Infectious Diseases

ACP Puerto Rico Chapter Meeting

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Infectious Diseases, ACP
Disclosures

- Relevant Financial Relationships
  - None

- Off-Label/Investigational Uses
  - None

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Infectious Diseases
Objectives

1. Discuss common infectious disease syndromes
2. Discuss antibiotic therapy where appropriate

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Infectious Diseases
Clinical Pearls

- Approach to **every** ID case:

1. **Syndrome** (“itis”; endocard*itis*, pneumon*itis*, mening*itis*)
2. **Host** (steroids, DM, chemotherapy, radiation)
3. **Bug** (most common organism given syndrome)
4. **Drug** (based on bug and syndrome, route/duration)

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Meningitis

- Patients are toxic in appearance, rapid duration of illness (less than 24 hour)
- Fever, nuchal rigidity, altered mental status
- Seizure, focal neurologic deficits, papilledema
- *N. meningitidis*—cause petechiae and palpable purpura
- Examination for nuchal rigidity—Kernig and Brudzinski signs

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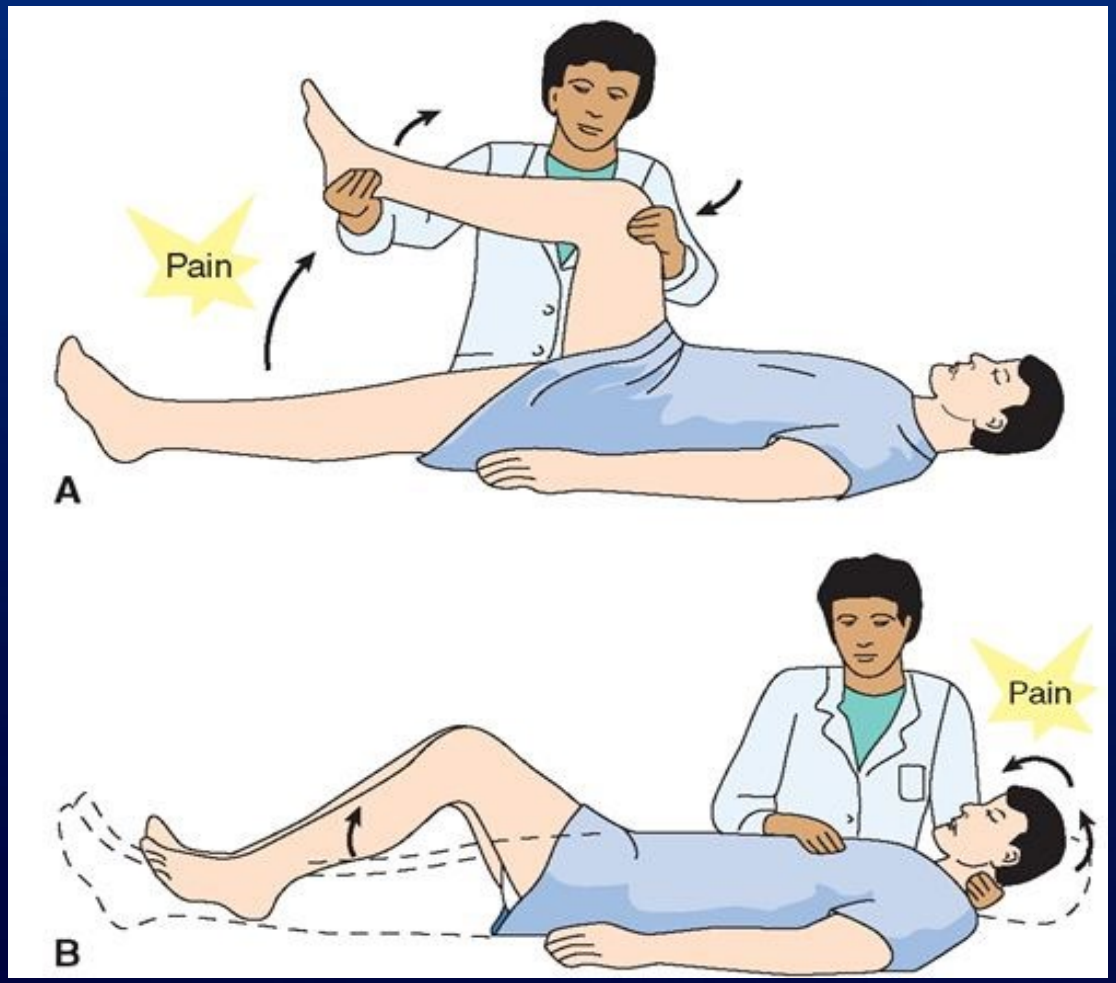
http://www.uptodate.com/contents/clinical-features-and-diagnosis-of-acute-bacterial-meningitis-in-adults?source=search_result&search=meningitis&selectedTitle=1%7E150

Meningitis



Kernig's sign

Brudzinski sign

Image/Graphic: 56

Meningitis

- Diagnosis
  - Lumbar puncture—CSF examination
  - CT head prior to LP to exclude mass lesion or increased intracranial pressure
    - ***Give antibiotics ASAP**
  - Gram stain CSF and culture

http://www.uptodate.com/contents/clinical-features-and-diagnosis-of-acute-bacterial-meningitis-in-adults?source=search_result&search=meningitis&selectedTitle=1%7E150

Meningitis

- Treatment—Avoidance of delay in antibiotics
- *S. pneumoniae*: IV Vancomycin + Ceftriaxone, and adjunctive dexamethasone
  - Dexamethasone given early has helped lower the rate of hear loss, other neurologic complications, and mortality
- *N. meningitidis*: IV Vancomycin + Ceftriaxone
- *Listeria monocytogenes* (infants, elderly): IV Ampicillin + Vancomycin + Ceftriaxone

http://www.uptodate.com/contents/clinical-features-and-diagnosis-of-acute-bacterial-meningitis-in-adults?source=search_result&search=meningitis&selectedTitle=1%7E150

Question

33 y/o woman, born and raised in Minnesota, seen in the ED in January with a 3-day history of fever, headache, stiff neck, and photophobia. No recent travel; takes no meds. Temp 38.5C, BP 136/86, pulse 100, RR 18. Unremarkable physical exam. No papilledema on fundoscopic exam. CSF shows 324 TNC (40% N), glucose 58 mg/dL, protein 125. Gram stain negative but some atypical cells were seen, culture is pending. *Which of the following is the most likely cause of this patient's symptoms?*

A. Enterovirus

B. Herpes simplex virus type 2

C. Mumps virus

D. West Nile Virus

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Question

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A. Enterovirus--most common cause of viral meningitis between May & November in western hemisphere; seasonality—influenza, LCMV

B. Herpes simplex virus type 2--Can cause meningitis year round (no seasonality)

C. Mumps virus—reduced incidence since MMR vaccine, often associated with parotits or orchitis

D. West Nile Virus—focal motor weakness is a common finding such as flaccid paralysis. IgM AB availability. Mosquito-borne illness between June & October

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Meningitis

	Glucose (mg/dL)		Protein (mg/dL)		Total white blood cell count (cells/microL)		
	<10[¶]	10 to 40[Δ]	100 to 500[◇]	50 to 300[§]	>1000	100 to 1000	5 to 100
More common	Bacterial meningitis	Bacterial meningitis	Bacterial meningitis	Viral meningitis Nervous system Lyme disease (neuroborreliosis) Neurosyphilis TB meningitis[¥]	Bacterial meningitis	Bacterial or viral meningitis TB meningitis	Early bacterial meningitis Viral meningitis Neurosyphilis TB meningitis
Less common	TB meningitis Fungal meningitis	Neurosyphilis Some viral infections (such as mumps and LCMV)			Some cases of mumps and LCMV	Encephalitis	Encephalitis

http://www.uptodate.com/contents/clinical-features-and-diagnosis-of-acute-bacterial-meningitis-in-adults?source=search_result&search=meningitis&selectedTitle=1%7E150

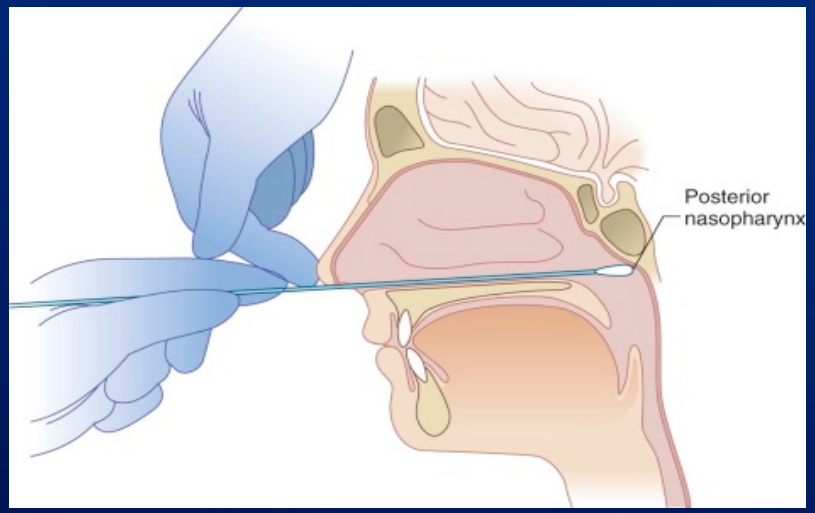
Pertussis (Whooping cough)

- *Bordetella pertussis*
- Highly contagious via aerosol droplet
- Classic paroxysmal cough—uncontrollable expirations followed by gasping inhalation
- Pertussis vaccine resulted in marked reduction
  - However, there has been waning immunity in adults and now there has been an increased in cases of pertussis

Goldman-Cecil Medicine, 313, 1990-1993.e2

Pertussis (Whooping cough)

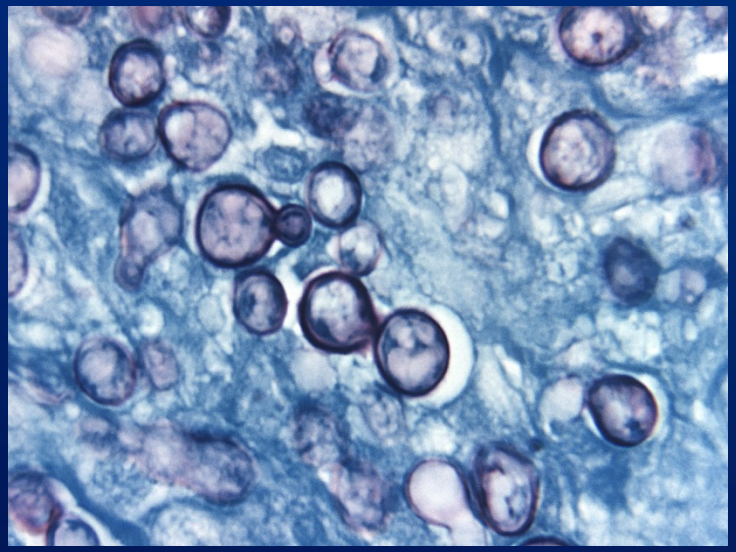
- Diagnosis—PCR testing of nasopharyngeal swab specimen
- Treatment
  - Azithromycin or
  - Clarithromycin or
  - Bactrim
- Prevention
  - All adults should receive a one-time TDaP booster



Goldman-Cecil Medicine, 313, 1990-1993.e2
Image/Graphic: 6

Pneumonia
Fungal-Histoplasmosis

- *Histoplasma capsulatum*
- *"Spelunker's lung"*
- Soil, bird droppings, bat guano
- Self-limited, influenza-like illness to disseminated infection
- AIDS, immunosuppression drugs (i.e. TNF-alpha inhibitors)
  - Predispose to dissemination



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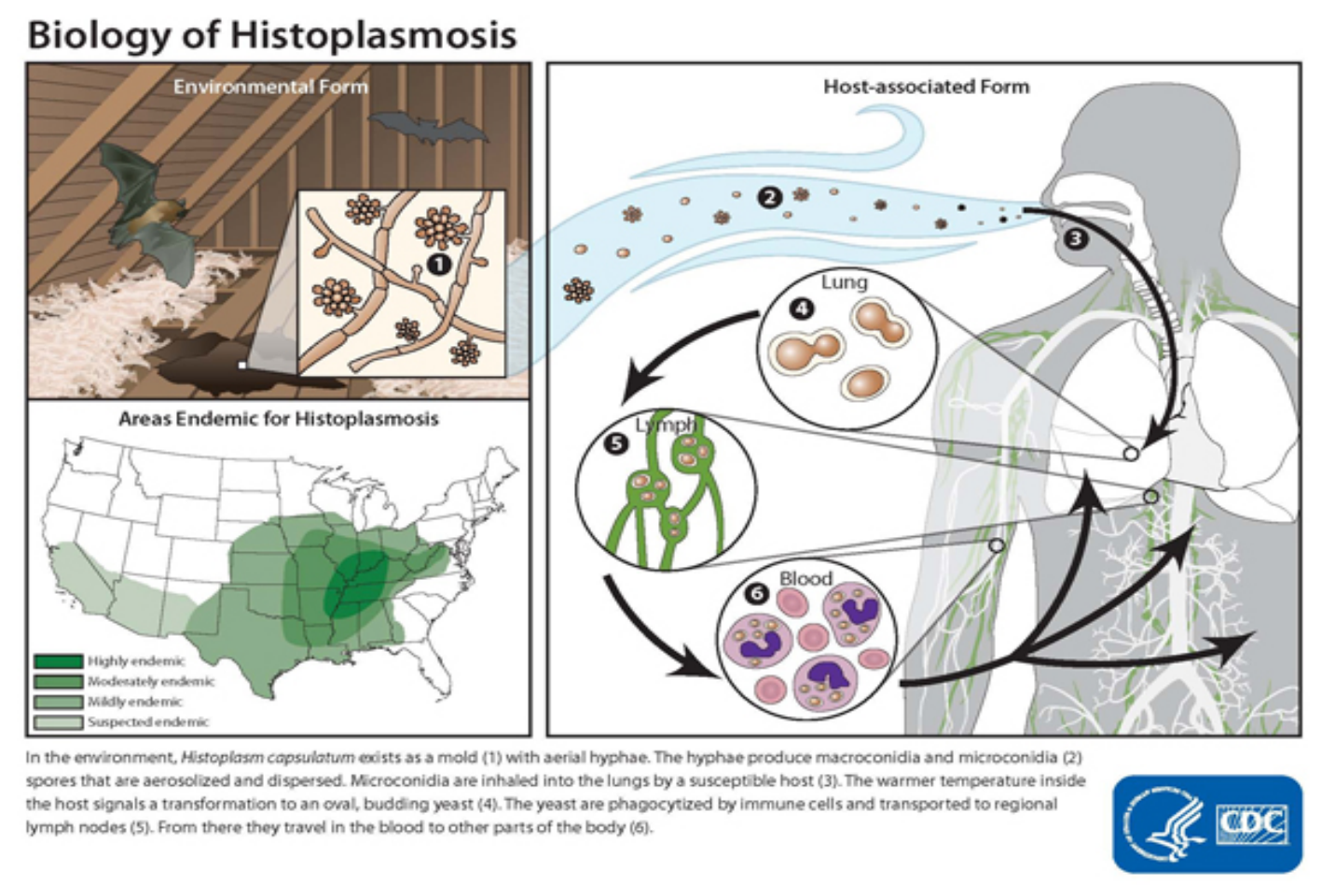
Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 265, 2949-2962.e1
Image/Graphic: 9

Pneumonia
Fungal-Histoplasmosis



Image/Graphic: 10

Pneumonia
Fungal-Histoplasmosis

- *Histoplasma* antigen test in urine or serum help in extrapulmonary disease and response to therapy
- Serology is useful—complement-fixation titers of 1:32 or greater indicate active disease
- Treatment
  - Pulmonary, mild-moderate—Itraconazole for 3 months; mod-severe—IV Amphotericin x 2 weeks, then oral Itraconazole for 3 months
  - Disseminated: same as mod-severe

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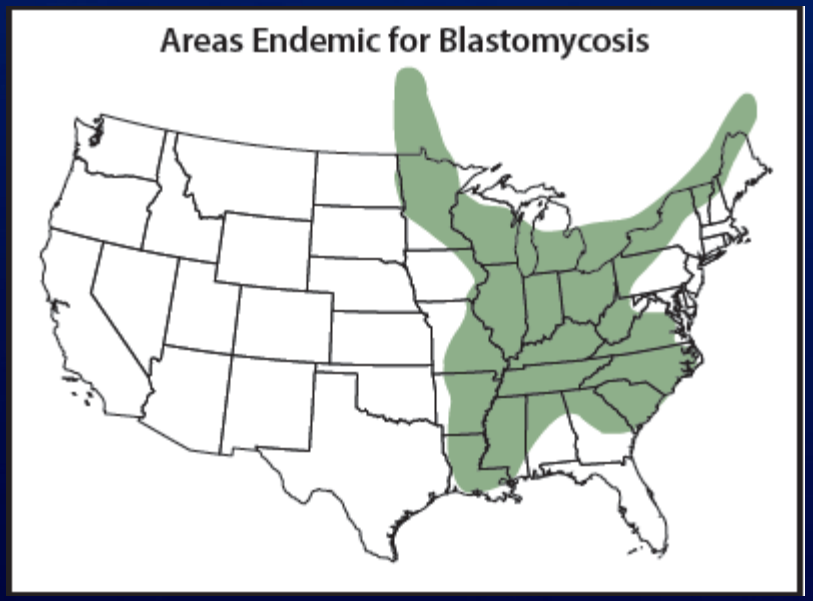
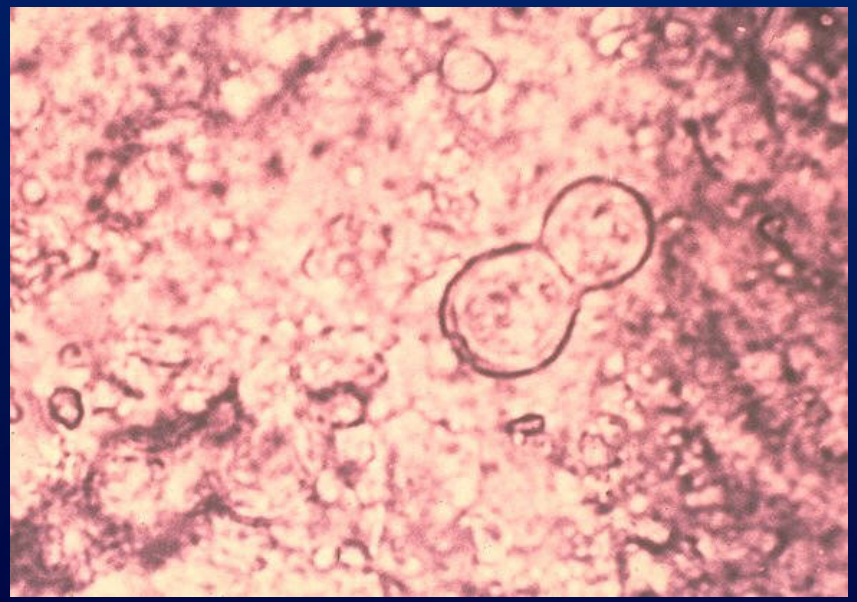
Mandell, Douglas, and Bennett's Principles and Practice o
Infectious Diseases, Updated Edition, 265, 2949-2962.e1

Pneumonia
Fungal-Blastomycosis

- *Blastomyces dermatitidis*
- "BBB"—Broad Based Budding yeast
- "dimorphic"—mold at 25-28ºC, yeast at 37ºC





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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 266, 2963-2973.e2
Image/Graphic: 11, 12

Pneumonia
Fungal-Blastomycosis

- Outbreaks—destruction of beaver dams, lakes/rivers, occupational exposures; Pet dogs
- Lungs are portal of entry
- Extrapulmonary—skin, bone, prostate, CNS

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 266, 2963-2973.e2
Image/Graphic: 13, 14

Pneumonia
Fungal-Blastomycosis

- Diagnosis: direct visualization of organism on fungal stain or culture of specimens
  - Urine antigen testing available; but can cross react with other dimorphic fungal infections
- Treatment
  - Mild-moderate: Itraconazole
  - Severe/disseminated: IV Amphotericin, then Itraconazole

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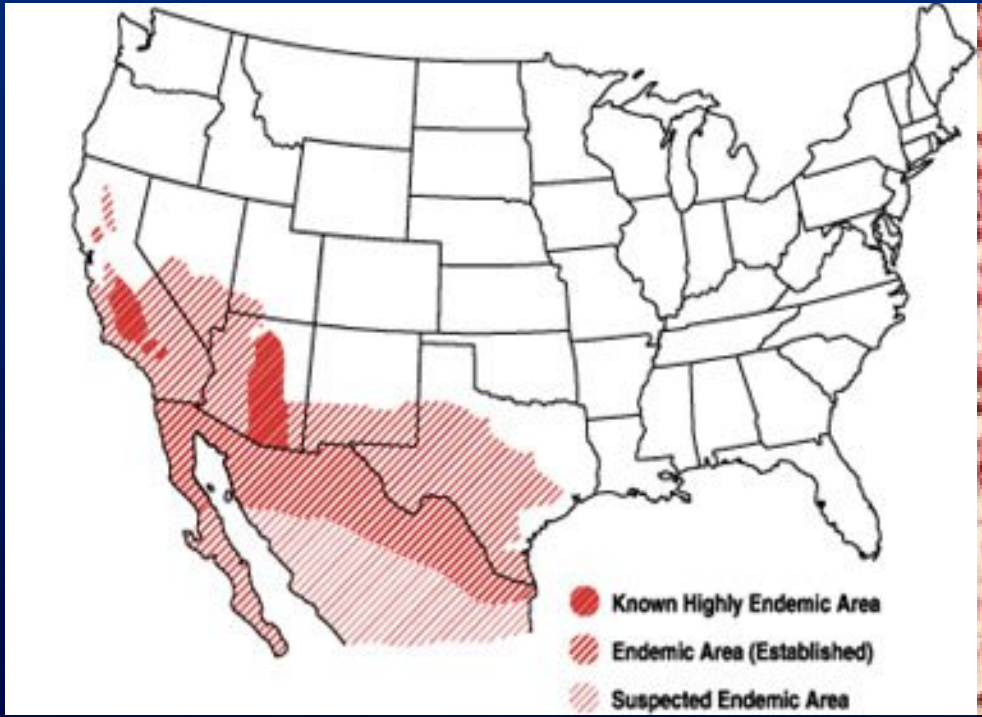
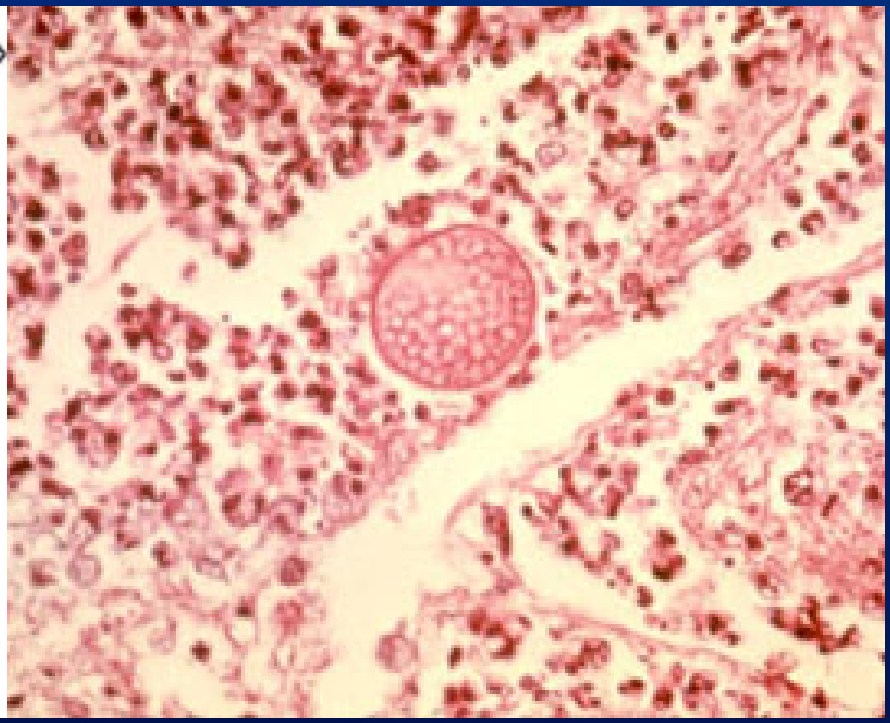
Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 266, 2963-2973.e2

Pneumonia
Fungal-Coccidioidomycosis





Image/Graphic: 15, 16

Pneumonia
Fungal-Coccidioidomycosis

- Diagnosis: isolation from culture, detection of anti-coccidioidal antibodies
- Treatment
  - Healthy, mild-moderate: Fluconazole for 3 months to 1 year
  - Severe/Disseminated: IV Amphotericin, then oral Fluconazole or Itraconazole for at least 1 year

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 267, 2974-2984.e3

Question

27 y/o male is evaluated in the hospital for a 1-month history of fever, drenching night sweats, malaise, fatigue, chest pain, and a nonproductive cough. He completed a 7-day course of levofloxacin without improvement. The patient works on a military base as a car mechanic stationed in Bakersfield, California. Chest x-ray showed a right lower lobe infiltrate & ipsilateral hilar lymphadenopathy. MTB QuantiFERON negative. WBC 11.9, Hgb 12.4. *Which of the following is the most likely diagnosis?*

A. Coccidioidomycosis

B. Sarcoidosis

C. *Streptococcus pneumoniae pneumonia*

D. Tuberculosis

MAYO CLINIC

Question

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A. Coccidioidomycosis--pulmonary cocci. 1/3rd of cases of CAP caused by Cocci in endemic areas; Bakersfield is the epicenter of cocci

B. Sarcoidosis—young black female most common, indolent over months to years, bilateral hilar lymphadenopathy

C. *Streptococcus pneumoniae* pneumonia—symptoms for 1 month and peripheral eosinophilia inconsistent

D. Tuberculosis—negative MTB quantiFERON excludes diagnosis

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Pneumonia
Fungal--Aspergillosis

- *Aspergillus* species; mold
- Fungal ball (aspergilloma)
- Invasive pulmonary aspergillosis
- Host: hematopoietic stem cell transplantation or solid organ transplant
- Diagnosis: Culture of organism; biomarkers—galactomannan, beta-D-glucan, and PCR testing
- Treatment of choice: Voriconazole

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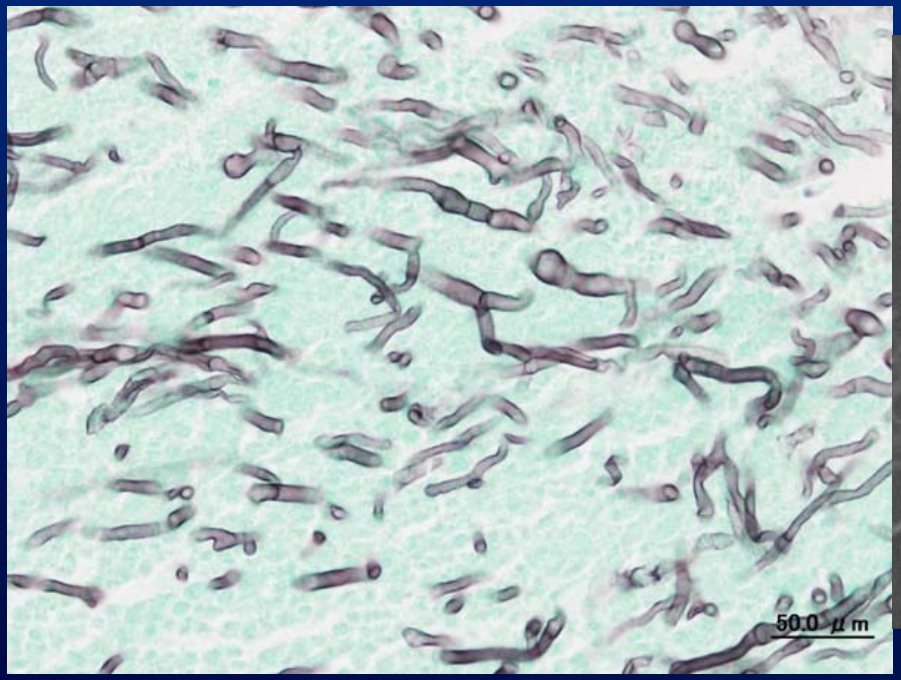
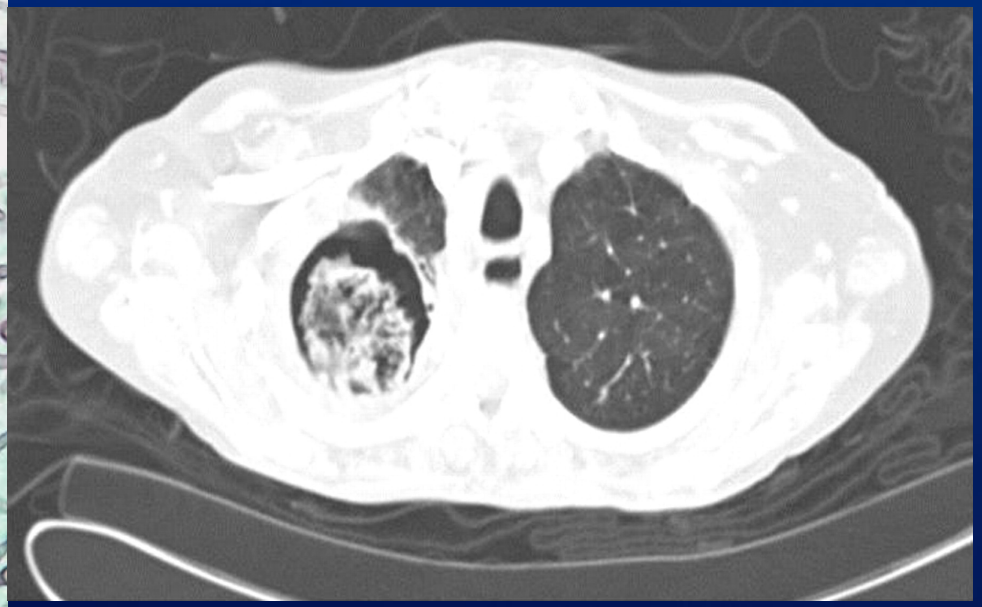
Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 259, 2895-2908.e4

Pneumonia
Fungal--Asperigillosis





Image/Graphic: 17, 18

Pneumonia
Fungal--Mucormycosis

- Aggressive, angio-invasive fungal infection
- *Rhizopus* species, *Mucorales* speicies, *Rhizomucor*
- Host: Immunocompromised or severely hyperglycemic
- *High index of suspicion as signs, symptoms, imaging are non-specific in these patients

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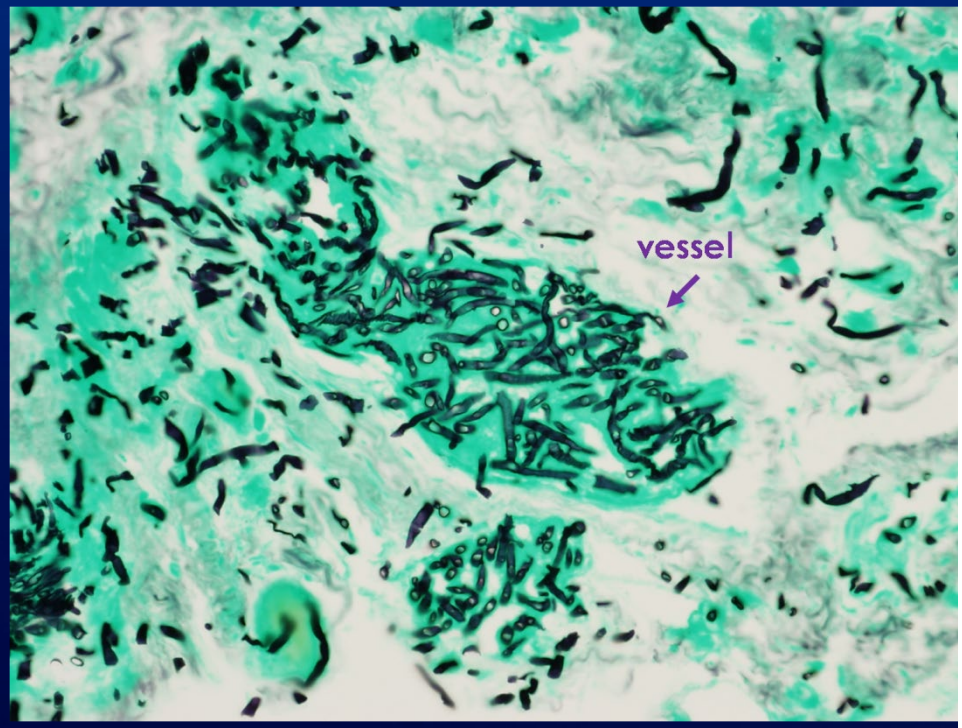
Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 260, 2909-2919.e4

Pneumonia
Fungal--Mucormycosis



Image/Graphic: 19, 20

Pneumonia
Fungal--Mucormycosis

- Treatment
  - Surgery; immediately
  - IV Amphotericin, PO Posaconazole

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 260, 2909-2919.e4

Fungal Disease
Candidiasis

Image/Graphic: 30,31,32

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Fungal Disease
Candidiasis

- Candida—budding yeast, normal human commensals
- *C. albicans, C. glabrata*, C. krusei* (*resistant to azoles)*
- Not pathogenic until host defense mechanisms are compromised
  - Antibiotics, prosthetic devices, indwelling IV catheters, hyperalimentation fluids, chemotherapy, immunosuppressive agents, burn victims

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 258, 2879-2894.e3

Fungal Disease
Candidiasis

- Diagnosis: Gram stain, fungal stains and culture
- Treatment: topical/oral/IV; Azoles (fluconazole, voriconazole), echinocandins (caspofungin), polyenes (amphotericin, nystatin)

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 258, 2879-2894.e3

Fungal Disease
Cryptococcosis

- *Cryptococcus neoformans*, *C. gattii*
- Found in pigeon guano, rotting trees

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 264, 2934-2948.e6
Graphic/Image: 33,34

Fungal Disease
Pneumocystis

- *Pneumocystis jirovecii*
- Found in humans, causes pneumonia (“PCP”) in immunocompromised patients
- Inhalation of cyst form of the organism—often within the first 2 years of life
- Host: most commonly HIV/AIDS
- Diagnosis: microscopic demonstration of organisms in respiratory tract specimens, and PCR

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 271, 3016-3030.e4

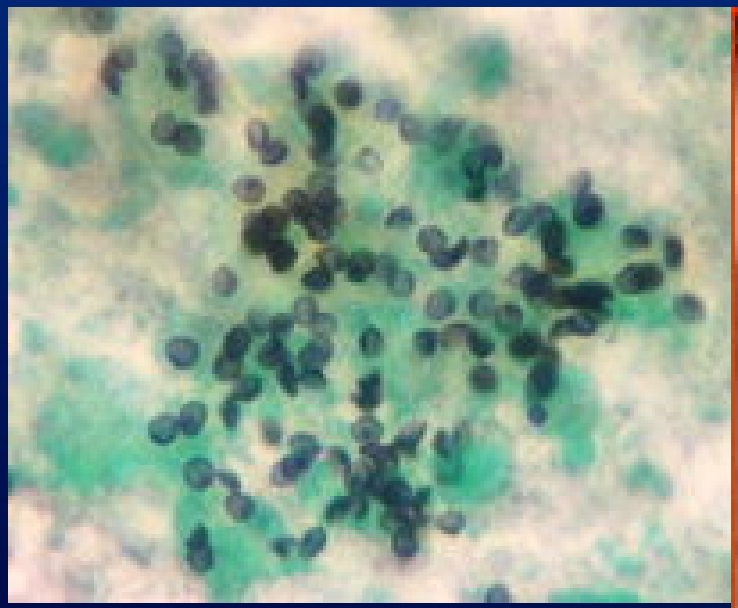
Fungal Disease
Pneumocystis

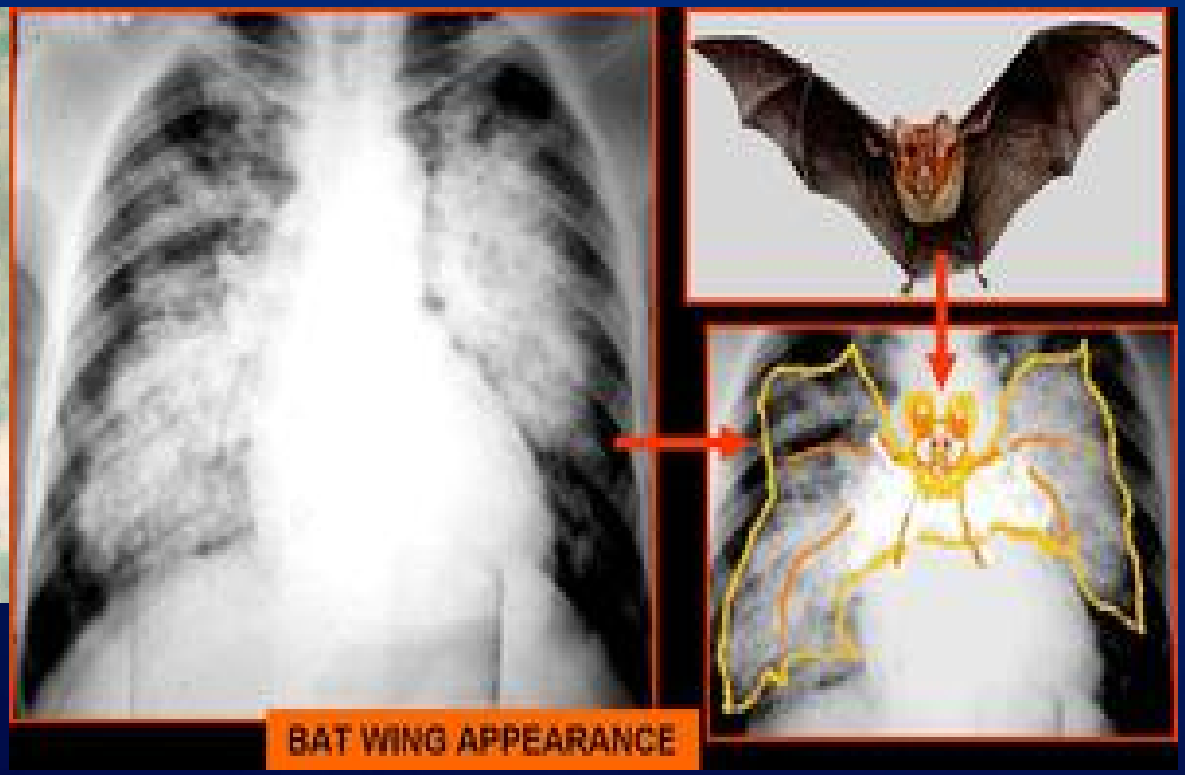
- Treatment: IV or PO Bactrim (TMP-SMX) 15 mg/kg/day for 21 days
- Adjunctive therapy with Corticosteroids (prednisone) for moderate-to-severe PCP
  - PaO2 ≤70 mm Hg or alveolar-arterial O2 gradient >35 mm Hg
- Prevention: Bactrim (double or single-strength) 1-tablet PO daily
- Alternative agents: Pentamidine (IV/inhaled), Atovaquone, Dapsone

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 271, 3016-3030.e4

Fungal Disease
Pneumocystis





Image/Graphic: 35,36

Tuberculosis

- *Mycobacterium tuberculosis*
- Acid-fast bacillus; high cell wall content of lipids (fatty acids)
- Airborne droplet nuclei reach terminal alveoli and are ingested by alveolar macrophages, then carried to lymphatics
- Diagnosis: 3 sputum specimens increase sensitivity, PCR testing, solid and liquid media cultures; X-ray shows patchy infiltrate in lung apices, often with cavitation is highly suggestive

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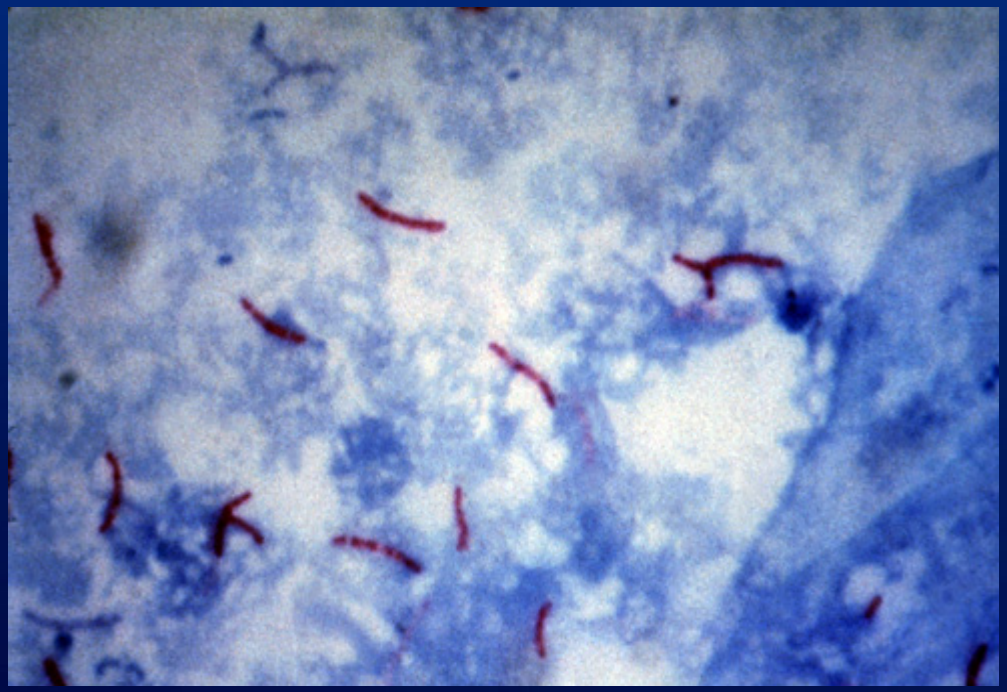
Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 251, 2787-2818.e5

Mycobacterial disease
Tuberculosis—Active



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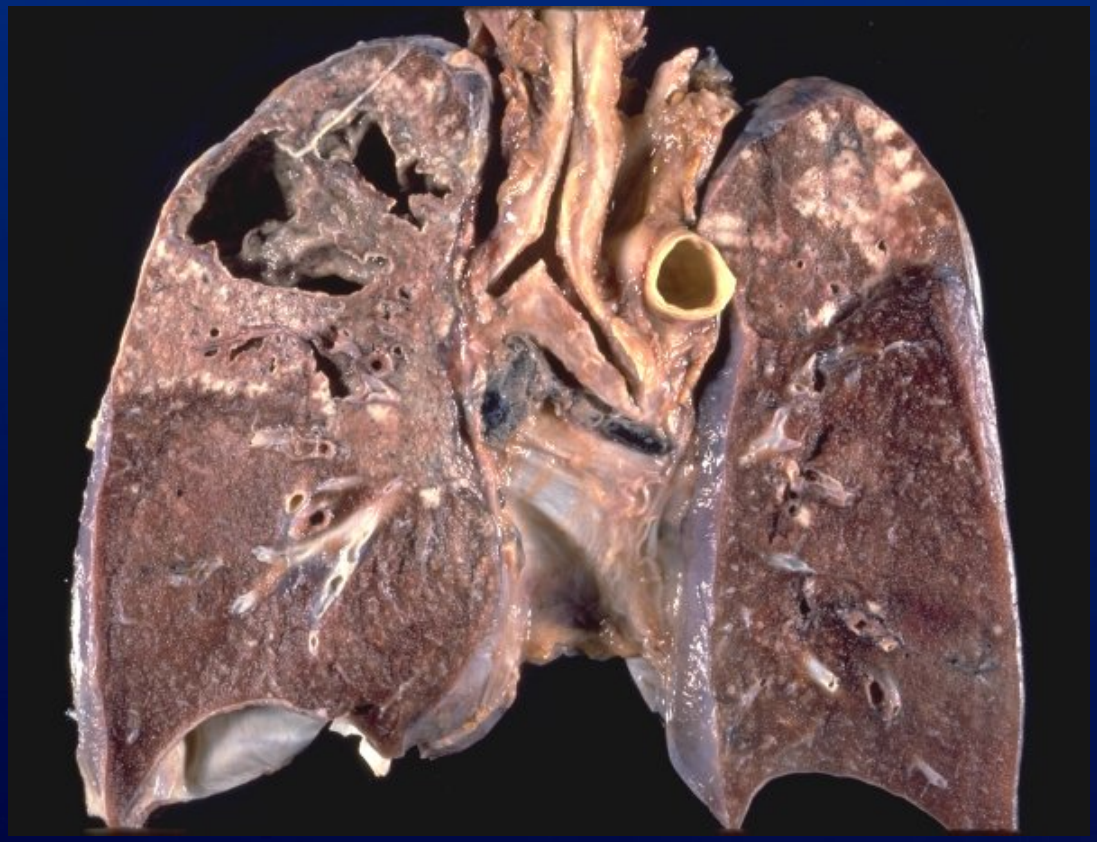
Tuberculosis



Image/Graphic: 23, 24

Mycobacterial disease
Tuberculosis

- Latent TB versus Active TB infection
  - Latent TB
    - Exposed to somebody with active pulmonary TB infection at some point in life
    - Screening test positive (skin test or QuantiFERON Gold)
    - Normal chest x-ray, asymptomatic (no cough, hemoptysis)
    - Immune system “controls” Mycobacteria; granulomas
  - Active TB
    - Mycobacterium tuberculosis “actively” dividing and infecting lung tissue
    - Infectious via airborne droplets
    - Cough, fever, chills, night sweats, weight loss, hemoptysis
    - Chest x-ray: Upper lobe infiltrate, +/- cavitation lesions

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Question

55 y/o female undergoes annual TB skin testing. An 8-mm induration is recorded after 48 hours. She denies any symptoms/exposures. She works as a clerk in an internal medicine outpatient clinic in New York City. She takes no medications. Medical history and physical exam are unremarkable. *Which of the following is the most appropriate management?*

A. Chest radiography

B. Induce sputum for culture

C. Initiate INH for treatment of latent TB

D. Move patient to airborne isolation

E. No further testing or treatment

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Mycobacterial disease
Tuberculosis—Latent

- TB skin-testing
- Skin-test—size of *induration* and risk factors
  - Positive:
    - **≥5mm**: HIV, recent contact with person with TB, x-ray changes consistent with prior TB, organ transplant, immunosuppressed
    - **≥10mm**: recent immigrant (<5 years), injection drug user, resident of high risk setting, mycobacterial lab personnel, children <4 years of age, infants/children exposed to adults in high-risk categories, persons with clinical conditions that place them at high risk (diabetes)
    - **≥15mm**: no risk factors

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http://www.cdc.gov/tb/publications/factsheets/testing/skintesting.htm

Mycobacterial disease
Tuberculosis—Active

- Acid-fast, aerobic bacillus; takes 3-8 weeks to grow on solid media, 1-3 weeks liquid media
- PCR with good sensitivity and specificity
- “Caseating granulomas”—incomplete necrosis produces cheesy, acellular material
- Infection due to inhalation of droplet nuclei
- Hospital—negative pressure isolation, N95 mask use

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 251, 2787-2818.e5

Mycobacterial disease
Tuberculosis-Treatment

- **Latent** TB infection
  - 9 months Isoniazid
  - +/- Vitamin B6 (pyridoxine) to prevent peripheral neuropathy due to Isoniazid
- **Active** TB infection
  - "RIPE"—Rifampin, Isoniazid, Pyrazinamide, Ethambutol
  - 6 months total (usually 2 months of all 4 drugs, then 4 months of 2 drugs-isoniazid & rifampin)
  - DOT—directly observed therapy

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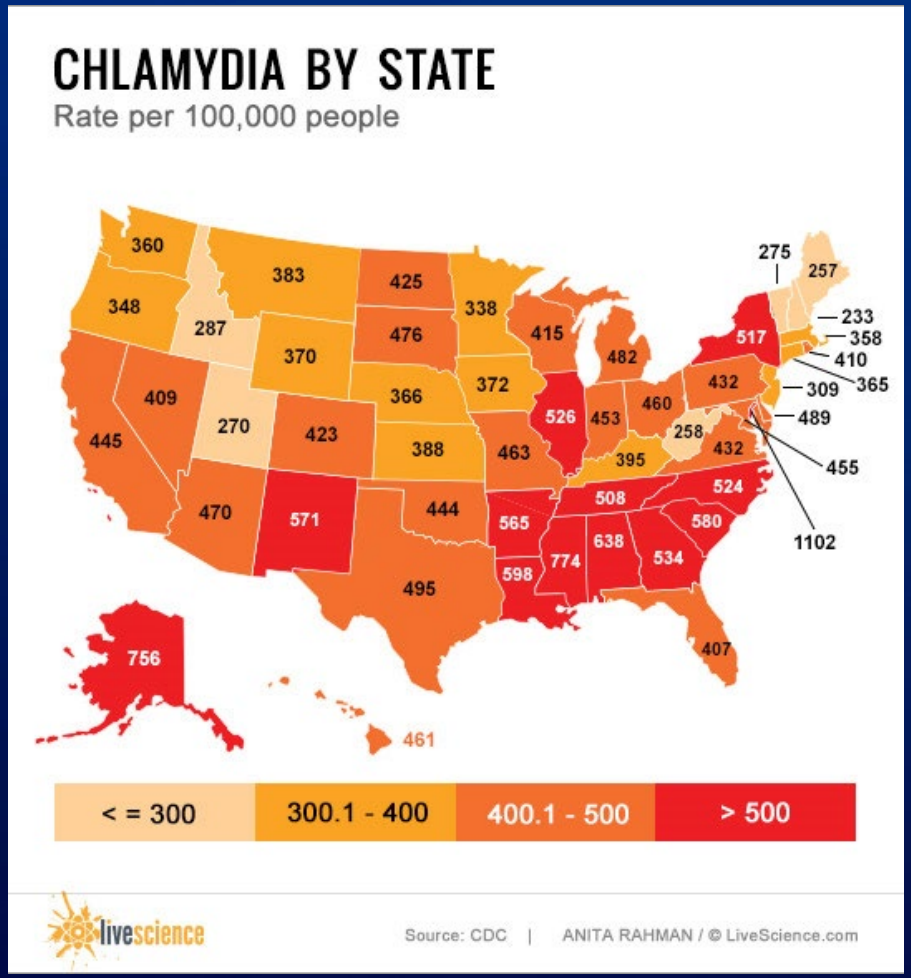
Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 251, 2787-2818.e5

Bacterial Disease
Chlamydia



Image/Graphics: 25, 26, 27

Bacterial Disease
Chlamydia

- *Chlamydia trachomatis*
- Ocular disease—leading infectious cause of blindness worldwide
- Genital infections—#1 bacterial STI in the world
  - 100 million new cases per year
  - Often asymptomatic
  - Women—involuntary infertility and ectopic pregnancy
  - Transmission during vaginal delivery can lead to neonatal conjunctivitis and pneumonia

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 182, 2154-2170.e7

Bacterial Disease
Chlamydia

- Diagnosis—nucleic acid amplification tests of first-catch urine in men; vaginal swabs in women
- Treatment for urogenital infection
  - Azithromycin 1 gram PO single dose or Doxycycline 100 mg PO BID x 7 days
  - *Treatment of sex partners is crucial
- Prevention
  - Screening high-risk men/women, all women sexually active <25 years annually, all pregnant women

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 182, 2154-2170.e7

Bacterial Disease
Gonococcal infections

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Bacterial Disease
Gonococcal infections

- Gonorrhea is a sexually transmitted infection caused by *Neisseria gonorrhoeae*
- Often asymptomatic
- Cervicitis, urethritis, pelvic inflammatory disease
- Routine screening women <25 years, or older women with risk factors
- Nucleic acid amplification testing at all potentially infected anatomic sites

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 214, 2446-2462.e3

Bacterial Disease
Gonococcal infections

- Treatment
  - Ceftriaxone (IV/IM)
  - Also cover for Chlamydia--Azithromycin or Doxycycline
  - Sexual partners should be treated presumptively

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 214, 2446-2462.e3

Spirochetal disease
Syphilis

- *Treponema pallidum*
- Chronic, multistage sexually transmitted infection
- “The Great Imitator”
- Direct contact with a syphilis sore during vaginal, anal, or oral sex

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
http://www.cdc.gov/std/syphilis/stdfact-syphilis.htm

Spirochetal disease
Syphilis

- Primary syphilis
  - Sore (chancre) is firm, round, painless ulcer, lasts 3-6 weeks, heals regardless of treatment

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
Image/Graphic: 45,46

Spirochetal disease
Syphilis

- Secondary syphilis
  - Rash on palms of hands and soles of feet
  - Fever, sore throat, patchy hair loss, fatigue

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Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
Image/Graphic: 47,48

Spirochetal disease
Syphilis

- Tertiary/Late syphilis
  - Can occur 10-30 years after infection
  - Paralysis, loss of coordination, blindness, damage to internal organs (“gummas”)

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5; Image: 49

Spirochetal disease
Syphilis

- Diagnosis: Darkfield microscopy and PCR of chancres
  - Serology: Treponemal & nontreponemal antibody tests.
  - Nontreponemal tests (RPR)-indicate disease activity
  - Treponemal tests (TP-PA) confirm reactivity of nontreponemal tests & remain active for life
- Treatment: IM benzathine Penicillin G 2.4 million units
  - Penicillin allergic pregnant females—should be desensitized

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5

Question

32 y/o female who is sexually active with a new male partner & reports consistent condom use. PMHx significant for chlamydia cervicitis 5 years ago & treatment for syphilis 6 years ago. Physical exam unremarkable. A syphilis enzyme immunoassay is positive; RPR testing negative. A fluorescent treponemal antibody test is positive. Nuclear acid amplification testing is negative for GC/Chlamydia. HIV testing negative. *Which of the following is the most appropriate management*?

A. IM benzathine penicillin, Single Dose

B. IM benzathine penicillin, Weekly for 3 weeks

C. Repeat serology with *Treponema pallidum* particle agglutination assay

D. No further testing or treatment

MAYO CLINIC

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A. IM benzathine penicillin, Single Dose—If RPR was positive, then it would indicate a new infection, then treatment would be based on stage of disease

B. IM benzathine penicillin, Weekly for 3 weeks—same as A, but if no history of syphilis, then treat as syphilis of unknown duration

C. Repeat serology with *Treponema pallidum* particle agglutination assay—not needed as the fluorescenT treponemal AB was positive—confirming the EIA.

D. No further testing or treatment

MAYO CLINIC

Bacterial Disease
Cholera

- *Vibrio cholerae*—curved Gram-negative rod
- Acute, severe watery diarrhea (“rice-water with fishy odor”)
- Cholera toxin on intestinal epithelial cells
- Fecal-oral transmission—brackish water, inadequate sanitation
- Current pandemic
  - Haiti following earthquake 2010

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 216, 2471-2479.e2

Bacterial Disease
Cholera

- Treatment—IV fluids, electrolyte repletion
  - Antibiotics secondary—Azithromycin or Ciprofloxacin
- Prevention—oral vaccination, adequate sanitation and safe water

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 216, 2471-2479.e2; Image: 29

Fungal Disease
Cryptococcosis

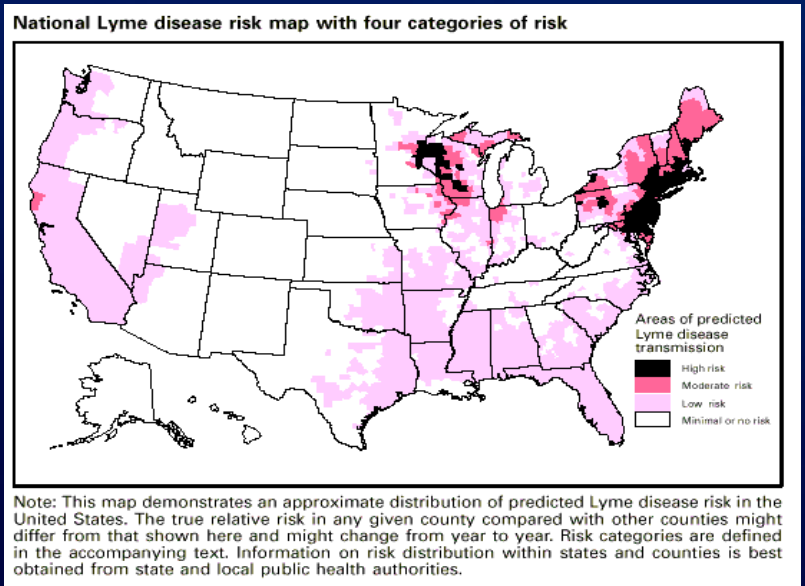
- Majority of infections are asymptomatic in exposed populations
- Risk factors for disease: AIDS, corticosteriod use, organ transplantation, cancer, monoclonal antibody use
- Major sites of infection are CNS and lung
- Diagnosis: India ink staining of CNS/tissue, Cryptococcal antigen on serum and CSF is sensitive and specific
- Treatment: IV Amphotericin + Flucytosine

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 264, 2934-2948.e6

MAYO CLINIC

Spirochetal disease
Lyme Disease

- *Borrelia burgdorferi*
- Multisystem illness—skin, joints, nervous system, heart
- Tick-borne infection—Ixodes tick



Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 243, 2725-2735.e2
Image/Graphic: 38,39

Erythema migrans

Image/Graphic: 40

Spirochetal disease
Lyme Disease

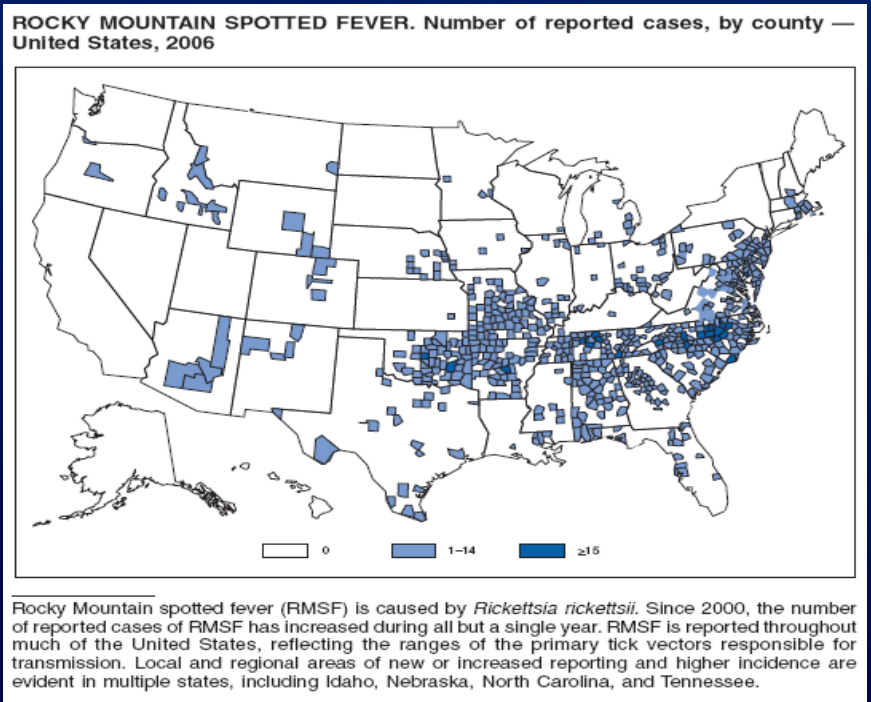
- Diagnosis: clinical features, and positive IgG serology testing (ELISA & Western Blot testing)
- Treatment
  - Early infection: PO Doxycycline x 21 days; Pregnancy—PO Amoxicillin x 21 days
  - CNS/Heart/Joint involvement: IV Ceftriaxone for 28 days
- Prevention: Avoid ticks, tick checks after exposure in endemic areas

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 243, 2725-2735.e2

Spirochetal disease
Rocky Mountain spotted fever (RMSF)

- *Rickettsia rickettsii*
- Tick-borne—*Dermacentor* tick



MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 188, 2198-2205.e4
Image/Graphic: 41,42

Spirochetal disease
Rocky Mountain spotted fever

- Fever, headache, myalgias, abdominal pain
- Rash—starts on wrists & ankles, then spreads proximally
- Complications—skin necrosis, neurologic, pulmonary edema, acute respiratory distress
- Fatality rate
  - 23% without treatment
  - 4% with treatment

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 188, 2198-2205.e4

Spirochetal disease
Rocky Mountain spotted fever

Image/Graphic: 43,44

MAYO CLINIC

Spirochetal disease
Rocky Mountain spotted fever

- Diagnosis: IgG serology testing—fourfold rise in titer confirms diagnosis; PCR in blood, skin biopsy
- Treatment: PO Doxycycline x 7-10 days

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 188, 2198-2205.e4

Viral disease
HIV

- Human Immunodeficiency Virus—infects CD4 T-cells
- Causes Acquired Immunodeficiency Syndrome (AIDS)
- Transmitted via sex & injection drug use
- Uses a reverse transcriptase to turn RNA → DNA and integrate into the genome
- Diagnosis: HIV serology screening, confirmation with Western blot, and detection of viral RNA (viral load)

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3

Viral disease
HIV

- Treatment: Antiretroviral therapy (ART)
  - Combination of 3 Active Drugs
    - 2 nucleoside reverse-transcriptase inhibitors PLUS
    - 1 protease inhibitor or integrase inhibitors, or non-nucleoside reverse-transcriptase inhibitors, or entry inhibitors
- Decreases viral load, resulting in increased CD4 levels

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3

Viral disease
HIV

- Drugs to know:
- Efavirenz—do not use in pregnant women, or history of psychiatric disorder
- Tenofovir—increases risk of kidney injury and osteoporosis
- Abacavir—increases risk of myocardial infarction

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3

Viral disease
HIV

- Opportunistic infections
  - Depends on CD4 levels
  - CD4 <200—Pneumocystis pneumonia
    - Prophylaxis with daily Bactrim
  - CD4 <100—Toxoplasmosis
    - Prophylaxis with daily Bactrim
  - CD4 <50—MAC (mycobacterium avium complex)
    - Prophylaxis with weekly Azithromycin

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3

Question

27 y/o male is evaluated for a routine health maintenance visit. He asks about reducing his risk for HIV infection because he has sex with men, has multiple partners, and sometimes uses condoms. He takes no meds. Normal exam. Labs show normal serum creatinine, serum RPR negative, negative GC/Chlamydia from urine, pharynx,and rectum, and negative HIV testing. *Which of the following is the most appropriate preventive measure?*

A. Reinforce consistent condom use and avoid antiretroviral therapy

B. Tenofovir and emtricitabine single dose before each sexual encouter

C. Tenofovir and emtricitabine single dose after each sexual encounter

D. Tenofovir disoproxil fumarate and emtricitabine daily

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A. Reinforce consistent condom use and avoid antiretroviral therapy—PrEP & barrier protection is now the standard of prevention for MSM at risk for HIV infection

B. Tenofovir and emtricitabine single dose before each sexual encounter—lower effectiveness and possible selection for resistance

C. Tenofovir and emtricitabine single dose after each sexual encounter--lower effectiveness and possible selection for resistance

D. Tenofovir disoproxil fumarate and emtricitabine daily—more than 90% effective if taken consistently in preventing HIV

MAYO CLINIC

Parasitic disease
Malaria

- Transmission via bite from *Anopheles* mosquito
- *Plasmodium falciparium, P. vivax, P. ovale, P. malariae, P. knowlesi*
- History of travel and exposure to malaria-endemic area (Africa, South America, Asia)
- Fever, headaches, body aches, malaise
- Severe malaria—convulsions, hyperparasitemia, severe anemia, hypoglycemia, jaundice, shock, vomiting, high fevers

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 276, 3070-3090.e9

Parasitic disease
Malaria

Image/Graphic: 52,53

Parasitic disease
Malaria

- Diagnosis: Thick and thin blood smears (x3)
- Treatment: Depends on disease severity, drug-resistance, age, pregnancy status
  - Uncomplicated: Chloroquine if sensitive (Mexico, Carribbean); if resistant, then Atovaquone, mefloquine, quinone plus doxycycline
    - *P. vivax, P. ovale*—give Primaquine to prevent relapsing malaria
  - Severe: IV Quinidine, Artensunate (only from CDC)
- Prevention: Doxycycline or Atovaquone; mosquito repellants/nets, avoidance measures

MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 276, 3070-3090.e9

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MAYO CLINIC

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 276, 3070-3090.e9

Questions & Discussion