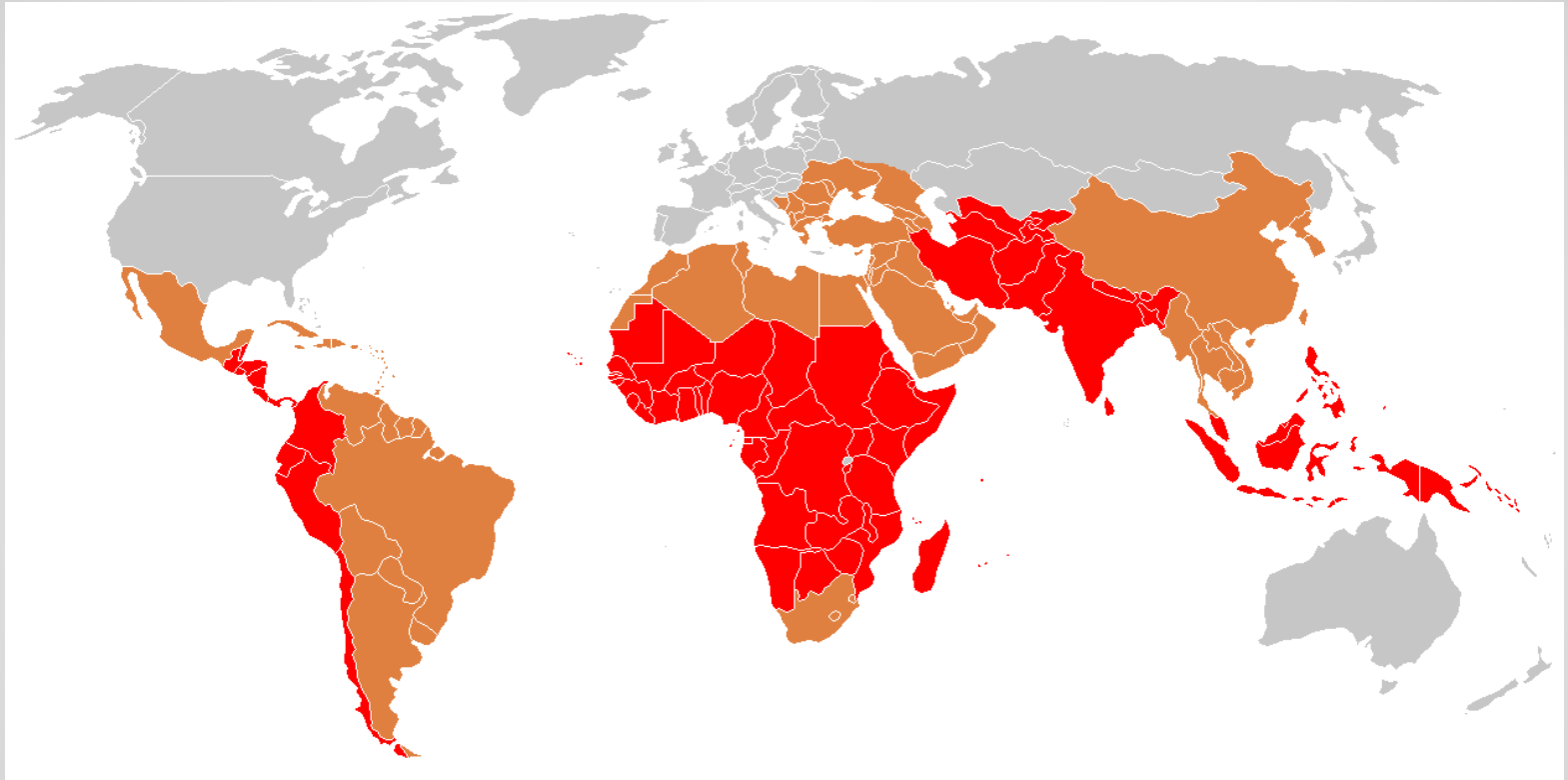
*Note: Many developing nations do not
have reliable health statistics*



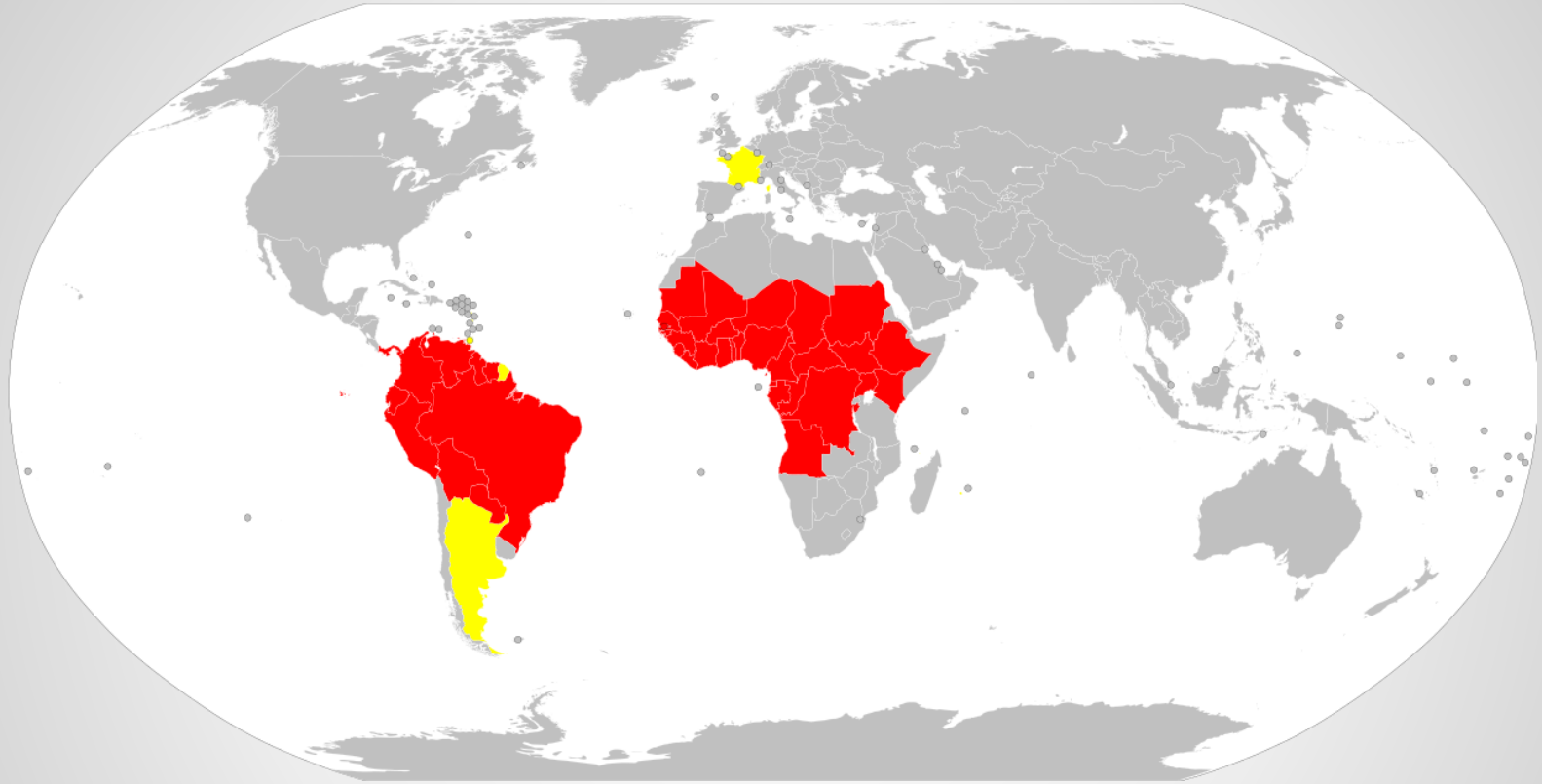
INFLUENZA INCIDENCE



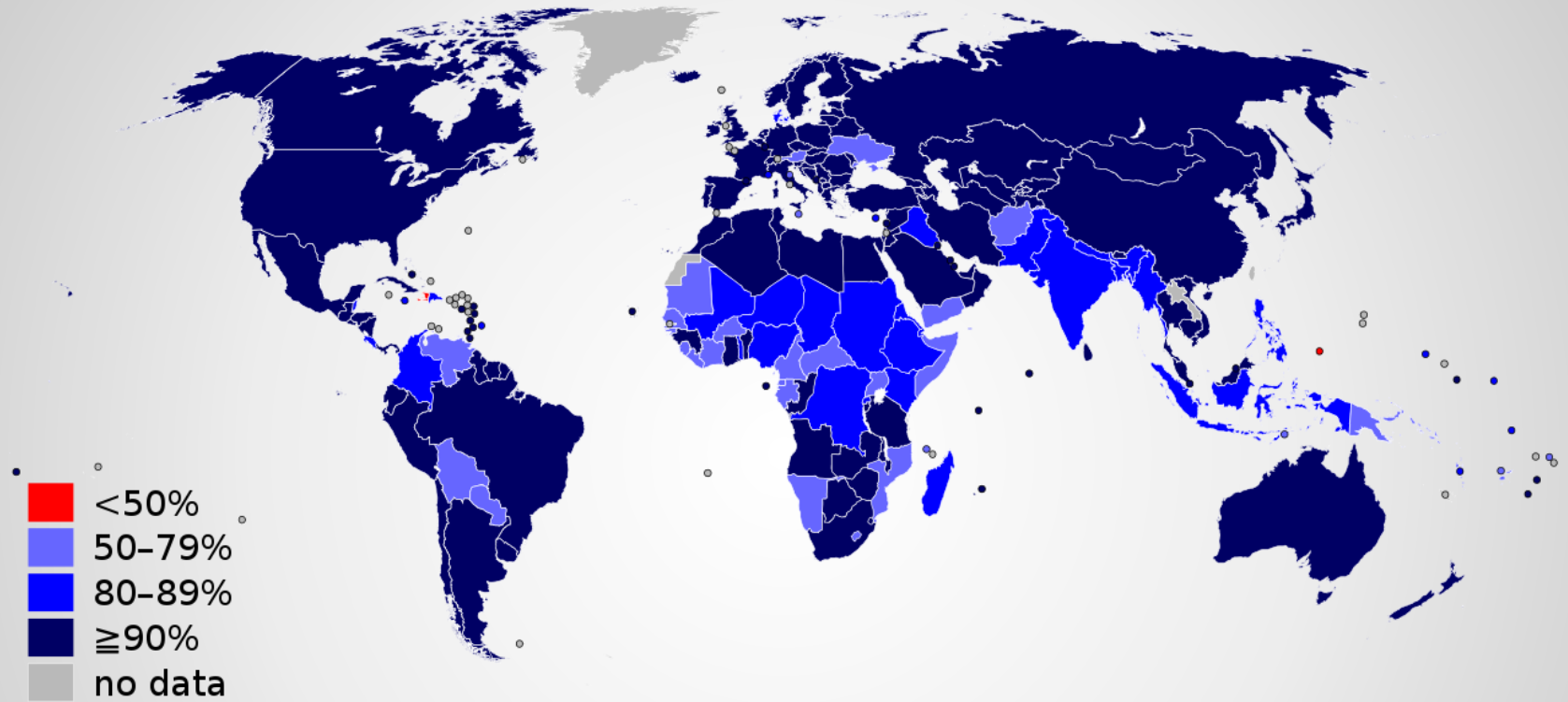
DENGUE INCIDENCE



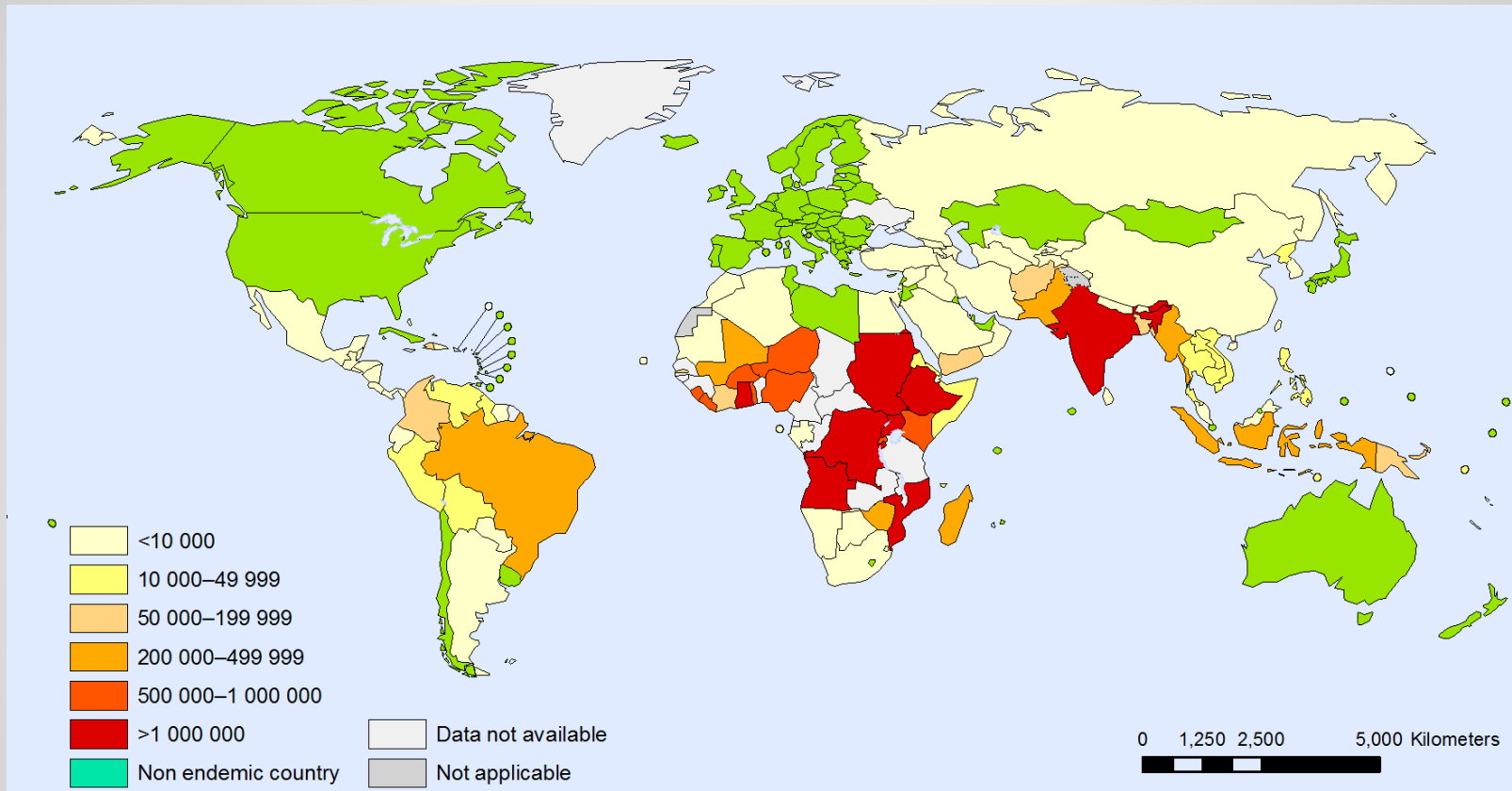
TYPHOID INCIDENCE



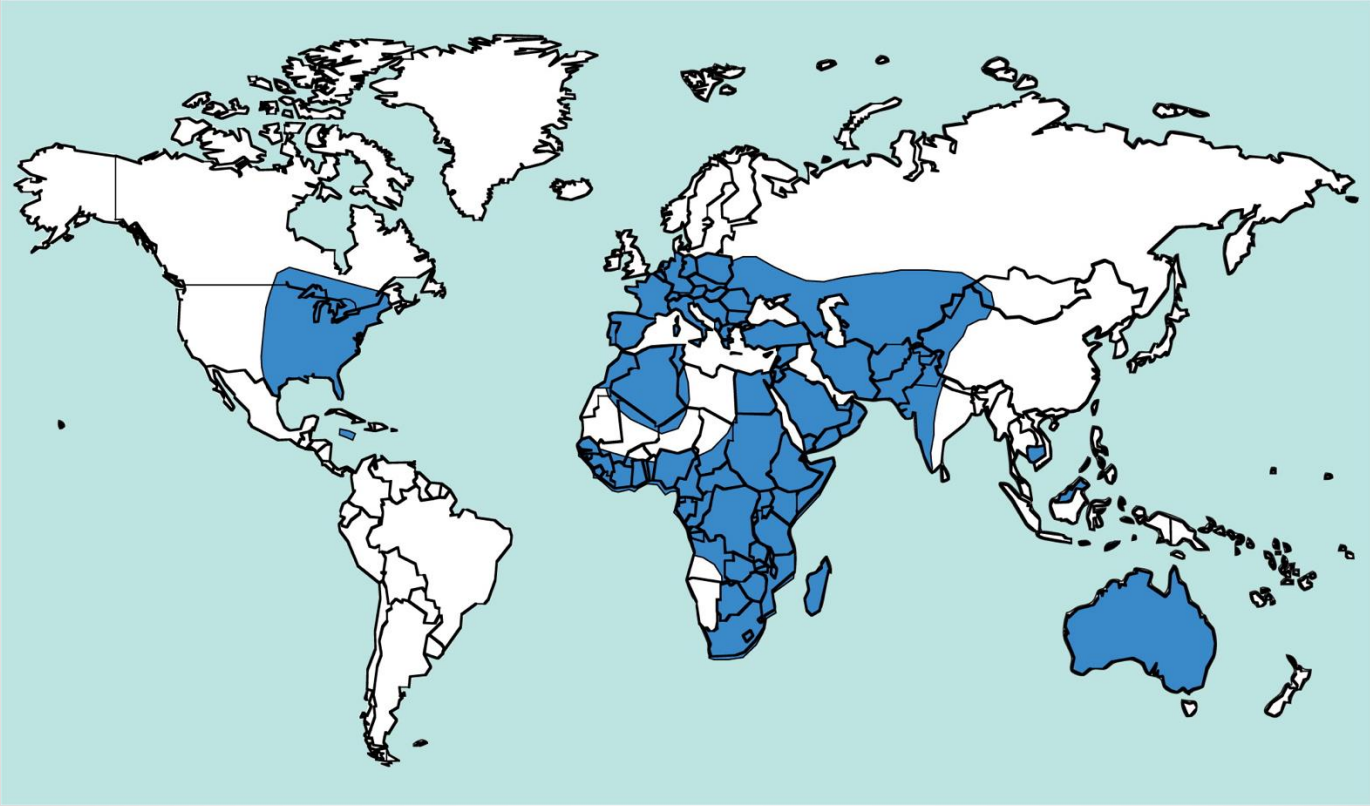
YELLOW FEVER INCIDENCE



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 nasopharynx 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

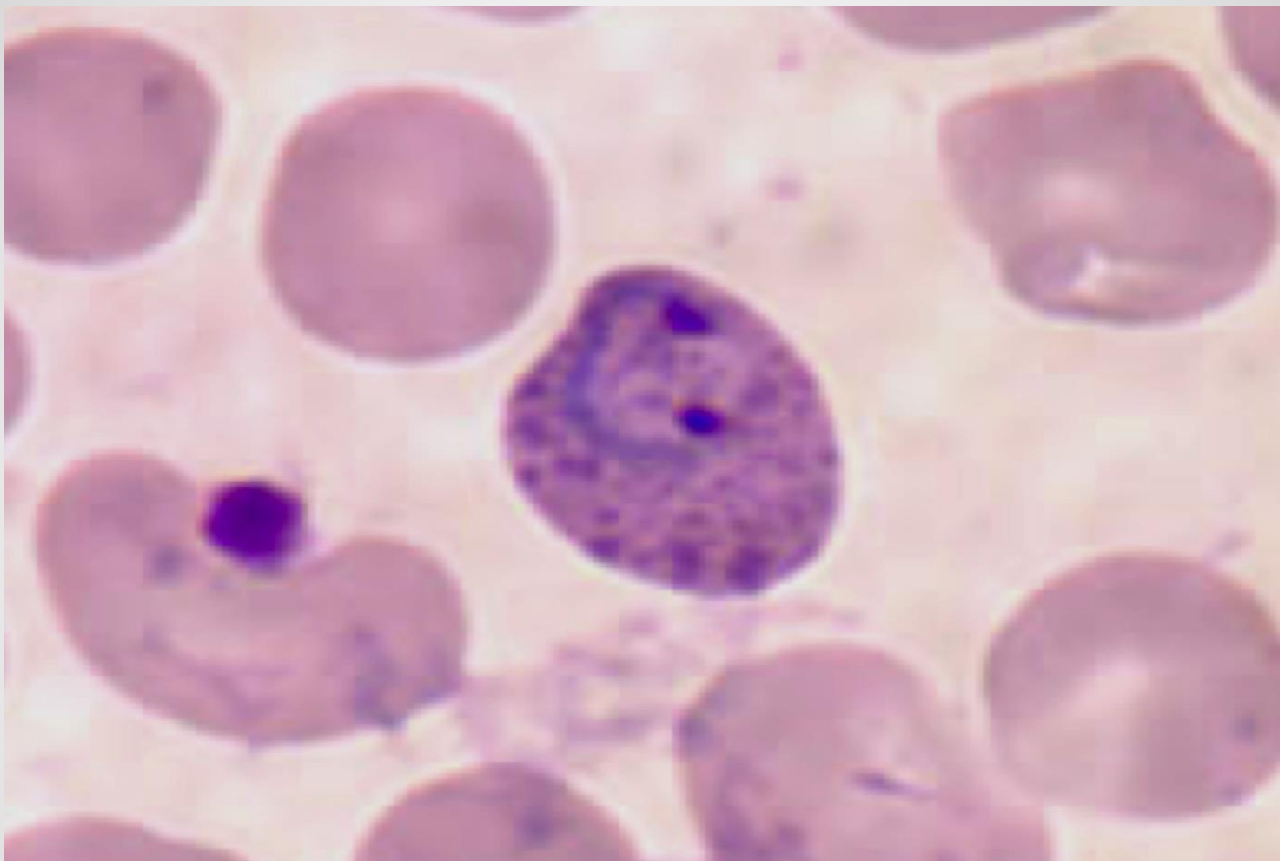


- Hemoglobin: 9
- White blood cells: 12,000 with bands 10%, polys 45%, lymphs 35%, eos 10%
- Platelets: 45,000

WHAT ARE TESTS FOR MALARIA?

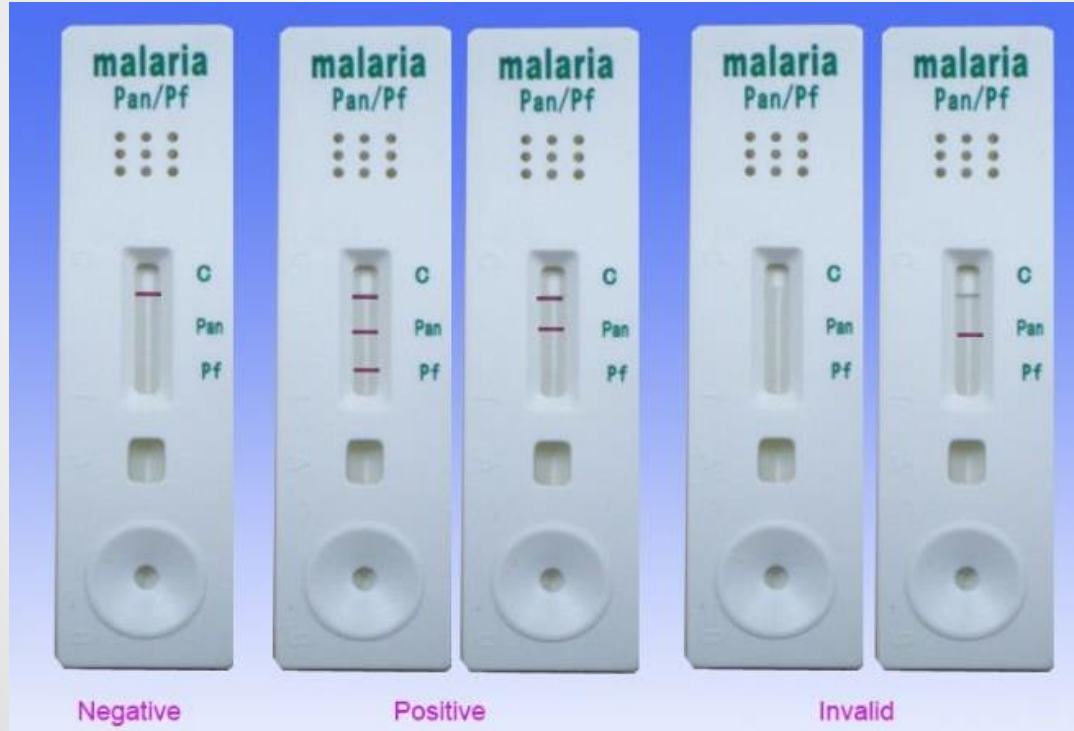
MALARIA TESTS

- 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

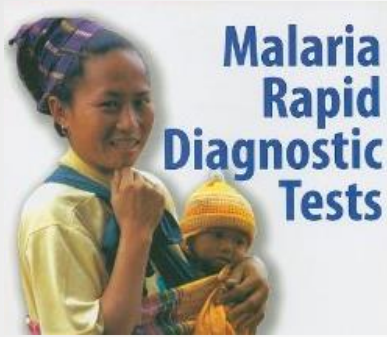
Pros:

- 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-steroidal 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?



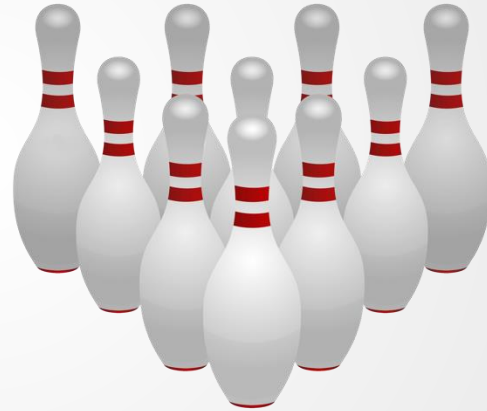
WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?



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

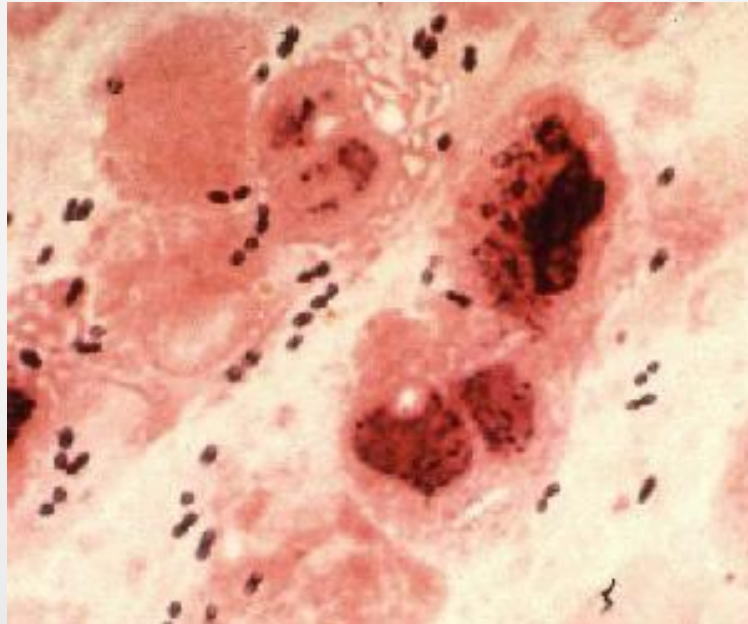
Disease or Injury	Percentage of Total DALYs Lost
Lower respiratory infection	9.7
Diarrheal diseases	6.9
Malaria	5.1
Preterm birth complications	5.1
HIV/AIDS	5.0
Birth asphyxia & birth injury	4.9
Congenital anomalies	3.2
Road injury	3.0
Neonatal sepsis & infections	2.7
Tuberculosis	2.5

PEDIATRIC PNEUMONIA & BRONCHITIS

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

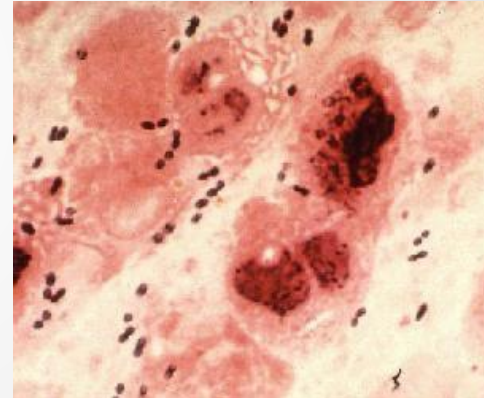


WHAT ORGANISMS CAUSE PNEUMONIA & BRONCHITIS IN DEVELOPING NATIONS?

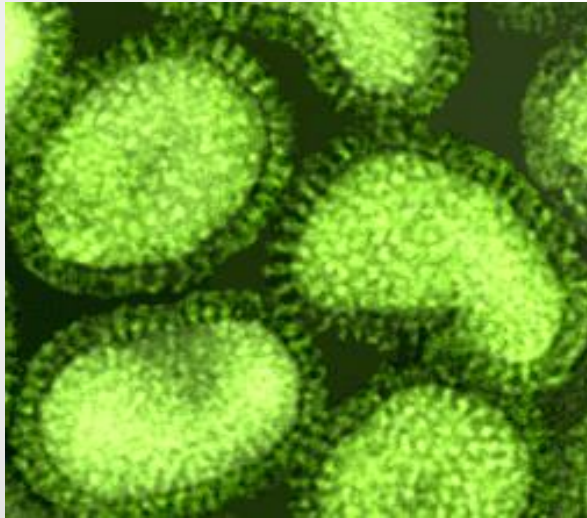


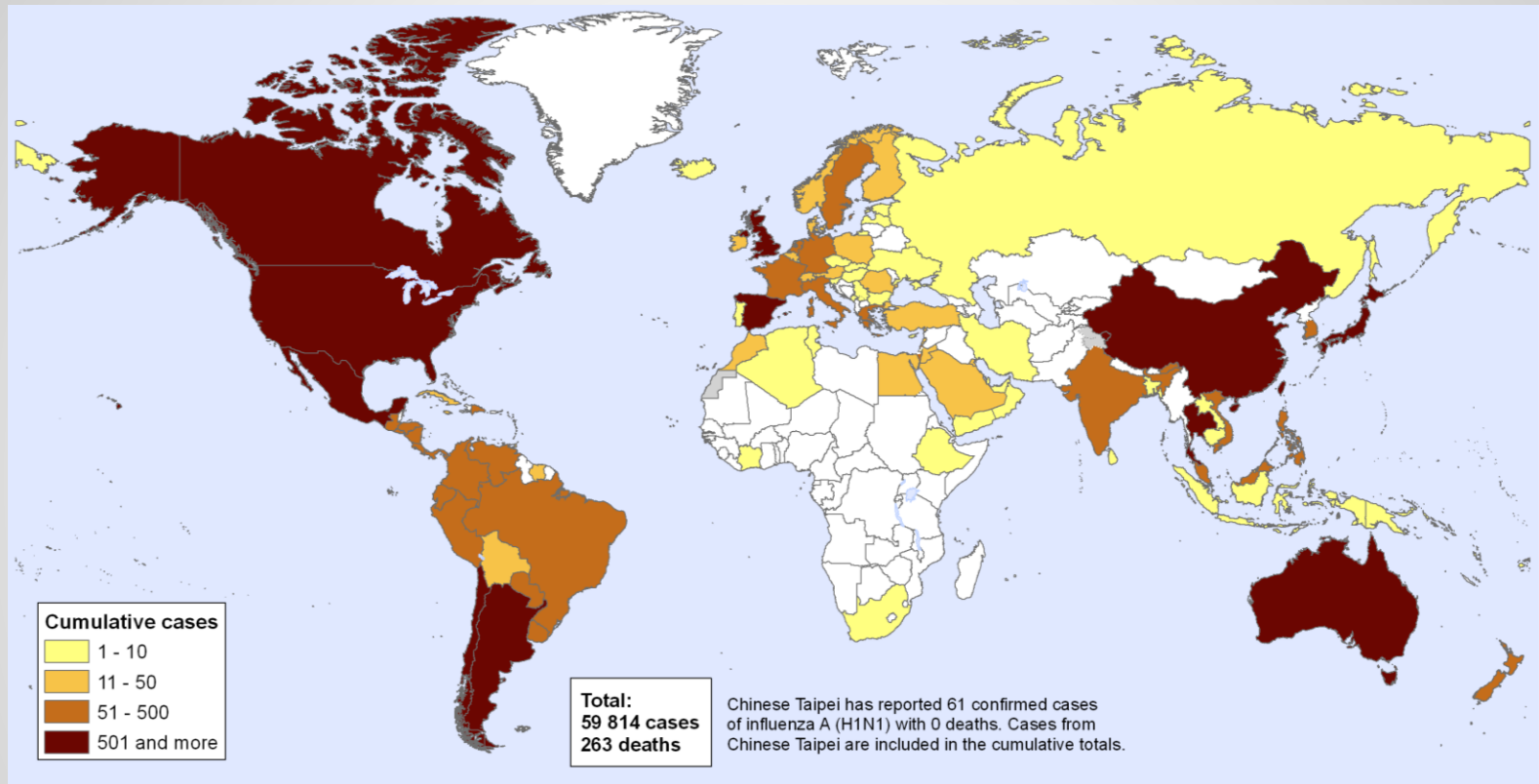
ORGANISMS CAUSING PNEUMONIA & BRONCHITIS

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



WHAT IS THE EPIDEMIOLOGY OF INFLUENZA?





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



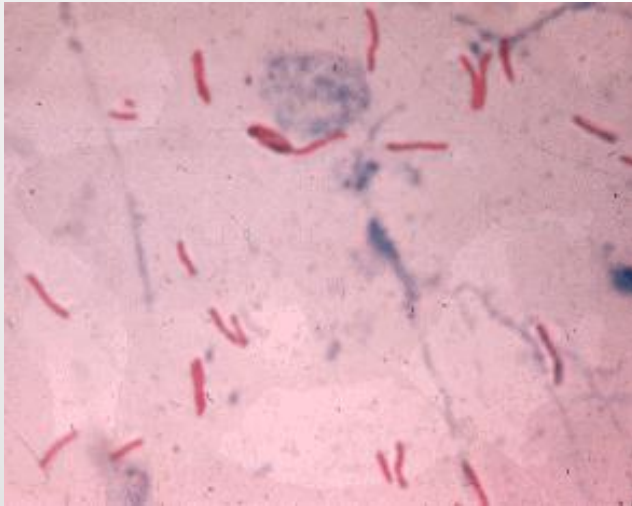
INFLUENZA

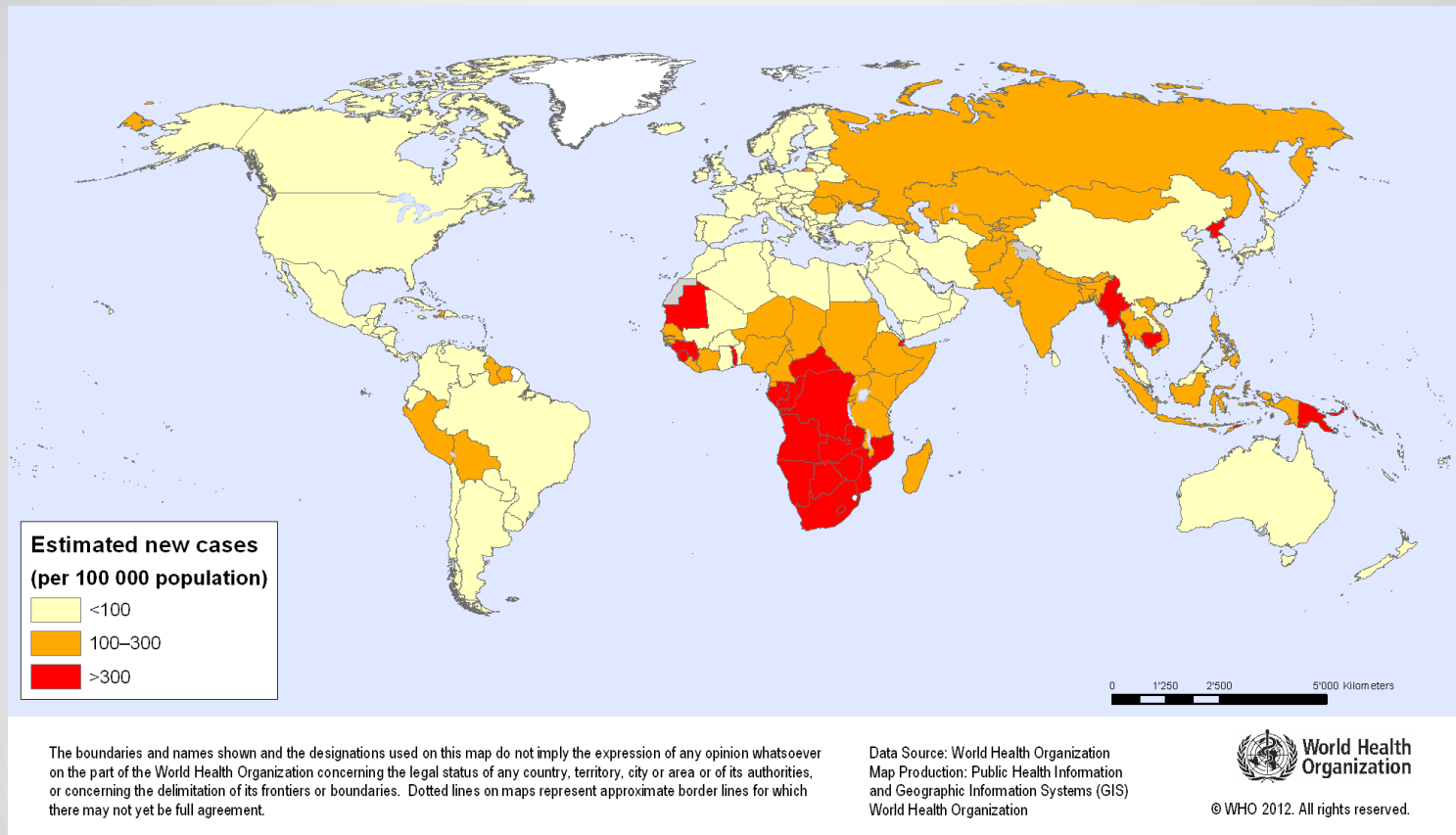
INFLUENZA PNEUMONIA

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



WHAT IS THE EPIDEMIOLOGY OF TUBERCULOSIS?



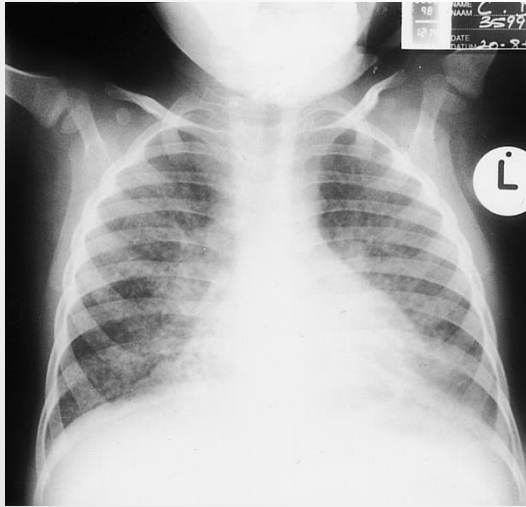


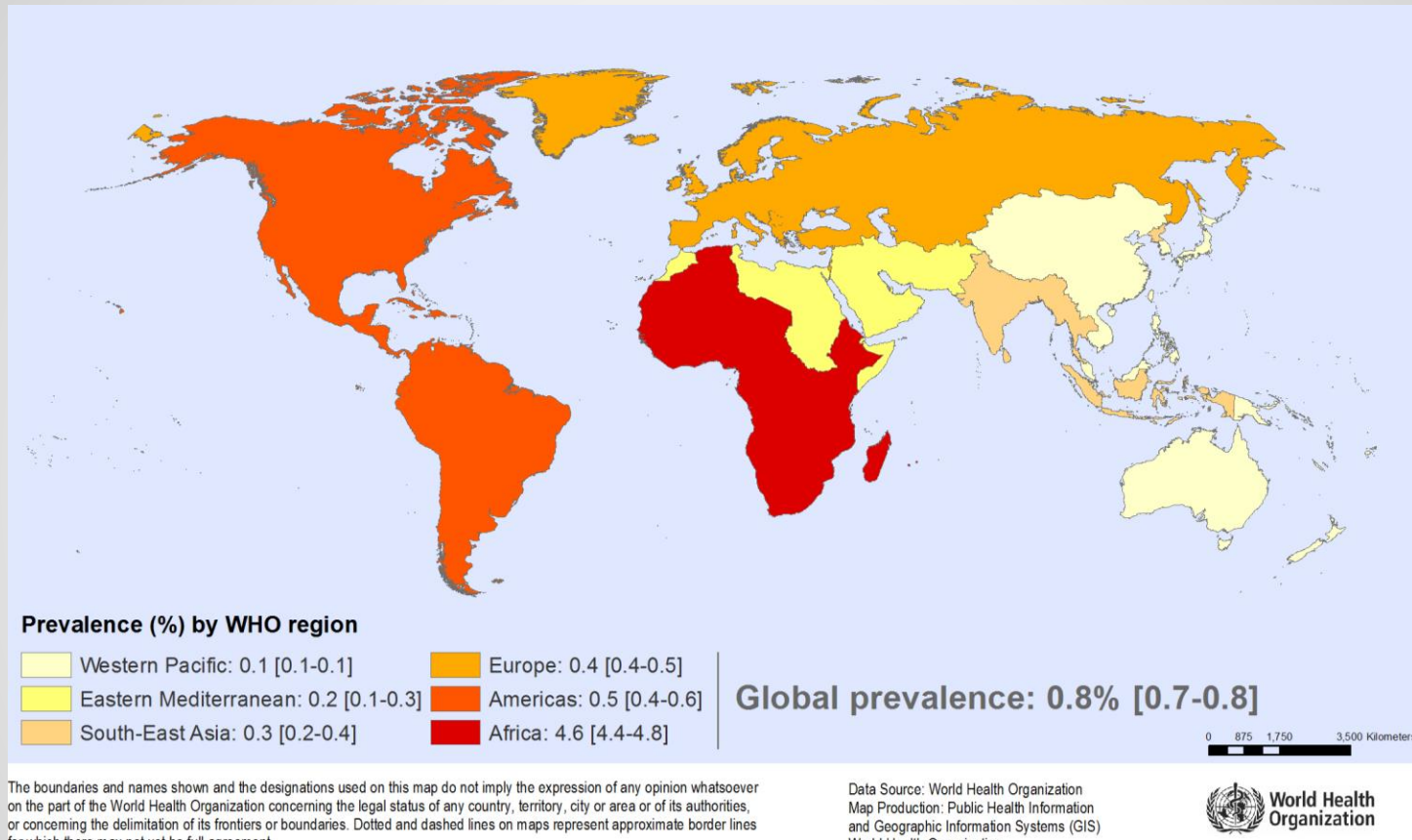
TUBERCULOSIS INCIDENCE

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?

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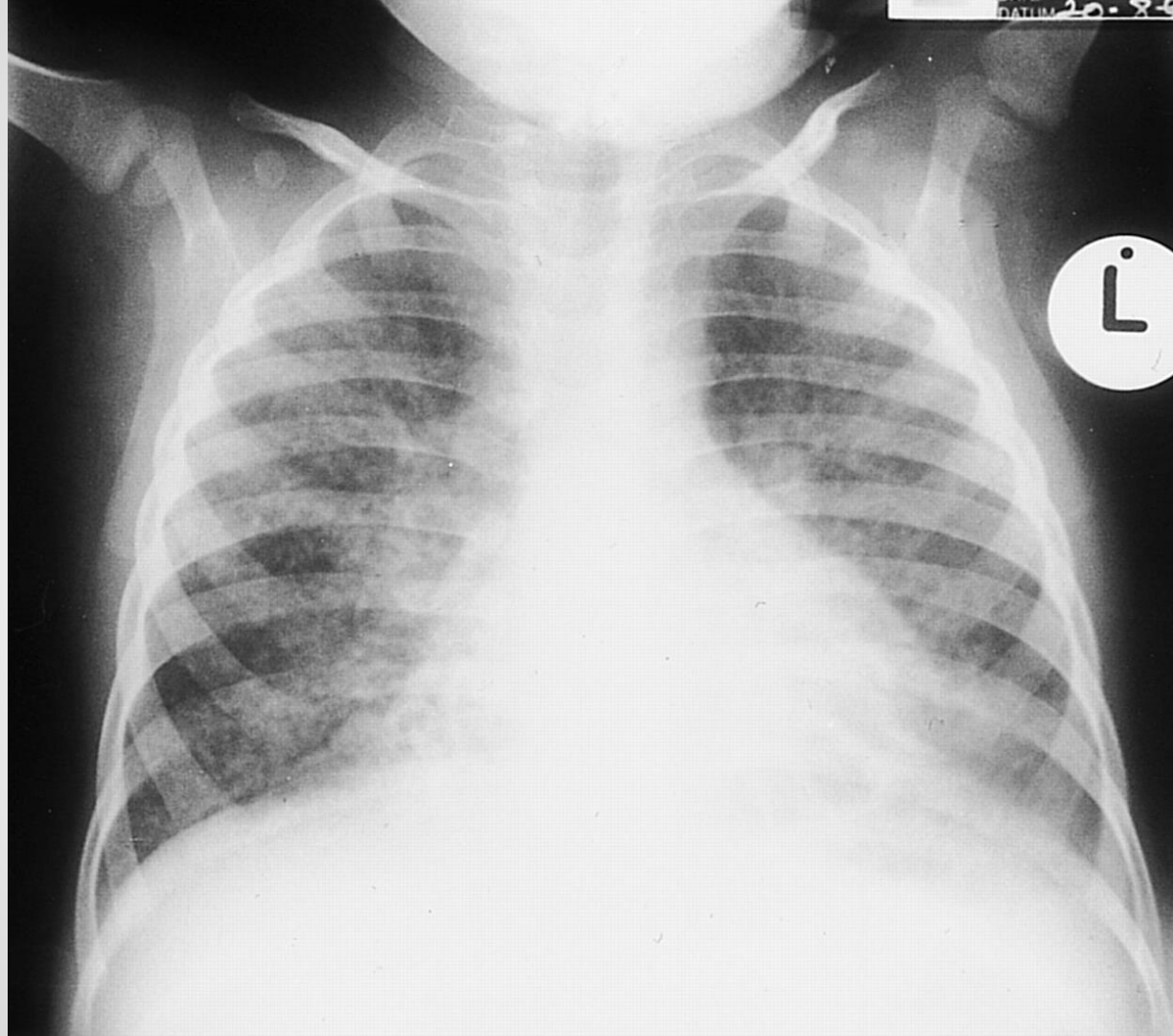


WHAT BASIC TESTS WOULD YOU RECOMMEND?

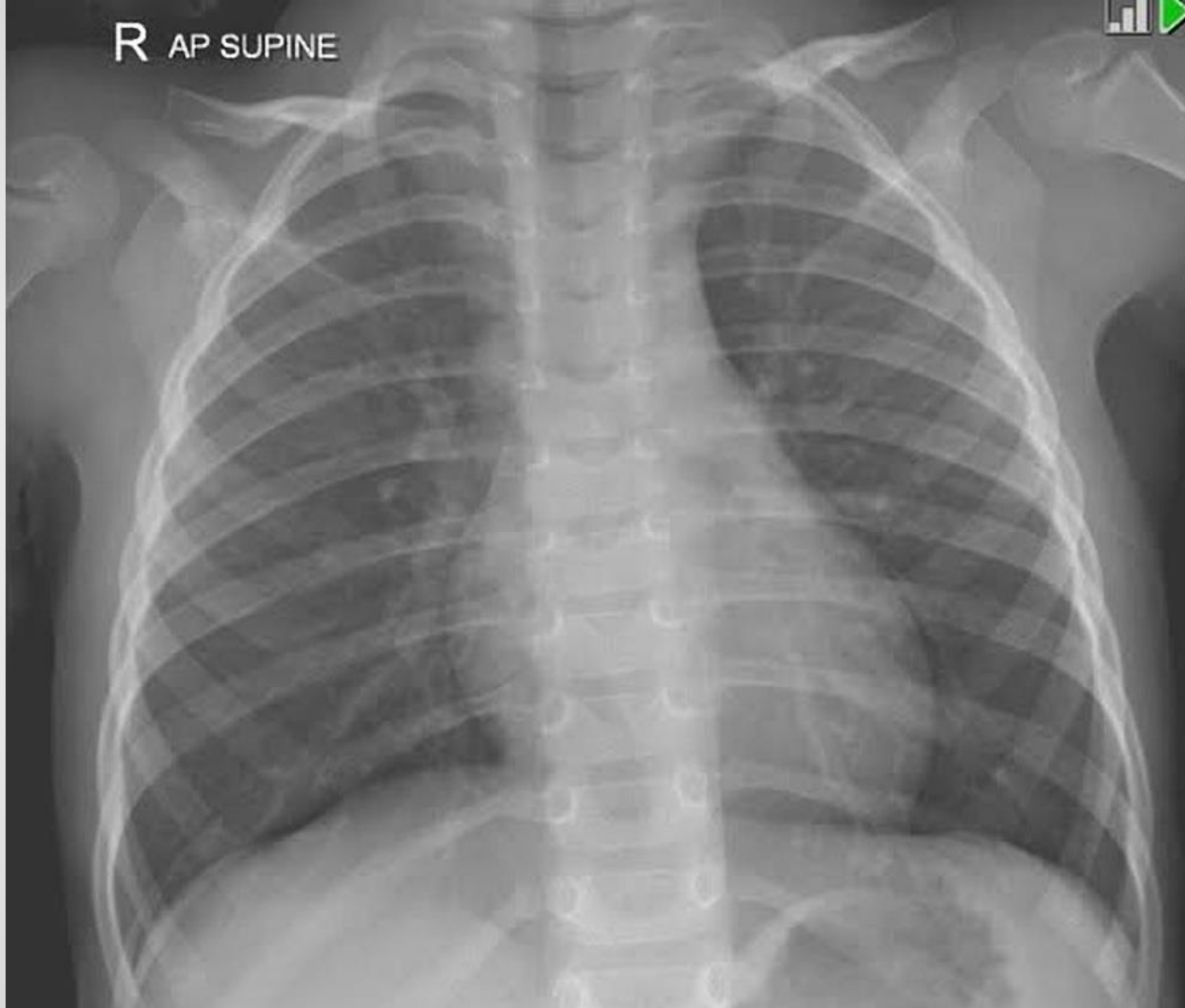
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R AP SUPINE

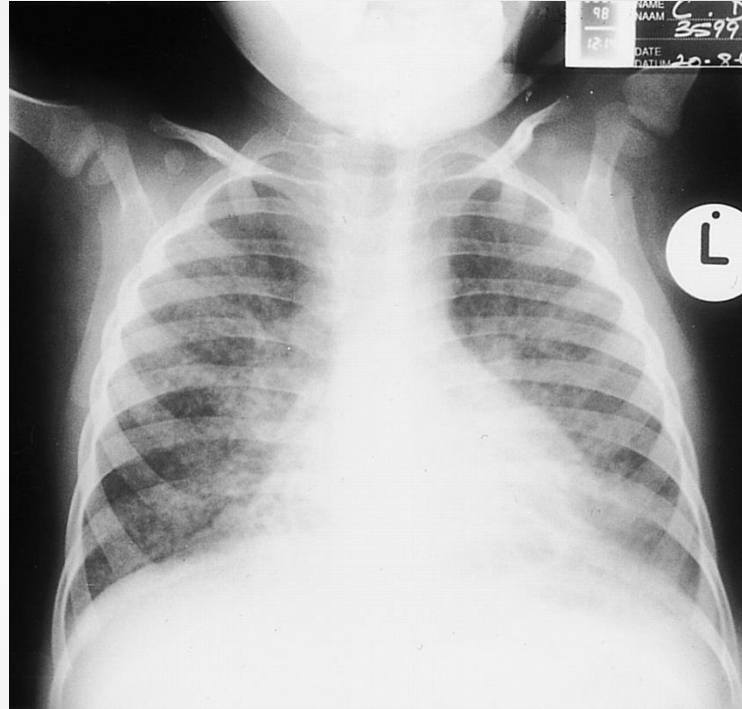


LABORATORY TESTS



- 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 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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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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