

## **Acute Respiratory Diseases and Pneumonias**

**Paul K. Drain, MD, MPH**  
Massachusetts General Hospital and  
Brigham and Women's Hospital  
pdrain@partners.org  
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Education Consortium and collaborating partners

# Learning Objectives

1. Describe major causes and management of upper respiratory infections.
2. Describe major causes and management of acute bronchitis.
3. Describe major causes and management of pneumonias.
4. Describe when antibiotics should be used in management of respiratory tract infections.

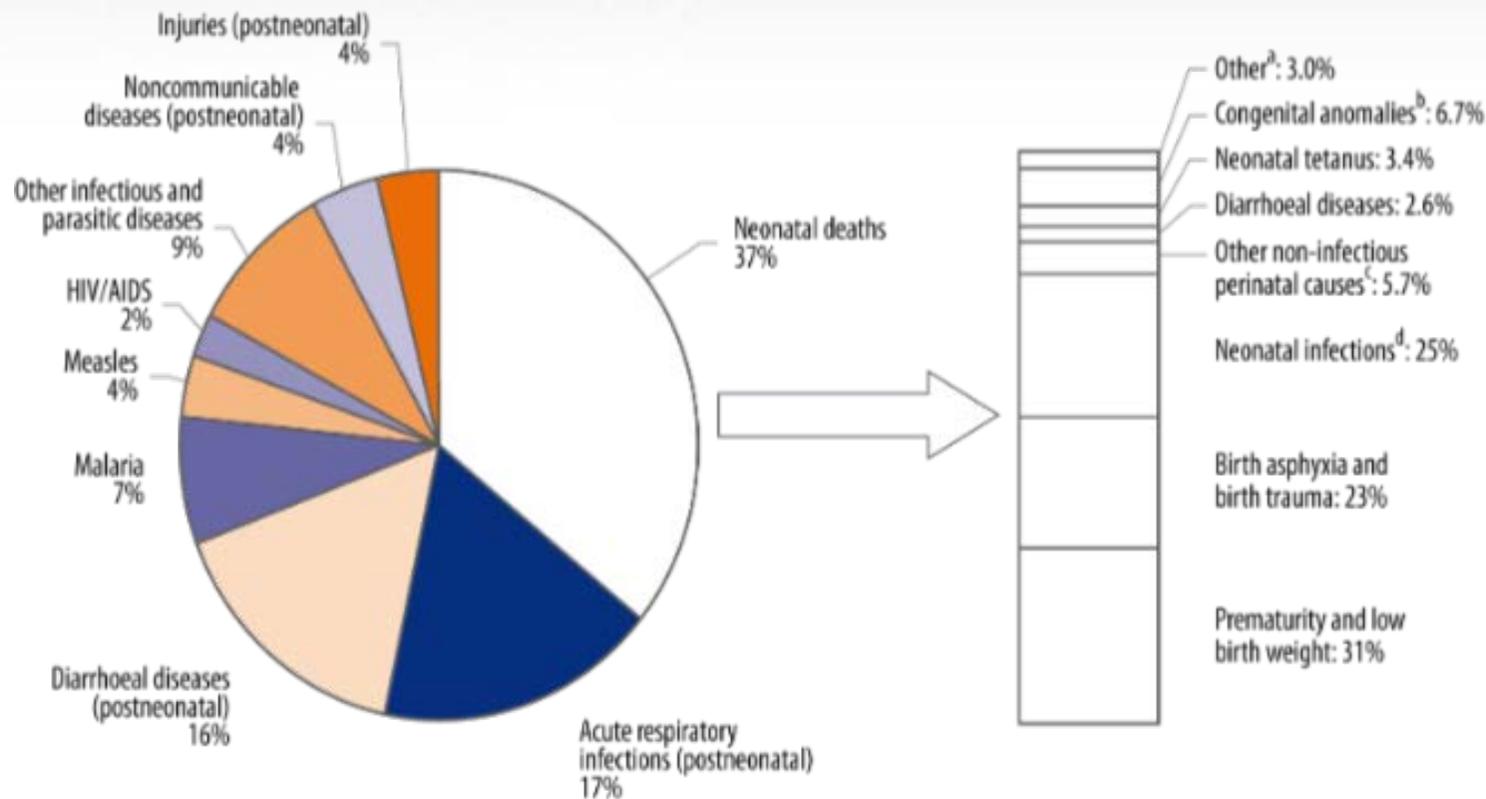
# Presentation Outline

- **Epidemiology**
- Upper respiratory infections
- Lower respiratory infections
  - Acute bronchitis
  - Pneumonia
    - Community-acquired pneumonia
    - Hospital-acquired pneumonia
    - Aspiration pneumonia
    - AIDS-related pneumonia
    - Recurrent pneumonia
- Summary
- Self-assessment Quiz

# Epidemiology of Respiratory Tract Infections

- Acute respiratory infections
  - 3.9 million deaths worldwide
  - ARI among leading causes of death in children under 5
  - 1.9 million deaths in children under age 5
    - Mostly in Africa and South East Asia

# Distribution of causes of death among children aged under five years and within the neonatal period, 2004



World Health Organization. Global Burden of Disease 2004 Report. Health Statistics and Informatics Dept.

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# Upper Respiratory Infections (URIs)

- Transmitted by sneezing, coughing, or direct contact with infectious secretions, often from poor hand hygiene.
- Often difficult to distinguish between viral and bacterial infections, but the vast majority of URIs are self-limited viral infections.
- Antibiotics have no effect in viral infections.
- However, some patients may progress to develop an acute bronchitis or bacterial superinfection.

# Epidemiology of URIs

- URIs are the most common infection in the general population
- Leading reason for people missing work or school
- Leading acute diagnosis in office setting

# Pathogens of URIs

- Typical viral infections include:
  - Coronavirus
  - Rhinovirus
  - Adenovirus
  - Influenza virus
  - Parainfluenza virus

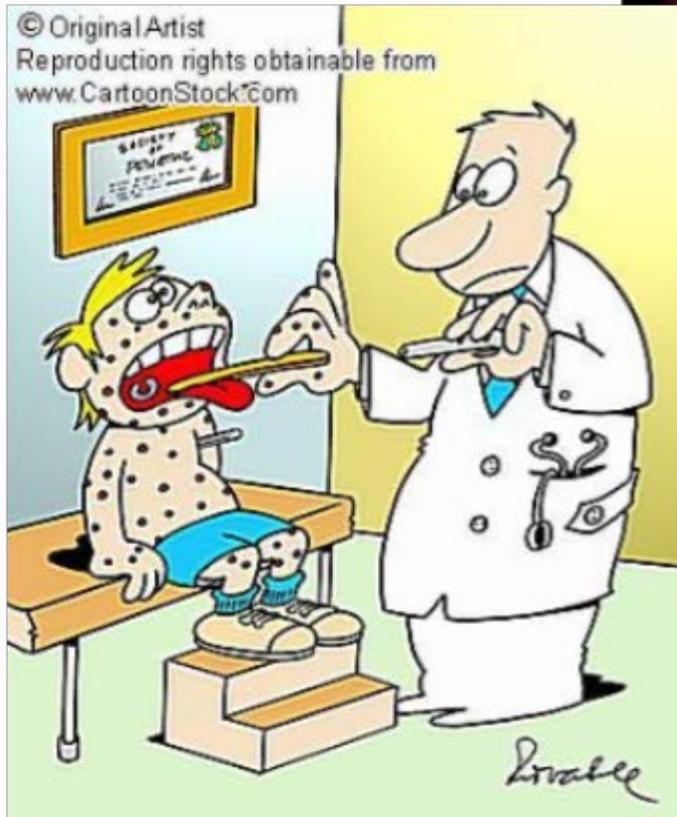


Coronavirus

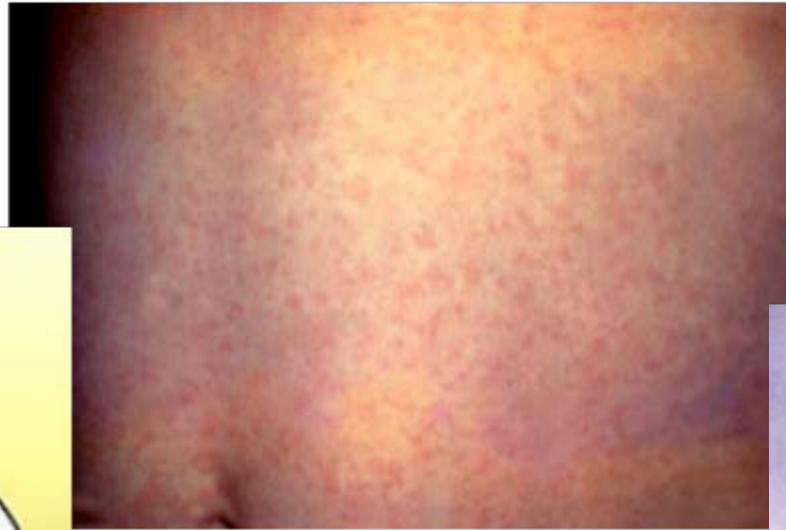
# Pathogens of URIs

- Other viral infections include:
  - Respiratory syncytial virus (RSV)
    - Typically among infants <1 year of age
    - Often leads to bronchitis or pneumonia
  - Measles virus
    - Vaccine-preventable (vaccinate between 9-15 months)
    - Fever and coryza early, conjunctivitis and cough later
    - Major cause of child mortality in developing countries
  - Epstein-Barr virus
    - Typically opportunistic infection among HIV+

# Measles



Measles is highly contagious, and typically from 5 days before rash to 5 days after appearance of rash



Early phase of measles rash on trunk of a child



Late phase of measles rash

# Pathogens of URIs

- Typical bacterial and fungal infections include:
  - *Streptococcus pyogenes* (Strep throat)
    - Repeated infections can lead to rheumatic heart disease and glomerulonephritis
  - *Staphylococcus aureus*
  - *Corynebacterium diphtheriae*
  - *Neisseria gonorrhoea*
  - Secondary syphilis
  - *Candida albicans*
    - Typically opportunistic infection among HIV+

# Strep throat (*Streptococcus pyogenes*)



## Management of URIs

- Determine if systemic involvement (fever is unusual) or includes lower respiratory infection.
- If only upper respiratory infection, most are self-limited viral infections that do not require antimicrobial treatment.
- Need to rule out *Streptococcus pyogenes* - repeated infections may lead to rheumatic heart disease and glomerulonephritis.
- Treat symptoms appropriately.
- If bacterial infection, provide appropriate antimicrobials.

## Case of an Upper Respiratory Infection

A 9 year-old girl presents to the clinic with two days of “runny nose” (coryza), sore throat (pharyngitis), and nasal congestion. She generally feels a little more tired than usual. Several children at school have had a “cold”. She has not had any nausea, vomiting, headache, or difficulty breathing. On exam, she is afebrile (normal temp.) and has a normal respiratory rate (<20 breaths/min.). She has mucopurulent discharge from her nose, a diffuse erythematous pharynx, and a clear lung exam. Her mother is concerned about something serious, since many kids at school have become ill, despite the patient feeling a little better this morning.

What are you most concerned about? What would you do now?

# Case of Upper Respiratory Infection

**Concerns:** *Streptococcus pyogenes* (Streptococcal pharyngitis)

## Next steps:

1. Complete a careful history with review of symptoms and physical exam.
2. Obtain a throat swab to test of *Streptococcus pyogenes*.
3. Provide reassurance that the infection is most likely a self-limited viral infection that is “not serious” and does not require antimicrobial therapy.
4. Treat symptoms appropriately
  - Nasal decongestants
5. Inform the patient and mother that they should return if the symptoms worsen or if the symptoms do not resolve in 7 days.
6. If symptoms worsen or do not resolve, then suspect bacterial infection and consider antimicrobial therapy.

# Presentation Outline

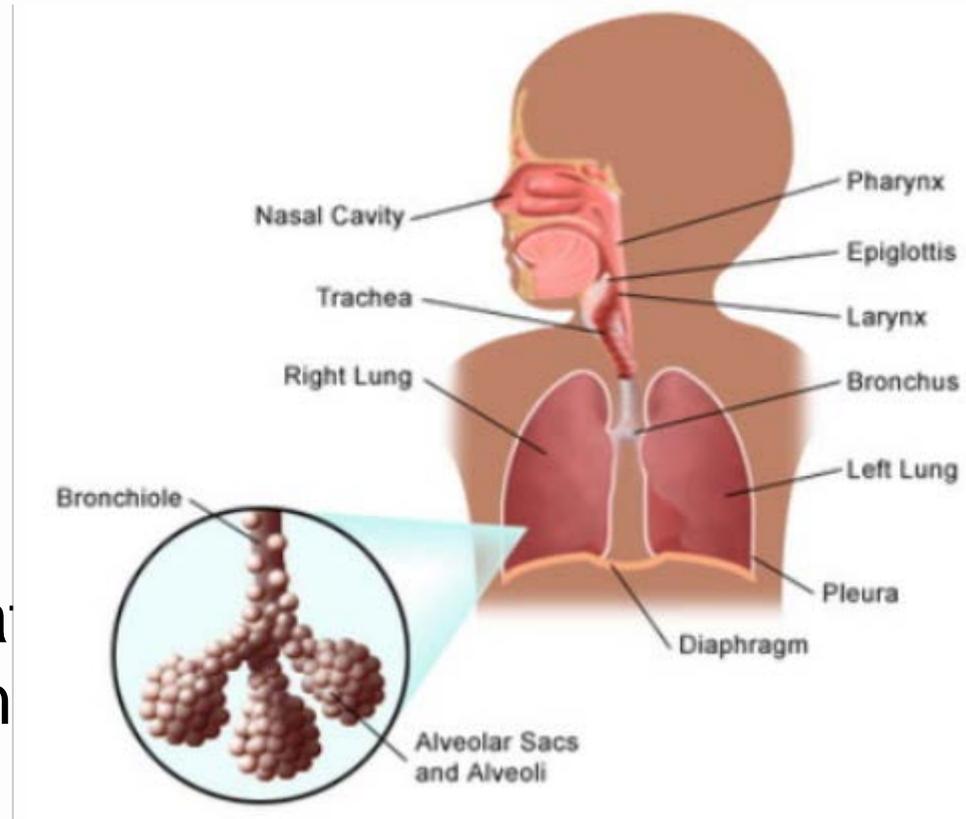
- Epidemiology
- Upper respiratory infections
- **Lower respiratory infections**
  - Acute bronchitis
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# Epidemiology of Lower Respiratory Tract Infections

- About 20% of deaths among children (<5) due to acute lower respiratory infections.
  - 90% of these deaths due to pneumonia
- Pneumonia causes 2-5 million deaths/year among children in developing countries.
- Pneumonia remains a major killer of elderly in both developed and developing countries.

# Lower Respiratory Tract Infections

- **Acute bronchitis** are usually self-limited viral infections in bronchus that should not be treated with antimicrobials. Antibiotics have no effect against viruses.
- **Pneumonias** are usually bacterial infections in lung that require antimicrobial treatment

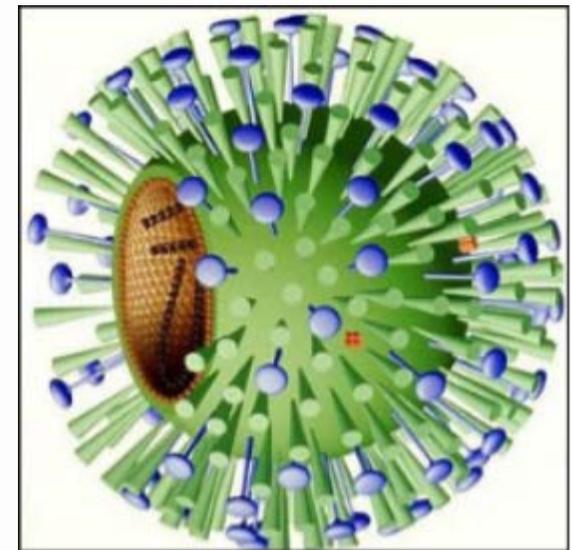


# Acute Bronchitis

- Characterized by inflammation of the bronchi.
- Clinically expressed as cough, usually with sputum, and evidence of concurrent upper respiratory infection.
- Absence of abnormalities on a chest X-ray distinguishes acute bronchitis from pneumonia.
- Must exclude an exacerbation of chronic bronchitis and chronic cough (>3 weeks) - usually postnasal drip syndrome, asthma, or gastroesophageal reflux.
- Usually (~90%) self-limited viral infections that do not require antimicrobial treatment.

# Pathogens of Acute Bronchitis

- Typical viral infections include:
  - Coronavirus
  - Rhinovirus
  - Adenovirus
  - Influenza virus
  - Parainfluenza virus
  - Human Metapneumovirus



Influenza Virus

# Pathogens of Acute Bronchitis

- Typical bacterial and fungal infections include:
  - *Mycoplasma pneumoniae*
    - Typical in young adults and symptoms may persist up to 4-6 weeks
  - *Chlamydophila* (formerly *Chlamydia*) *pneumoniae*
  - *Bordetella pertussis*
    - Vaccine-preventable, causes ‘whooping cough’ with distinctive “whoop” sound
    - Substantial morbidity and mortality in unvaccinated persons

# Management of Acute Bronchitis

- Determine if systemic involvement (fever is unusual).
- Obtain chest X-ray to exclude pneumonia.
- If only acute bronchitis, most are self-limited viral infections that do not require antimicrobial treatment.
- Treat symptoms appropriately.
  - Bronchodilators not effective if symptoms <4 weeks, unless airflow obstruction was present.<sup>1</sup>

1. Smucny JJ, et al. J fam Pract 2001;50:945.

## Case of Acute Bronchitis

A 16 year-old boy presents with three days of cough, occasionally productive with yellow phlegm, and sore throat (pharyngitis). He has stayed home from school for the last 2 days because he felt like he “had the flu”. He has not had any nausea, vomiting, headache, or difficulty breathing. On exam, he is afebrile (normal temp.), tachycardic (110 heart beats/min.), and has a normal respiratory rate (<20 breaths/min.). He has a diffuse erythematous pharynx and a clear lung exam.

What are you most concerned about? What would you do now?

# Case of Acute Bronchitis

## Concerns -- Pneumonia

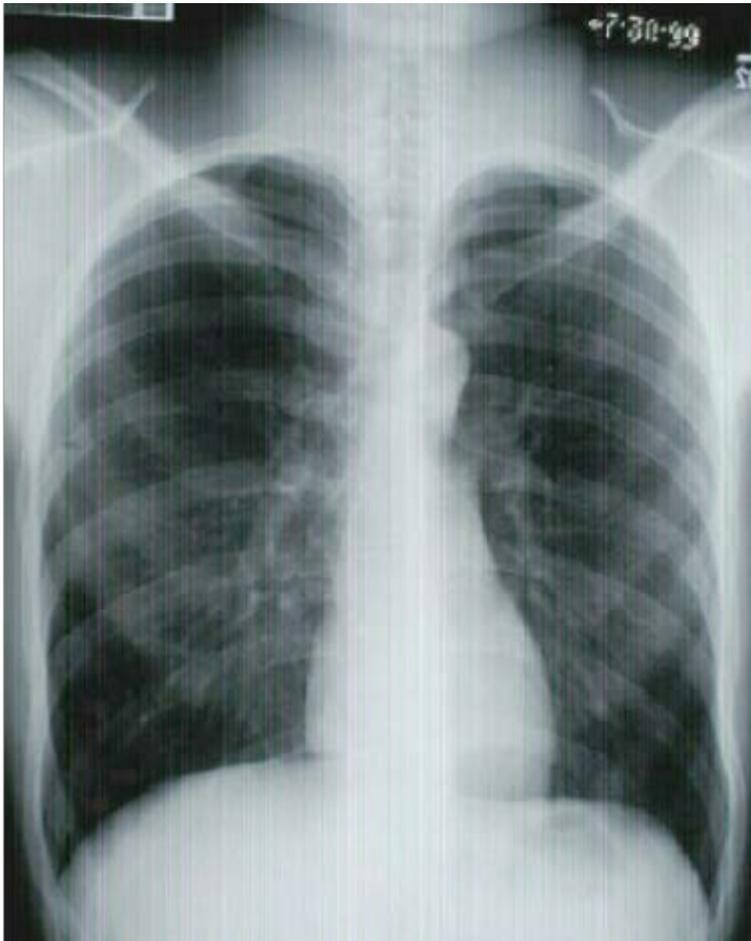
### Next steps:

1. Complete a careful history with review of symptoms and physical exam.
2. Obtain a chest X-ray.
3. If negative for pneumonia, provide reassurance that the infection is most likely a self-limited viral infection and does not require antimicrobial therapy.
4. Treat symptoms appropriately
  - Nonsteroidal anti-inflammatory drugs
  - Nasal decongestants
5. Inform the patient and mother to return if the symptoms worsen or if the symptoms do not resolve in 7-10 days.
6. If symptoms worsen or do not resolve, then suspect bacterial infection and consider antimicrobial therapy.

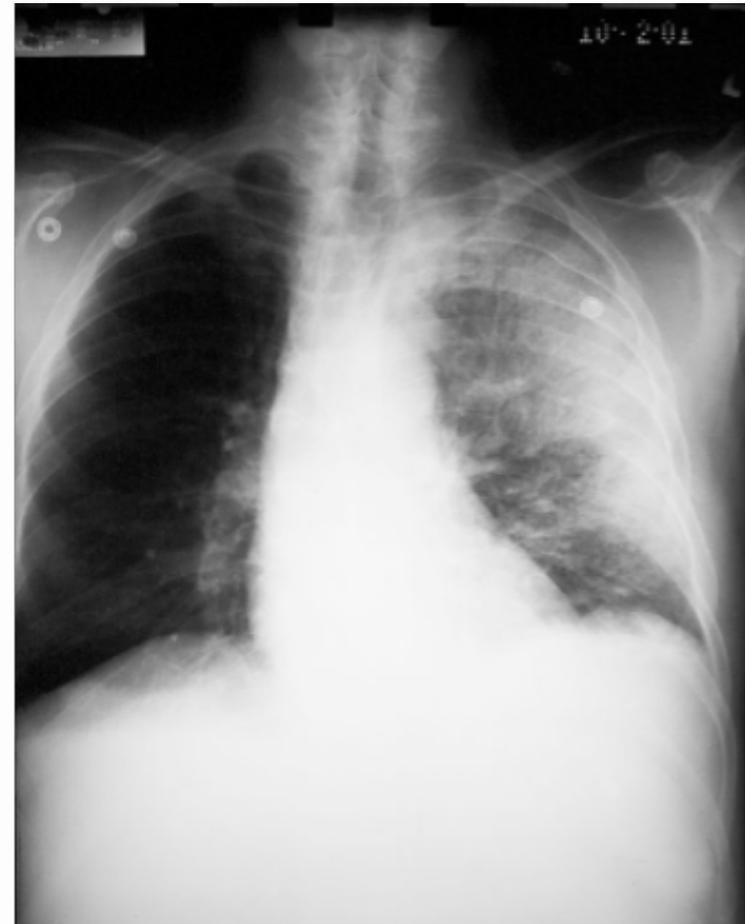
# Pneumonia

- An infection of the lower respiratory tract.
- Substantial cause of morbidity and mortality worldwide.
- *Streptococcus pneumoniae* is most common cause worldwide.
- Clinically expressed as cough, usually with sputum, and may have evidence of concurrent upper respiratory infection.
- Usually have chest X-ray findings indicating pneumonia.
- Usually bacterial infections that require antimicrobial treatment.

# Chest x-rays

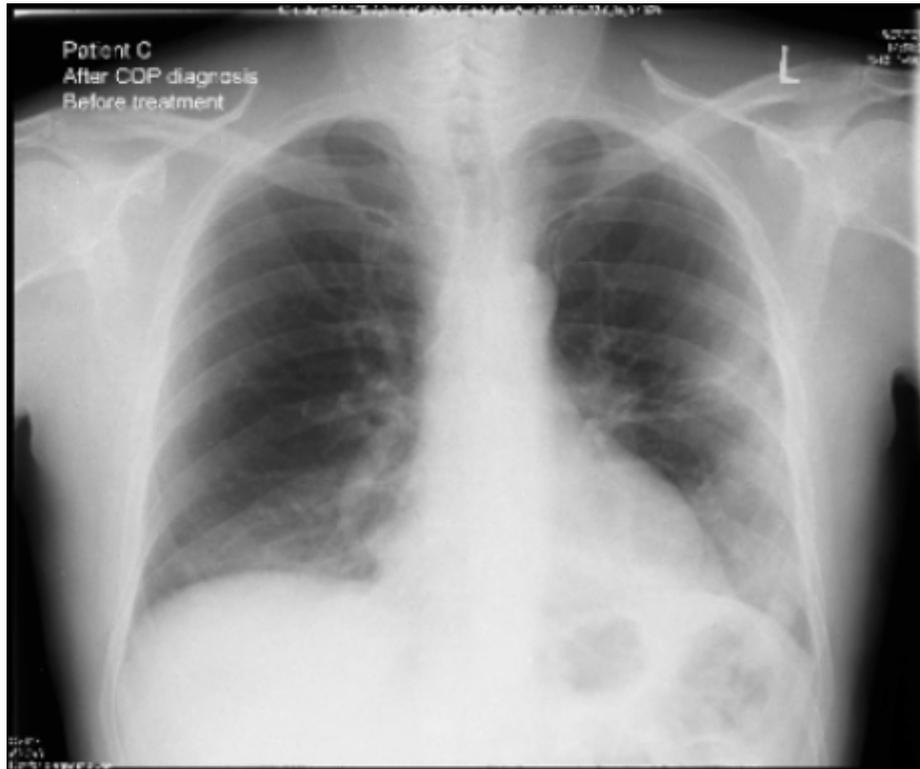


Normal male chest x-ray



Diffuse pneumonia of left lung

For more example x-ray images, please visit:  
University of Virginia module: <http://www.med-ed.virginia.edu/courses/rad/cxr>



Chest X-Ray of patient 6; 58 year-old male with recently diagnosed C.O.P. before treatment. Note patchy air space opacification affecting the lateral aspect of the left mid-zone.

## Pneumonia in left lung (may be subtle)



## Pneumonia in right middle lobe

For more example x-ray images, please visit: University of Virginia module: <http://www.med-ed.virginia.edu/courses/rad/cxr>

Chest radiography with postero-anterior and lateral views is the preferred imaging examination for the evaluation of suspected typical pneumonia. Typical pneumonia x-ray would present with opacity (whiteness in lung areas) indicating more density compared to air. Though controversial, opacity occurs within 12 hours. Opacity can be focal or diffuse. In the above image, the opacity is diffuse. Other findings that suggest the presence of pneumonia on a chest x-ray include air bronchograms, parapneumonic effusions, lung abscesses and atelectasis.

Franquet T. Imaging of pneumonia: trends and algorithms. *Eur Respir J.* Jul 2001;18(1):196-208.

# Pneumonia

- **Typical clinical features**
  - Systemically ill with malaise, fever, body aches, and headache.
  - Delirium can occur with serious infections, children, or elderly.
- **Typical respiratory symptoms**
  - Cough, sputum production, difficulty breathing (dyspnea), pleural pain, and rarely coughing blood (hemoptysis).
  - Sputum is often initially scanty or absent, and can become more purulent.
- **Typical respiratory signs**
  - Rapid breathing (tachypnea), rapid heart rate (tachycardia), inspiratory crackles/rales, reduced chest movement.

# Pneumonia

- Two important questions:
  - Community-acquired or hospital-acquired?
  - Previous health status of patient?
    - HIV-positive or immunocompromised
    - Malnutrition
    - Absence or malfunctioning spleen
    - Pregnancy or diabetes
- Help determine causative agent and disease course, direct antimicrobial therapy, and predict prognosis.

## Note about Tuberculosis (TB)

- Approximately 1/3 of worldwide population infected with latent TB.
- Should strongly consider TB infection in anyone that lives in or has traveled to a country with endemic TB.



Chest x-ray of TB

For more example x-ray images, please visit:

University of Virginia module: <http://www.med-ed.virginia.edu/courses/rad/cxr>

Typical TB x-rays would present with segmental or lobar airspace consolidation, mediastinal lymphadenopathy, pleural effusion, and atelectasis. Note that chest x-rays may be normal in as many as 15% of patients with primary pulmonary TB. Harisinghani MG, McLoud TC, Shepard JA, et al. Tuberculosis from head to toe. *Radiographics*. Mar-Apr 2000;20(2):449-70; quiz 528-9, 532.

# Community-Acquired Pneumonia

- Generally occur among healthy patients.
- Over 100 possible infectious causes.
- “Typical” bacterial organisms include
  - *Streptococcus pneumoniae*
  - *Haemophilus influenzae* type B
  - *Moraxella catarrhalis*
  - *Staphylococcus aureus*
- Vaccinations are useful in the prevention of infectious respiratory diseases
  - Pneumococcal vaccine against *Streptococcus pneumoniae* (mainly in young children and the elderly)
  - Hib vaccine against *Haemophilus influenzae* type B (mainly in children)

# Community-Acquired Pneumonia

- Some “atypical” bacterial organisms
  - *Mycoplasma pneumoniae*
  - *Chlamydophila pneumoniae*
  - *Chlamydophila psittaci*
  - *Coxiella burnetti*
  - *Legionella pneumophila*
  - *Bacillus anthracis*
  - *Yersinia pestis* (plague)
  - *Salmonella typhi* (typhoid fever)

# Community-Acquired Pneumonia

- Some “atypical” viral infections include
  - Influenza virus
  - Most viruses that can cause common upper respiratory infections
- Some “atypical” fungal infections include
  - Histoplasmosis
  - Blastomycosis
  - Coccidiomycosis
  - Paracoccidiomycosis

# Case Study of Community-Acquired Pneumonia

## Influenza A (H1N1) Pandemic

- 2009 summer outbreak attributed to a new viral pathogen
- Led to number of cases of severe hypoxemic respiratory failure due to viral pneumonia
- People at high risk:
  - Elderly, children under 5, pregnant women, immunosuppressed patients, obese individuals
- Epidemiology:
  - More than 214 countries reported case of H1N1
  - more than 18,000 deaths during pandemic

Ramsey, C and Kumar A. 2011. H1N1: viral pneumonia as a cause of acute respiratory distress syndrome. *Current Opinion in Critical Care*. 17: 64-71.

# Case Study of Community-Acquired Pneumonia

- Clinical presentation of H1N1 pneumonia:
  - cough, dyspnea, fever
  - severe and rapidly progressing hypoxemia
  - viral pneumonitis
  - multi-focal pneumonia
  - bilateral alveolar infiltrates
  - most ICU admissions were for acute respiratory distress syndrome type presentations

## Management and Prevention

- early treatment with antivirals (i.e., oseltamavir)
- mechanical ventilation if in respiratory distress
- CDC guidelines suggest everyone receive annual flu vaccination

Ramsey, C and Kumar A. 2011. H1N1: viral pneumonia as a cause of acute respiratory distress syndrome. *Current Opinion in Critical Care*. 17: 64-71.

# Hospital-Acquired Pneumonia

- “Health care-associated pneumonia” or “nosocomial pneumonia” are acquired in health care settings
- CDC has recommendations to reduce these infections<sup>1</sup>
  - Maintain clean equipment
  - Gloves or disinfectant to prevent person-to-person transmission
  - Increase host defenses and precautions to prevent infections

1. CDC. Guidelines for preventing health care-associated pneumonia, 2003. MMWR Rec and Reports 2004; 53(RR03): 1-36.

# Hospital-Acquired Pneumonia

- Occurs >48 hours after hospital admission.
- Signs: Fever, high white blood cell count (>10,000), purulent sputum, lung infiltrates seen on chest X-ray.
- Risk factors: Increased age, obesity, smoking, intubation and mechanical ventilation, prolonged anesthesia, surgical, catheter infection
- Etiology:
  - Aspiration of nasopharyngeal or gastrointestinal secretions.
  - Inhalation from contaminated instruments, such as ventilator-associated pneumonia
  - Hematogenous spread
- Prevention: Reduce preoperative smoking, encourage early mobilization, restrict contact with contagious patients

# Hospital-Acquired Pneumonia

- Some causative agents:
  - *Staphylococcus aureus*
  - *Pseudomonas aeruginosa*
  - *Klebsiella pneumoniae*
  - *Streptococcus pneumoniae*
  - *Haemophilus influenzae*
  - Anaerobic bacteria

# Aspiration Pneumonia

- Predominantly anaerobic bacteria affect lower lobe of right lung.
- Suspect in alcoholics, IV drug users, and debilitated persons.
- Risk factors:
  - impaired consciousness
  - poor dentition
  - dysphagia
  - being bed-bound
  - neuromuscular disease
  - decreased ability to clear secretions
- If hospital-acquired, then aerobic bacteria (Gram-negative Enterobacteriaceae and *Pseudomonas aeruginosa*) are more concerning.
- As infection proceeds untreated, tissue necrosis can result in foul-smelling purulent discharge.

## AIDS-Related Pneumonia

- ‘Typical’ bacterial infections are still most common.
- Must consider tuberculosis and *Pneumocystis jirovecii* pneumonia.
- Other opportunistic infections include
  - Fungal infections (candidiasis, cryptococcosis, histoplasmosis, coccidioidomycosis)
  - Atypical mycobacteria (*Mycobacterium avium complex*)
  - Viral infections (Cytomegalovirus, Epstein-Barr Virus)
  - Bacterial infections (*Nocardia asteroides*, *Legionella pneumophila*)
  - Parasitic infections (*Toxoplasma gondii*)

# AIDS-Related Pneumonia

## Signs:

- fatigue, fever, chills, sweats, dry cough, hemoptysis, dyspnea, tachypnea

## Risk factors:

- post-HIV seroconversion, CD4<sup>+</sup> count below 200cells/microliter, lack of antiretroviral and preventative treatments

# AIDS - Related Pneumonia

- **Etiology**

- Impaired T-cell immunity
- Colonization by fungi, *Mycobacterium*, other bacteria and viruses
- Can lead to bacteremia and disseminated disease
- Presence of clinical signs

- **Prevention**

- Chemoprophylaxis for fungal infections (*Pneumocystis jirovecii* pneumonia) and *Mycobacterium*
- Testing from immunoglobulins (IgG) in the case of *Toxoplasma* infections
- Tuberculin skin test for TB

## Management of AIDS-Related Pneumonia

- Obtain chest X-ray, but may not be diagnostic.
- Obtain sputum cultures to determine infectious organism, with testing for tuberculosis and *Pneumocystis jiroveci*.
- Obtain CD4 count and HIV viral load to help determine likely organisms.
- Obtain blood cultures to look for disseminated infection.
- Typically hospitalize for appropriate diagnostic work-up and management.

## Recurrent Pneumonia

- Defined as 2 or more episodes of pneumonia within the past 12 months
- Etiology:
  - Localized respiratory disease, such as bronchiectasis, bronchial obstruction, intrapulmonary sequestration, etc.
  - Generalized respiratory disease, such as COPD, cystic fibrosis, etc.
  - Non-respiratory problem, such as recurrent aspiration, immunocompromised, etc.
- Prevention: Determine and address underlying cause.

# Management of Pneumonia

- Determine if systemic involvement (fever is typical).
- Consider obtaining chest X-ray
  - May not be needed if diagnosis is clear from history and exam.
- If pneumonia, most are bacterial infections that require antimicrobial treatment.
- Treat signs and symptoms appropriately.
  - Analgesia for pleuritic pain.
  - Fluids for dehydration.
  - Oxygen for difficulty breathing or dyspnea.
- Obtain blood cultures if suspect sepsis, consider empiric IV antibiotics if patient is too ill to wait for blood culture results.

# Management of Pneumonia

- General points for antimicrobial use
  - Amoxicillin and ampicillin usually covers *S. pneumoniae* from community-acquired pneumonia.
  - Macrolide (azithromycin) added to cover 'atypical' infections from community-acquired pneumonia.
- Antibiotic use should be determined by probable infectious cause, antibiotic availability, and local antibiotic resistance pattern.
- If severe, consider intravenous antibiotics (ex. ceftriaxone) or a respiratory fluoroquinolone
- Should consult with local physicians when prescribing antibiotics.

# Management of Pneumonia

- Slow or incomplete resolution of pneumonia is common problem
- Complication of untreated or non-resolving pneumonia
  - Empyema - loculated lung infection
  - Lung abscess
  - Neoplastic or inflammatory disorders
  - Pulmonary embolism or pulmonary edema
- Should be further evaluated with imaging study, bronchoscopy, or lung biopsy and treated appropriately.

## Case of Pneumonia

A 24-year-old woman presents with four days of cough with productive sputum (without blood) that has been increasing over the last 2 days. She feels a fever and general malaise. She also feels short of breath when she walks, but has been resting in bed most of the last three days. Before this episode she was generally healthy and has not had any recent infections or hospitalizations. She has been mainly at home and work for the last several weeks and does not know if any sick contacts. She is HIV-negative and does not know if she has been exposed to Tuberculosis. She has not had any nausea, vomiting, headaches, or body aches. On exam, she is febrile (temp. is 39.0 F), tachycardic (110 heart beats/min.), and tachypnea (24 breaths/min.). She has diffuse crackles in the bases of both lungs.

What is the most likely diagnosis? What would you do now?

## Likely diagnosis -- Community-Acquired Pneumonia from *S. pneumoniae*

### Next Steps:

1. Complete a careful history with review of symptoms and physical exam.
2. Consider obtaining a chest X-ray, may not alter treatment.
3. Provide reassurance that the infection is most likely a bacterial infection and can be treated with appropriate antimicrobial therapy.
  - Consult with local physician for appropriate antibiotics and duration of therapy.
4. Treat symptoms appropriately
  - Analgesia for pleuritic pain.
  - Fluids for dehydration.
  - Oxygen for difficulty breathing or dyspnea.
5. Consider obtaining blood cultures and admission to hospital for disease management and further work-up of infection.

## Case of AIDS-Related Pneumonia

A 32 year-old man presents with four days of cough with mild sputum production sputum (without blood). He is HIV-positive and his last CD4 T-cell count was 125 several months ago. He has not had access to HIV medicines or prophylactic antibiotics. He has been feeling weak with a general malaise for several weeks. He does not feel short of breath. He has had a poor appetite for the last two months. He knows that he has been exposed to Tuberculosis in the past, and did not complete a full course of therapy. He has not had any nausea, vomiting, headaches, or body aches. On exam, he is afebrile (temp. is 38.0 F), tachycardic (110 heart beats/min.), and tachypnea (24 breaths/min.). He has mild diffuse crackles in the bases of both lungs.

What are you most concerned about? What would you do now?

# Case of Pneumonia

## Concerns -- AIDS-Related Pneumonia from Tuberculosis

### Next steps:

1. Complete a careful history with review of symptoms and physical exam.
2. Obtaining a chest X-ray and appropriate labs, including CD4 count, HIV viral load, and sputum culture.
3. Treat symptoms appropriately
  - Analgesia for pleuritic pain.
  - Fluids for dehydration.
  - Oxygen for difficulty breathing or dyspnea.
4. Hospitalize patient for appropriate work-up and treatment.
5. Consult with local physician for treatment of opportunistic infection, once identified. Consider empiric IV antibiotics if suspect sepsis.
6. Once treatment plan has been initiated and patient is stable, arrange for appropriate outpatient follow-up for HIV management.

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    - AIDS-related pneumonia
    - Recurrent pneumonia
- **Summary**
- Self-assessment Quiz

## Summary - Upper Respiratory Infections

- Infection limited to upper respiratory tract that does not include systemic infection or lower respiratory tract.
- Need to rule out *Streptococcus pyogenes*, which can lead to rheumatic heart disease and glomerulonephritis.
- Usually self-limited viral infections that do not require antimicrobial treatment.
- Common cause of morbidity, but not a major cause of mortality.

## Summary - Acute Bronchitis

- Infection of lower respiratory tract that does not include systemic infection or pneumonia.
- Chest X-ray needed to exclude pneumonia.
- Usually self-limited viral infections that do not require antimicrobial treatment.

## Summary - Pneumonia

- Infection of lower respiratory tract that usually involves systemic signs or symptoms.
- *S. pneumoniae* and other 'typical' bacterial infections are most common cause.
- Need to determine if community- or hospital-acquired infection.
- Need to determine previous health status of the patient, particularly HIV status and prior exposure to Tuberculosis.
- Consider hospitalizing patient, obtaining sputum or blood cultures to identify organism, and starting appropriate antibiotic therapy.

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## Self-assessment Quiz

We hope to have a computer application that allows quizzes to be self-contained so that you can click your preferred answer and immediately see the results displayed. For now, please write down your preferred answer to the next 10 questions and check your answers against the correct list on slide #72.

1) What percentage of deaths among children under 5 are due to lower respiratory tract infections?

- a) <1%
- b) 5%
- c) 10%
- d) 20%
- e) 50%

2) What is the most common cause of bacterial pneumonia?

- a) *Streptococcus pneumoniae*
- b) *Staphylococcus aureus*
- c) *Escherichia coli*
- d) *Pseudomonas aeruginosa*
- e) *Bordetella pertusis*

3) What proportion of the world's population is infected with latent tuberculosis?

- a)  $1/50$
- b)  $1/20$
- c)  $1/10$
- d)  $1/5$
- e)  $1/3$

4) Most cases of acute bronchitis are caused by:

- a) *Streptococcus pneumoniae*
- b) *Pneumocystis jiroveci*
- c) Viruses
- d) *Mycobacterium tuberculosis*
- e) *Candida* species

5) Which of the following is NOT a pathogen commonly implicated in hospital-acquired pneumonias?

- a) *Pseudomonas aeruginosa*
- b) *Staphylococcus aureus*
- c) *Haemophilus influenzae*
- d) *Escherichia coli*
- e) *Klebsiella pneumoniae*

6) Which of the following is **NOT** a CDC recommendation to prevent Hospital-Acquired Pneumonia?

- a) Clean equipment, gloves, and disinfectants to prevent person-to-person transmission
- b) Provide patient with prophylactic antibiotics
- c) Encourage early mobilization
- d) Reduce preoperative smoking
- e) Increase host defences and precautions to prevent infections

7) In the management of AIDS-related pneumonia, which of the following is necessary?

- a) Obtain chest x-ray, even though it may not be diagnostic
- b) Obtain CD4 count and HIV viral load to help determine organism
- c) Obtain sputum cultures to determine infectious organisms, such as Tuberculosis and *Pneumocystis carinii*
- d) Obtain blood cultures to look for disseminated infection
- e) All of the above

- 8) In the management of pneumonia, treating symptoms appropriately **DOES NOT** involve which of the following?
- a) Oxygen for difficulty breathing or dyspnea
  - b) Bronchodilators to decrease airway resistance
  - c) Analgesia for pleuritic pain
  - d) Fluids for dehydration
  - e) None of the above. They are all involved in the management of pneumonia symptoms

9. Read the case below and answer the question on the next slide

A 30-year-old female presents with five days of cough and mild sputum production (without blood). She is HIV-positive and her last CD4 T-cell count was 115 several months ago. She has not had access to HIV medicines or prophylactic antibiotics for a while now. She has been feeling weak with a general malaise for several weeks. She does not feel short of breath. However, she has had a poor appetite for the last two months. She has not had any nausea, vomiting, headaches, or body aches. On exam, she is febrile (temp. is 38.8 °C), tachycardic (110 heart beats/min.), and tachypnic (24 breaths/min.). She has mild diffuse crackles in the bases of both lungs.

- 9) Which of the following opportunistic infections is MOST likely in this individual?
- a) Fungal infections (*Candida albicans*, *Pneumocystis carinii* pneumonia)
  - b) Bacterial infections (TB)
  - c) Viral infections (Cytomegalovirus, Epstein-Barr virus)
  - d) Atypical mycobacteria (*Mycobacterium avium complex*)
  - e) Parasitic infections (*Toxoplasma gondii*)

10. Read the case below and answer the question on the next slide

A 9 year-old girl presents to the clinic with two days of “runny nose” (coryza), sore throat (pharyngitis), and nasal congestion. However, she hasn’t complained of a cough. She generally feels a little more tired than usual. Several children at school have had a “cold”. She has not had any nausea, vomiting, headache, or difficulty breathing. On exam, she is afebrile (normal temp.) and has a normal respiratory rate (<20 breaths/min). She has mucopurulent discharge from her nose, a diffuse erythematous pharynx, tonsillar exudates, tender anterior cervical lymph nodes, and a clear lung exam. Her mother is concerned about something serious, since many kids at school have become ill, despite the patient feeling a little better this morning.

- 10) After determining what you are most concerned about, which step would you try to avoid in the management of this patient?
- a) A careful history, review of symptoms, and a physical exam
  - b) Obtaining a throat swab to rule out *Streptococcus pyogenes*
  - c) Providing antimicrobial therapy (i.e. antibiotics) since this is most likely a upper respiratory tract infection caused by a bacterial infection
  - d) Treating symptoms as needed (i.e. nasal decongestants)
  - e) Informing the patient and mother that they should return if the symptoms worsen or if they do not resolve in 7 days

# Quiz Answers

1. d
2. a
3. e
4. c
5. d
6. b
7. e
8. b
9. b
10. c

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