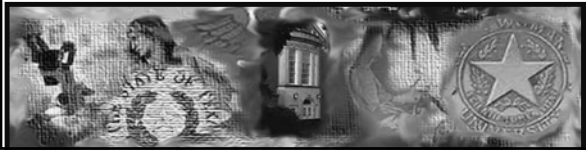


Common Respiratory Disorders

Dr. Susan Chaney
NURS 5415 - Women's Health Nursing III



Acute Bronchitis

Respiratory Disorders

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Acute Bronchitis

- Poorly defined but common clinical condition caused by acute inflammation of the trachea and bronchi
- Usually attributed to infectious agents
- Nonspecific irritants such as dust and smoke cause irritation
- Unusual as an isolated entity in children

Epidemiology

- No known genetic pattern
- Incidence in USA: common
- Predominant age: all
- Male = female
- Usually self-limiting with complete healing and full return to function

Causes

- Influenza A and B viruses (older children and adults)
- Parainfluenza viruses, rhinovirus
- Respiratory syncytial virus
- Hemophilus influenza B
- Secondary infection as part of URI
- Streptococcal pneumoniae

Risk Factors

- Fatigue
- Chronic bronchopulmonary diseases
- Chronic sinusitis
- Bronchopulmonary allergy
- Hypertrophied tonsils and adenoids in children
- Immunosuppression

Risk Factors

- Air pollutants
- Elderly
- Infants
- Smoking: frequency and severity increased in smokers
- Second - hand smoke

Subjective Data

- Cough, dry to productive
- Sputum may be scant, clear to mucopurulent (viral); to moderate, >2 tbslsp/day, purulent (bacterial)

Subjective Data

- Most are afebrile; mild symptoms
- Occasional fever, substernal pain, mucoid sputum, or bronchospasm with wheezing
- Symptoms last 7-14 days; may continue 3-4 weeks
- Smokers have frequent, longer & more severe symptoms

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Objective Data

- Physical findings minimal or absent
- Temperature < 101
- Lungs: scattered wheezes, rhonchi, occasional rales
- Signs of pulmonary consolidation are absent
- Fever usually minimal or absent, except in cases of influenza

Essentials of Diagnosis

- Cough that usually progresses from dry to productive
- Rhonchi appearing predominantly during expiration
- Children appear nontoxic

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Pathogens

- 95% are viral
 - Adenovirus
 - Influenzae
 - Common cold
- Less commonly
 - Bordetella pertussis
 - Chlamydia pneumoniae
 - Moraxella catarrhalis
 - Mycoplasma pneumonia
- Secondary bacterial invasion in smokers
 - Streptococcus pneumoniae
 - Haemophilus influenzae rare

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Diagnosics

- Chest x-ray normal. Reserve for those patients in whom influenza is suspected, those with underlying COPD, or physical findings suggestive of pneumonia
- WBC: normal or slightly elevated
- Sputum cultures not considered useful
- PPD if patient at risk for TB

Diagnosics

- Severe symptoms--oximetry
- Asthma suspected—PFTs or provocative testing with methacholine
- At risk for pertussis—Culture (special) or antigen detection (contact TDH)
- Uncertain diagnosis—CBC, sputum cultures

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Assessment: Differential Diagnosis

- Pneumonia
- Noninfectious causes: allergens, repeated aspiration
- URI
- Influenza
- Pertussis
- Cystic fibrosis; Asthma

Differential Diagnosis

- Pneumonia—Following more consistent with pneumonia than bronchitis
 - High fever
 - Increased respiratory rate
 - Rigors (sever chills) and constitutional symptoms
 - Pleuritic chest pain
 - Rusty/bloody sputum
 - Focal crackles on auscultation

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Plan

- Palliative: rest, increase fluids up to 3-4 L/day while febrile
- Humidity/steam
- Acetaminophen, ibuprofen, aspirin prn pain, fever
- Cough suppressant sparingly, usually HS, codeine, Robitussin DM

Plan

- Do not use cough suppressants for COPD clients
- Bronchodilators (wheezing) such as albuterol, 2 puffs q 4 hours
- Antibiotics for more severe symptoms, high fever persists: Erythromycin, Amoxicillin, TMP-SMX, Tetracycline X 10 days; Levaquin

Pharmacotherapy

- Most cases (95%) viral--antibiotics not indicated
- Previously, coughs over 7-10 days treated with antibiotics
- Today, recognized that even viral infections may persist for 3-4 weeks

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Pharmacotherapy (continued)

- For persistent wheeze, treatment against Chlamydia species may prevent development of asthmatic symptoms
 - Children > 8 years: doxycycline 100mg bid for 2-3 weeks
 - Children < 8 years: clarithromycin 7.5 mg/kg q 12h
- Secondary bacterial infection
 - Adults: Erythromycin 250-500 QID X 10d; TMP/SMX 800/160 BID; doxycycline 100mg BID

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Pharmacotherapy (continued)

- Bronchodilators may relieve symptoms
 - Trial albuterol 2 puffs Q 6h X 7d
- Cough suppressants only at night
- Avoid antihistamines
- Mucolytic/decongestants if accompanied by sinus condition

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Patient Education

- Stop smoking
- Avoid pollutants
- Rest until fever subsides
- Avoid antihistamines because they dry out secretions
- Avoid cough suppressants unless needed for sleep

Follow-Up

- RTC if not improving in 72 hours; or if symptoms persist longer than 7-14 days or if condition worsens
- Viral infections may persist 3-4 weeks; may still not need antibiotics
- Refer to physician; consider for undiagnosed patients with risk factors for cancer such as smoking or occupational exposure

Complications

- In otherwise healthy children, complications of acute bronchitis secondary to viral infection are few
- Include OM, sinusitis, and pneumonia (Hay)
- In adults, diagnosis of chronic bronchitis is based on history of at least 3 months of productive cough for 2 or more years

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Prognosis

- Expected Course and Prognosis
 - Usual-complete healing with good return of function
 - Can be serious in elderly or debilitated patients
 - Cough may persist for weeks
 - Post-bronchitic reactive airways disease (rare)

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Respiratory System

Pneumonia

Pneumonia

- Infection of the alveoli and/or interstitial tissues
- Approximately 2-3 million cases annually
- Pneumonia is the 6th greatest cause of death in US
- Caused by viruses and bacteria; establishing a specific etiologic diagnosis is difficult (Tierney, refer to table)

Epidemiology

- 2-3 million adults develop CAP annually
 - 1.5 million are hospitalized
 - 90,00 die
- Most deadly of all infectious disease in US
- Morbidity and mortality highest at each end of age spectrum
- Death rate for infants < age 1 is 11.7 per 100,000 (higher than for persons age 55)
- Mortality 40% among ICU admissions for CAP

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Bacterial Pneumonia

- | | |
|-----------------|------------------|
| ■ Pneumococcus | ■ Staphylococcus |
| ■ Streptococcus | ■ Klebsiella |
| ■ H. influenzae | ■ Legionella |
| ■ Mycoplasma | ■ Psittacosis |

Typical and Atypical Pneumonia Typical Pneumonia

- Sudden onset of fever
- Cough productive of purulent sputum
- Chest pain
- Shaking chills
- Headache
- Dullness with bronchial signs of lung consolidation

Atypical Pneumonia

- Gradual onset
- Dry cough
- Headache
- Myalgia
- Fatigue
- Sore throat
- Nausea, vomiting
- Diarrhea
- Physical findings minimal
- Leukocyte count <15,000
- Viral or mycoplasma pneumoniae
- Chlamydia pneumoniae

Typical Pneumonia

- Localized X-ray findings
- Leukocyte count > 15,000
- Bacterial

Subjective Data

- Recent URI
- Cough: ranges from hacking, non-productive (mycoplasma, viral) to productive with rusty or yellow sputum (bacterial)
- Fever, chills
- Myalgia, pleuritic pain, dyspnea

Subjective Data

- Malaise, headache, loss of appetite
- Nausea, vomiting
- Occasional sore throat



Objective Data

- PE may be normal in early stages
- Increased temperature, pulse
- Nasal flaring, cyanosis, tachypnea
- Lungs: dullness to percussion over site of consolidation, diffuse crackles and wheezes, fine crepitant rales, increased tactile fremitus, increased whisper pectoriloquy, egophony E to A changes

Diagnostic Tests

- Chest X-ray: to establish diagnosis and distinguish whether viral or bacterial. Focal alveolar or lobar infiltrates suggest bacterial. Diffuse, interstitial suggest viral. Also shows if there is effusion. Forms basis for FU films.
- CBC with diff: WBC >15,000 suggests bacterial; <15,000 suggests viral

Diagnostic Tests

- Consider gram stain and culture of sputum
- Blood gases, blood cultures prn
- Serum cold agglutinins (mycoplasma)
- PPD (r/o TB)

Differential Diagnosis

- Chronic pulmonary disease: asthma, bronchitis, COPD
- Atelectasis
- Damage from physical agents: near drowning, smoke inhalation
- CHF
- Neoplasms
- Lung abscess
- Primary TB

Treatment Plan

- Viral: symptomatic
- Mycoplasma: erythromycin, tetracycline
- Pneumococcus: penicillin, erythromycin
- H flu: amoxicillin, Septra, Chloramphenicol (with caution)
- Legionella: erythromycin

Drugs of Choice

- Penicillin V 500 mg q 6 h or
- Erythromycin 500 mg q 6 h or
- Cefuroxime 500 mg q 8 h or
- Doxycycline 100 mg q 12 h or
- Clarithromycin 250-500 mg q 12 h or
- Azithromycin 500 mg qd, then 250 x 4
- Levaquin 500 mg qd x 10-14 days

Treatment Plan

- Increased fluids to 3 L/day, good nutrition
- Humidification, expectorants
- Cough suppressants with care, usually just HS
- Analgesics, acetaminophen for fever
- If likely diagnosis influenza pneumonia, consider amantadine (Symmetrel)

Patient Education/FU

- Avoid cigarettes
- Deep breathing exercises
- Contact in 24 hours to check improvement
- Schedule RTC in 3-4 days to assess response
- Improvement should be seen in 48-72 hours

Community Acquired Pneumonia (CAP)

Utilizing the New Practice Guidelines 2001

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Definition CAP

- Acute infection of the pulmonary parenchyma that is associated with at least some symptoms of acute infection, accompanied by the presence of an acute infiltrate on a chest radiograph or auscultatory findings consistent with pneumonia (such as altered breath sounds and/or localized rales), in a patient not hospitalized or residing in a long-term-care facility for >14 days before onset of symptoms.

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Etiology of CAP

- No specific pathogen found despite extensive diagnostics 40-60%
- "Atypical" pathogens—30-40 %
 - Mycoplasma pneumoniae--common in adults < 35 years; mild; Symptoms X6weeks
 - Chlamydia pneumoniae--similar to M. pneumoniae
 - Legionella pneumophila--opportunistic, rare in healthy young; severe symptoms; fatality rate 10-30%

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Etiology of CAP

- Streptococcus pneumoniae—up to 70%
 - Pneumococcal pneumonia
 - Abrupt onset high fever, rigors, productive cough, rusty, purulent sputum, pleuritic chest pain
 - Predominantly in elderly, co-morbid conditions
 - Bacteremia in 15-30%



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Etiology of CAP

- Hemophiles influenzae
 - Inpatient populations
 - Elderly, COPD, smokers
 - Follows influenza
- Staphylococcus aureus
 - Nursing home
 - Alcohol abuse, chronic illness
 - Follows influenza
- Moraxella catarrhalis
 - COPD, chronic illness
 - Symptoms usually mild
- Enteric gram-negative bacteria
 - Elderly, nursing home
 - Alcohol abuse, chronic illness
 - High 20-30% mortality
- Anaerobes "aspiration at risk patients"; putrid sputum
- Viral pneumonia
 - Immunocompromised
 - Adult RSV, herpes, cytomegalovirus, influenza
- Protozoan
 - Pneumocystis carinii
 - Immunocompromised

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Practice Guidelines

- American Thoracic Society (ATS)
 - First published in 1993; revised in 2001
 - Uphold references 1993 only
 - Full text available at www.thoracic.org
- Infectious Diseases Society of America (IDSA)
 - Published 1998; revised 2000
 - Uphold references 1998 only
 - Full text available at www.idsociety.org

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Practice Guidelines

- ATS guidelines for first time evidence based rather than relying on expert consensus alone
 - No data on pediatric patients
 - No data on immunocompromised, transplants or immune-related disease
 - Utilize the 2000 IDSA guidelines
- IDSA guidelines always have been evidence-based
 - More complex and longer than ATS
 - Even include respiratory tract infections resulting from bioterrorist attack

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Recommended Diagnostics

- Chest radiography
 - Establish diagnosis with finding of infiltrates
 - Identify complications such as pleural effusions or multilobar disease
 - R/O acute bronchitis
- Outpatients
 - Sputum Gram stain and culture optional

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Diagnostics (continued)

- Inpatients
 - Sputum Gram stain and culture
 - IDSA--all clients
 - ATS--only if resistance or unusual organism suspect
 - Blood cultures pretreatment
 - Oxygen saturation
 - CBC
 - Creatinine, BUN
 - Glucose, electrolytes
 - Luft's
 - At risk patients
 - TB and legionella studies
 - HIV serology

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Approach to Therapy

- Current methods of diagnosis force NPs to rely on empiric antibiotic therapy in most patients with CAP
- Approach is based on assessment of likelihood that given pathogen is causing disease in a given patient
- Hence the new guidelines

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Recommended Treatment

- New ATS guidelines based on
 - Place of therapy
 - Outpatient, hospital ward, ICU
 - Coexisting cardiopulmonary disease
 - COPD or CHF
 - Modifying factors (see next slides)
 - Risk for drug resistant *S. pneumoniae* (DRSP)
 - Enteric Gram-negative infections (nursing home patients)
 - Risk for *P. aeruginosa* (potential ICU patients)

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Modifying Factors

- Drug resistant pneumococci
 - Age >65 yr
 - Beta-Lactam therapy within the past 3 mo
 - Alcoholism
 - Immune-suppressive illness; treatment with corticosteroids
 - Multiple medical comorbidities
 - Exposure to child in day care

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Modifying Factors

- Enteric gram-negatives
 - Residence in nursing home
 - Underlying cardiopulmonary disease
 - Multiple medical comorbidities
 - Recent antibiotic therapy

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Factors (continued)

- Pseudomonas aeruginosa
 - Structural lung disease (bronchiectasis)
 - Corticosteroid therapy (>10mg prednisone daily)
 - Broad-spectrum antibiotic therapy for >7d in past month
 - Malnutrition

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ATS Stratification of CAP

- | | |
|---|---|
| ■ Group I <ul style="list-style-type: none">– Outpatients– No cardiopulmonary disease or modifying factors | ■ Group III <ul style="list-style-type: none">– Inpatients (non ICU)– May or may not have cardiopulmonary disease or modifying factors |
| ■ Group II <ul style="list-style-type: none">– Outpatients– Cardiopulmonary disease or modifying factors | ■ Group IV <ul style="list-style-type: none">– ICU– With or without risk for P. aeruginosa |

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Who to Hospitalize?

- Practitioner judgment-consider outpatient support and compliance issues
- Prediction model: Pneumonia Patient Outcomes Research Team (PORT) (Uphold, p. 423)
 - Decision making tool for hospitalization
 - Pneumonia severity index
 - Risk classes I-V: mortality low to high
 - Classes I and II outpatient treatment
 - Class III–brief hospitalization
 - Class IV and V–hospitalization

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Hospitalization

- Dependent on severity of illness, health, age of patient
- Severe abnormality in VS: HR > 140 beats/minute, systolic BP < 90 mm Hg, respiratory rate > 30/minute
- Altered mental status
- Acute coexistent medical condition (eg MI, COPD, DM, alcoholism)

Hospitalization (continued)

- Children at risk for life-threatening RSV infections (bronchopulmonary dysplasia, CHD, or immunocompromised) should be hospitalized & treated with ribavirin
- Rapid viral diagnostic tests may be a guide for such therapy
- Age over 65; any evidence of respiratory failure; absence of supportive care at home

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Hospital-Acquired Pneumonia Essentials of Diagnosis

- Occurs more than 48 hours after admission to the hospital & excludes any infection present at time of admission
- At least 2 of the following: fever, cough, leukocytosis, purulent sputum
- New or progressive parenchymal infiltrate on chest radiograph
- Especially common in patients requiring intensive care or mechanical ventilation (source: Tierney)

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Group I: Outpatients, No Cardiopulmonary Disease, No Modifying Factors

- | | |
|---|--|
| <ul style="list-style-type: none"> ■ Organisms <ul style="list-style-type: none"> - <i>S. pneumoniae</i> - <i>Mycoplasma pneumoniae</i> - <i>Chlamydia pneumoniae</i> - <i>H. influenzae</i> - Viral - <i>Legionella</i> - <i>M. tuberculosis</i> - Endemic fungi | <ul style="list-style-type: none"> ■ Therapy ■ Advanced-generation macrolide: <ul style="list-style-type: none"> - Azithromycin or clarithromycin - or - Doxycycline |
|---|--|

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Group II: Outpatients with Cardiopulmonary Disease And/OR Other Modifying Factors

- | | |
|---|--|
| <ul style="list-style-type: none"> ■ Organisms <ul style="list-style-type: none"> - <i>Streptococcus pneumoniae</i> (including DRSP) - <i>Mycoplasma pneumoniae</i> - <i>Chlamydia pneumoniae</i> - Mixed infection - <i>Hemophiles influenzae</i> - Enteric gram-negatives - Viruses - <i>Moraxella catarrhalis</i>, <i>Legionella</i>, aspiration (anaerobes), <i>Mycobacterium tuberculosis</i> - Endemic fungi | <ul style="list-style-type: none"> ■ Therapy <ul style="list-style-type: none"> - Beta-Lactam (oral cefpodoxime, cefuroxime, high-dose amoxicillin, amoxicillin/clavulanate; or parenteral ceftriaxone followed by oral cefpodoxime) - PLUS Macrolide or doxycycline - OR Antipneumococcal fluoroquinolone (used alone) |
|---|--|

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Group III: Inpatients, Not in ICU a. Cardiopulmonary Disease and/or Modifying factors (Including Being from a Nursing Home)

- | | |
|---|--|
| <ul style="list-style-type: none"> ■ <u>Organisms</u> <ul style="list-style-type: none"> - <i>Streptococcus pneumoniae</i> (including DRSP) - <i>Haemophilus influenzae</i> - <i>Mycoplasma pneumoniae</i> - <i>Chlamydia pneumoniae</i> - Mixed infection (bacteria plus atypical pathogen) Enteric gram-negatives - Aspirated (anaerobes) - Viruses - <i>Legionella</i> - <i>M. tuberculosis</i>, endemic fungi, <i>Pneumocystis carinii</i> | <ul style="list-style-type: none"> ■ <u>Therapy</u> <ul style="list-style-type: none"> - Intravenous Beta-lactam (cefotaxime, ceftriaxone, ampicillin/sulbactam, high-dose amoxicillin) - PLUS intravenous or oral macrolide or doxycycline - OR Intravenous antipneumococcal fluoroquinolone alone |
|---|--|

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Group III: Inpatients, Not in ICU b. No Cardiopulmonary Diseases, No Modifying Factors

- | | |
|--|---|
| <ul style="list-style-type: none"> ■ Organisms <ul style="list-style-type: none"> - <i>S. pneumoniae</i> - <i>H. influenzae</i> - <i>M. pneumoniae</i> - <i>C. pneumoniae</i> - Mixed infection - Viruses - <i>Legionella</i> - <i>M. tuberculosis</i>, endemic fungi, <i>P. carinii</i> | <ul style="list-style-type: none"> ■ Therapy <ul style="list-style-type: none"> - Intravenous azithromycin alone - If macrolide allergic or intolerant: Doxycycline and a Beta-lactam - OR - Monotherapy with an antipneumococcal fluoroquinolone |
|--|---|

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Group IV: ICU-Admitted Patients a. No Risks for *Pseudomonas aeruginosa*

- | | |
|--|---|
| <ul style="list-style-type: none"> ■ Organisms <ul style="list-style-type: none"> - <i>Streptococcus pneumoniae</i> (including DRSP) - <i>Legionella</i> - <i>Hemophiles influenzae</i> - Enteric gram-negative bacilli - <i>Staphylococcus aureus</i> - <i>Mycoplasma pneumoniae</i> - Viruses - <i>Chlamydia pneumoniae</i>, <i>M. tuberculosis</i>, endemic fungi | <ul style="list-style-type: none"> ■ Therapy <ul style="list-style-type: none"> - Intravenous Beta-lactam (cefotaxime, ceftriaxone) - PLUS EITHER Intravenous macrolide (azithromycin) OR Intravenous fluoroquinolone |
|--|---|

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Group IV: ICU-Admitted Patients b. Risks for *P. aeruginosa*

- Organisms
 - All of the previous pathogens plus *Pseudomonas aeruginosa*
- Therapy
 - Selected IV antipseudomonal Beta-lactam (cefepime, imipenem, meropenem, piperacillin/tazobactam) PLUS IV antipseudomonal quinolone (ciprofloxacin)
 - OR
 - Selected IV antipseudomonal Beta-Lactam (cefepime, imipenem, meropenem, piperacillin/tazobactam) PLUS IV aminoglycoside PLUS EITHER IV macrolide (azithromycin) or IV non pseudomonal fluoroquinolone

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Pharmacologic Therapy

- Route
 - Initial therapy usually begins with IV drugs (no advantage to parenteral unless intolerant or unable to take oral)
 - Outpatient IV therapy visits if reliable and compliant
 - Switch to PO when afebrile, improving symptoms, resolving leukocytosis, tolerant of oral intake (24h- 72h)
- Duration of therapy
 - Scant data
 - Differs by etiologic agent
 - Differs by Guideline used
 - Generally 7-14 days, in special cases 2 weeks or more.

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Improvement

- Generally seen in 2-5 days--longer with S. pneumoniae or elderly
- Stay with initial antibiotics in first 72 hrs, unless etiology/condition warrants change
- If lags behind this time period evaluate for
 - empyema
 - resistant pathogen
 - noninfectious cause

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Follow-Up

- Consult MD if no improvement or deterioration in 48-72 hours
- Reevaluate client in 2-3 weeks
- Chest X-ray repeat in 3-4 days if no improvement, 4-6 weeks all patients over 40 and all smokers, R/O cancer
- Influenza and Pneumovax immunizations

Follow-up

- Chest radiograph improvements usually lag behind
 - Only 25% will have normal film at 4 weeks
 - S. pneumoniae--6 weeks to resolution
 - M. pneumonias much faster--days
 - Legionella--weeks to months

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Prevention

- Pneumococcal vaccine
 - Pneumovax and Pneu Immune
 - 23 serotypes that cause 85-90% of invasive infections in adults and children
 - All patients >65; those with chronic illnesses
 - 1-2 doses required
 - Medicare approved
 - Pevnar --protein conjugate
 - 7 serotypes causing otitis, pneumonia and meningitis in children
 - Age 2 --23 months

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Prevention

- Influenza vaccine
 - Annual vaccine for at risk and all others
- Antivirals and neuraminidase inhibitors
 - Amantadine, rimantadine—influenza A
 - Neuro side effects, increasing resistance
 - Prophylaxis only
 - Zanamivir, oseltamivir—influenza A & B
 - Newer, no neuro side effects, low resistance
 - Prophylaxis and treatment (start within 36 h of onset of symptoms)

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Prognosis

- Most children with viral pneumonia recover uneventfully
- Worsening airway disease, persistent respiratory insufficiency and death may occur in high-risk patients as newborns, or those with underlying disease
- Children with RSV have a poorer prognosis

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Prognosis (continued)

- Clearing of lung infiltrates in community acquired pneumonia may take 6 weeks or longer
- Radiographic progression of infiltrates (with antibiotic therapy) is a very poor prognostic sign
- Pneumococcal vaccine can lessen or prevent infection in 85-90% of patients

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Risk Factors for Death

- Age > 65 yr
- Coexisting morbid illness (CHF, DM)
- Temperature > 38.3 degrees C (101 degrees F)
- Immunosuppression
- High risk pneumonia: Staphylococcus aureus, gram negative rods, or aspiration

Conclusions

- No longer using clinical findings as guide (Uphold uses old guide)
- Chest x-ray, lab as needed to determine risk
- Use PORT to evaluate need to hospitalize
- 2000 ATS categories Group I-IV based on
 - Place of therapy
 - Coexisting cardiopulmonary disease; modifying factors
- Choose drug therapy according to Group I-IV recommendations
- Use clinical judgment!!
- Adequate follow up
- Repeat chest film for specific at risk patients

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Conclusion

- Review your notes on bronchitis and pneumonia.
- We will now do case studies in groups.
- Thank you for your participation! Dr. Susan Chaney

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