Project: Ghana Emergency Medicine Collaborative

Document Title: Communicable & Infectious Diseases Emergencies

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Priorities & Major Goals

- To properly assess the patient with an infectious disease emergency
- To properly identify the infectious disease emergency
- To understand the specific emergency management

Definitions

Communicable disease **:** an infectious disease transmissible by direct contact with an affected individual or the individual's discharges or by indirect means

Infectious Disease : a disease caused by the entrance into the body of organisms as bacteria, protozoans, fungi, or viruses

Parasitic Infections

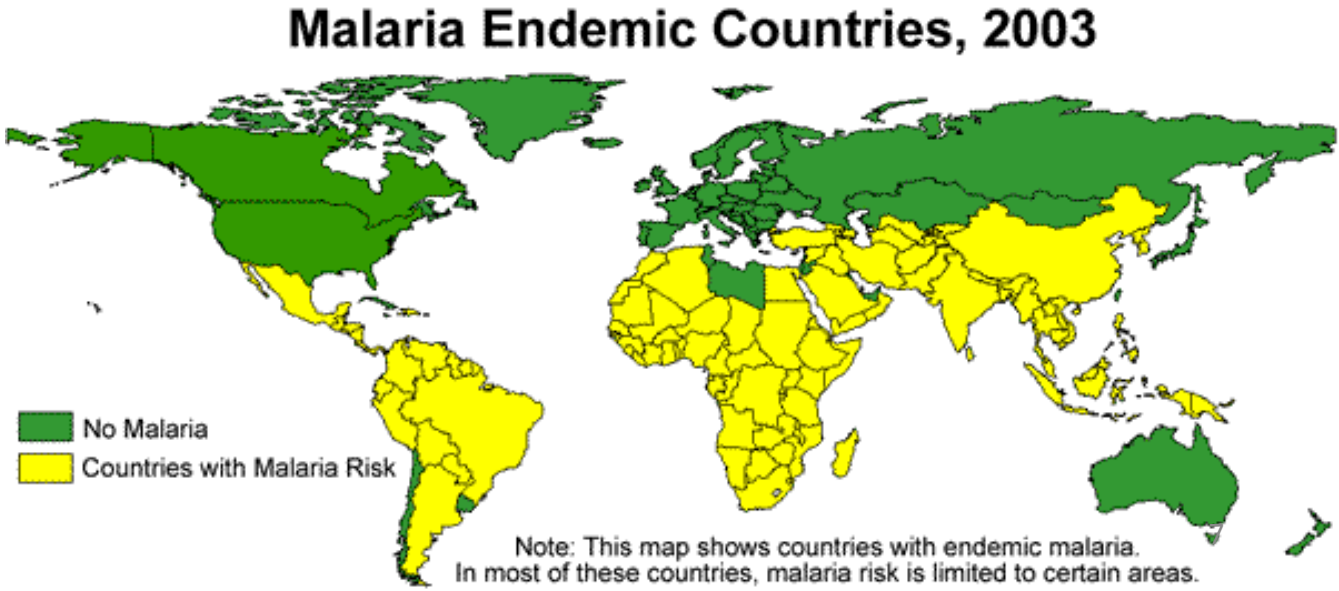
- Parasites enter through the mouth or skin
  - Mouth
    - Drinking
    - Eating
  - Skin
    - Burrowing
    - Bloodstream

Most Common Parasitic Infections

- Malaria
- African Trypanosomiasis (“sleeping sickness”)
- Cryptosporidiosis
- Schistosomiasis

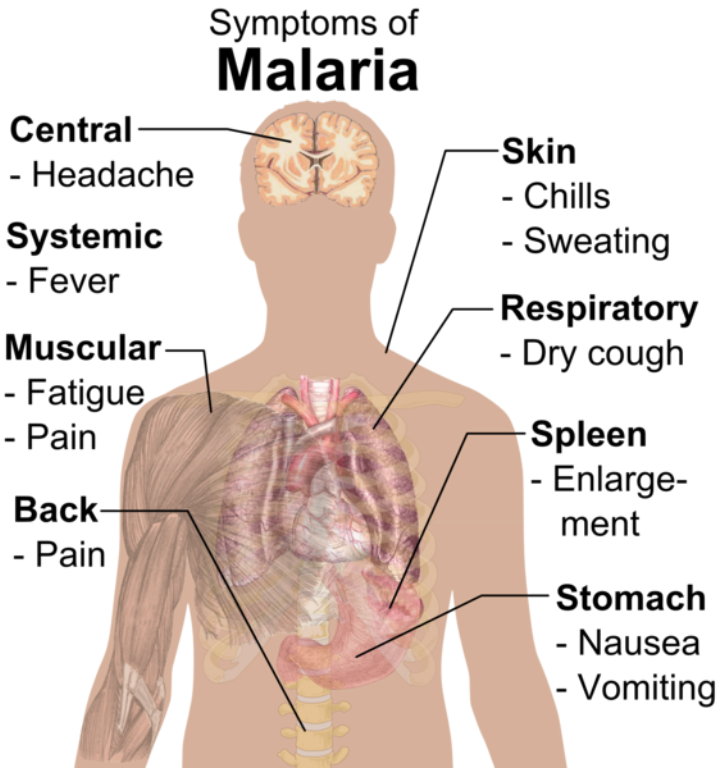
Malaria

- Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected female mosquitoes
- Sub-Saharan Africa
  - 90% of all Malaria cases
  - 1.8 million die each year
  - 1 in 5 childhood deaths



Clinical Presentation

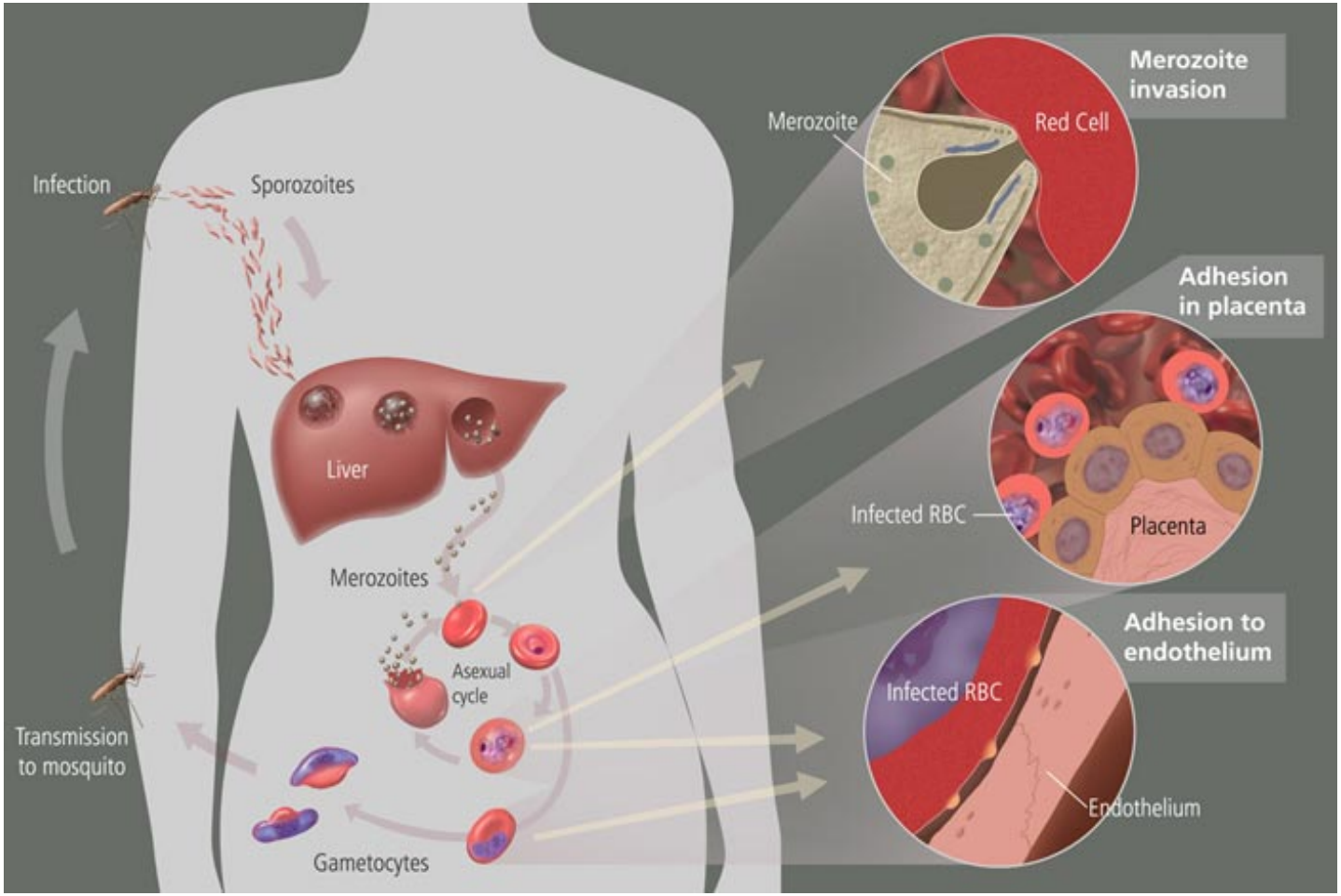
- In the early stages, malaria symptoms are sometimes similar to those of many other infections such as
  - Fever
  - Chills
  - Headache
  - Fatigue
  - Nausea & vomiting
  - Sweats
  - Dry (nonproductive) cough.
  - Muscle and/or back pain
  - Enlarged spleen



Clinical Presentation

- Cyclic symptoms
  - Parasites develop, reproduce, and released from red blood cells and liver

- In severe cases malaria can lead to impaired function of the brain or spinal cord, seizures, or loss of consciousness



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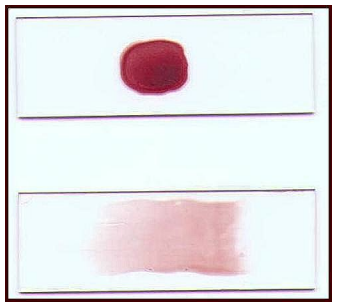
Different Types of Malaria

- *Plasmodium falciparum*- the most severe infections and is responsible for nearly 90% of malaria-related deaths in sub Saharan Africa
- *Plasmodium malaria*- cyclic paroxysms occur every 72 hours, not usually life-threatening
- *Plasmodium ovale*- can rest in the liver for several months up to 4 years after a person is bitten by an infected mosquito
- *Plasmodium vivax*- widest geographic distribution throughout the world

Diagnosis

- Peripheral smear examination
  - Gold-standard in confirming the diagnosis of malaria



- Quantitative Buffy Coat (QBC) Test
  - fluorescence microscopy-based malaria diagnostic test
  - components of blood (including parasites) separate into distinct layers based on their differing densities

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Diagnosis

- A clinician who faces these symptoms would need answers to the following questions:

- Is it malaria?
  If yes;
- What is the species?
- Is it severe?
- Is it new/ recurrence?
- Is it active?

Diagnosis

- Malaria may be described as simple or uncomplicated when the malaria infection is **NOT** life threatening and is easily treatable

- The definition of complicated Malaria is based on clinical presentation
  - A change in behavior, confusion or drowsiness;
  - Impaired consciousness or unarousable coma;
  - Multiple/recurrent convulsion
  - Deep breathing or respiratory distress
  - Pulmonary edema (x-ray)
  - Circulatory collapse or shock
  - Jaundice
  - Bleeding tendency or anemia
  - Prostration- generalized weakness so the patient cannot walk, or sit up without assistance

As a nurse, what nursing interventions do you expect?

- Blood tests
- Urine Analysis

- Your laboratory results would include:
  - P. falciparum malaria with possibly hyperparasitemia
  - Hypoglycemia
  - Metabolic acidosis
  - Severe anemia packed cell volume < 20%, Hgb < 6
  - Hemoglobinuria
  - Hyperlacticemia
  - Renal impairment, abnormal creatinine and urea levels

Risk factors for Malaria infection

- Children between the age of 6 months and 5 years
- People from non malaria to malaria endemic areas
- Returnees to highly endemic areas
- Indigenous pregnant women
- People with sickle cell disease
- People of all ages, no matter their location, who have lowered immunity and have exposure to Malaria

Treatment of Malaria

- The effectiveness of antimalarial drugs differs with different species of the parasite and with different stages of the parasite's life cycle

- To alleviate symptoms: Chloroquine, quinine, artemisinin combinations (Blood schizonticidal drugs)
- To prevent relapses: Primaquine (tissue schizonticidal drugs)

- To prevent spread: Primaquine for *P. falciparum*, Chloroquine for all other

Treatment

Type of Infection	Treatment
P. Vivax	Chloroquine 25 mg of salt/kg over 36-48 hours + Primaquine for 14 days.
P. Falciparum	Treatment depends on severity and sensitivity Artesunate+Pyrimethamine/sulphadoxine or other ACTs, OR Quinine plus tetracycline as suppressive therapy + Primaquine as gametocytocidal in single dose
Mixed (P. Vivax + P. falciparum)	ACT as for *P. falciparum* + Primaquine as for *P. vivax*

Case Study

Summary

You have now come to the end of this lecture on severe and complicated Malaria. You have learned that severe and complicated Malaria is a medical emergency and it requires early diagnosis and prompt treatment

TUBERCULOSIS

Tuberculosis

- Mycobacterium Tuberculosis (TB) = #1 Cause of Death Worldwide from a Single Infectious Agent

- TB most common in lungs (85%), but can occur in other parts of the body (extrapulmonary)

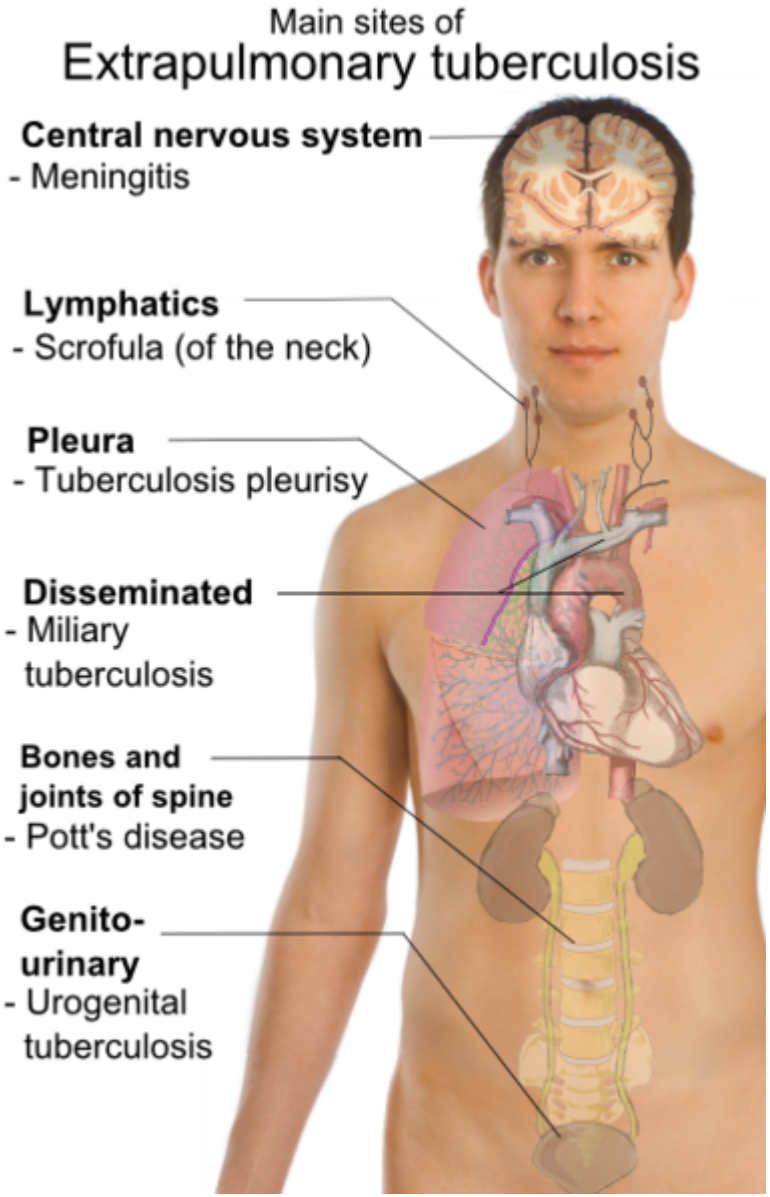
Transmission

- Infection = Person to Person via Airborne Infectious Aerosol:

  - Coughing
  - Sneezing
  - Talking

Clinical Presentation

- Prolonged cough
- Chest pain
- Hemoptysis
- Fever
- Chills
- Night sweats
- Fatigue
- Loss of appetite
- Weight loss/failure to gain weight



Droplet nuclei are inhaled

Macrophages and T lymphocytes try to contain the infection

In weaker immune systems, the wall loses integrity and the infection spreads to other alveoli/other organs

Children with TB

- Children have few tubercle bacilli in lungs, therefore, are rarely infectious
- Children less than 12 years of age usually lack the pulmonary force to produce airborne bacilli
- For a case of childhood TB infection, it is likely that an adolescent or adult transmitted TB bacilli to the child

Types of TB

- Active Tuberculosis:
  - When the immune system of a patient with dormant TB is weakened, the TB can become active (reactivate) and cause infection in the lungs or other parts of the body

- Latent Tuberculosis:
  - do not feel sick and do not have any symptoms
  - They are infected with *M. tuberculosis*, but do not have TB disease
  - Only sign of TB infection is a positive reaction to the tuberculin skin test or TB blood test
  - Are NOT infectious and cannot spread TB

Diagnosis of TB

- PPD
- Sputum Culture
- Chest X-Ray

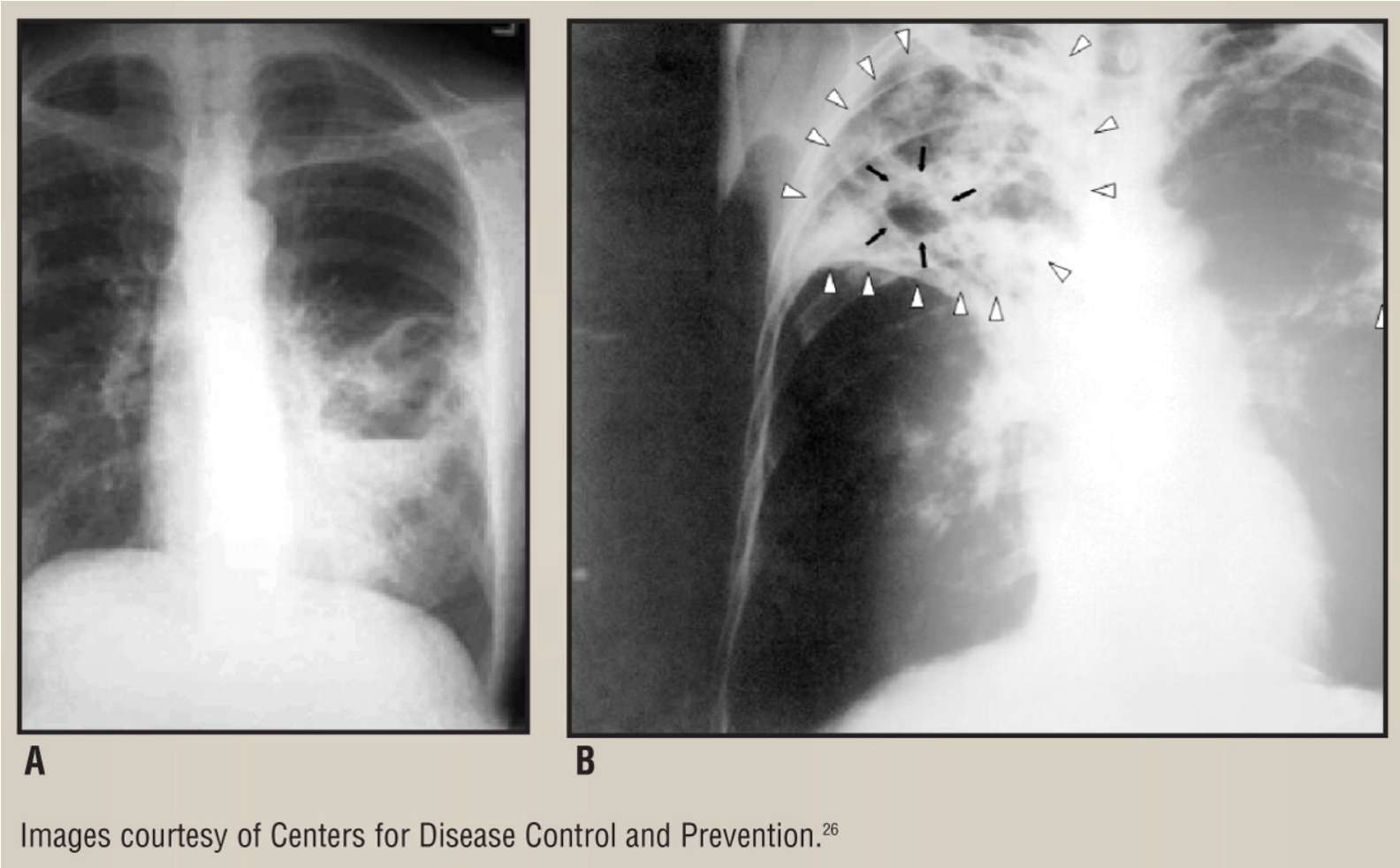
Diagnosis

- PPD – Purified Protein Derivative
  - The Tuberculin Skin Test Identifies Individuals infected with Mycobacterium Tuberculosis
  - Injection Site = Intradermally Dorsal Side of Forearm
  - Inflammatory Reaction = 24-72 Hours
  - Result Test in 48-72 Hours (If Positive at 6 Days = true Positive)

Greg Knobloch, Wikimedia Commons

Chest X-ray

- The chest X-ray examination is done and if there are any changes in the lung, a sputum sample will be sent for microscopic examination & culture



A. Infiltrates in left lung B. Bilateral advanced pulmonary tuberculosis

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Sputum Culture

- Definitive diagnosis of tuberculosis requires the identification of M tuberculosis in a culture of a diagnostic specimen
  - The most frequent sample used from a patient with a persistent and productive cough is sputum
  - mycobacteria grow slowly, 3 to 6 weeks may be required for detectable growth on solid media.

Treatment

- First-line anti-TB agents:
  - isoniazid (INH)
  - rifampin (RIF)
  - ethambutol (EMB)
  - pyrazinamide (PZA)

Diagnosis	Treatment
TB Infection	INH – 9 Months
TB Disease 3 or 4 drugs	First 2 months – INH, RIF, PZA, EMB (add EMB if drug resistance is suspected) Next 4 months – 2 most effective sensitive rugs (INH & RIF in pan-sensitive cases)
Multidrug resistant TB disease (resistance to at least INH & RIF)	Treat with sensitive drugs for at least 18 months

As a nurse, what is your nursing role?

Nurses Role

- Patients with TB should be monitored regularly to ensure that:
  - No interruptions occur in treatment;
  - Serious side-effects from the treatment are quickly identified;
  - There is improvement in the patient's condition, although this is often very gradual
- The nurse's role is vital in the control of TB and for the successful completion of the patient's therapy

Case Study #1

Physical Exam:

BP 130/70 HR 90 RR18 T-38.6

Lung:

Crackles in the Right Upper lung (RUL) There is Dullness to Percussion in the RUL

Heart:

Regular Rate Rhythm No Murmurs

Pt is having difficulty breathing

What nursing interventions do you expect?

- Administer oxygen if ordered and as ordered by a physician
- Give the TB patients fluids to loosen up secretions for easier expulsion from the lungs
- Position the patient in a high fowlers position to reduce the work needed to breathe
- Encourage and provide rest periods so the tuberculosis patient can have energy to breathe.