Acute Bronchitis in Children, Adolescents, and Adults

Key points
- More than 90% of acute cough illnesses are non-bacterial
- Multiple studies show that patients with acute bronchitis do not benefit from antibiotic therapy
- Symptoms may last up to 3 weeks
- Evaluation should focus on excluding pneumonia or other severe disease
- Purulent green or yellow sputum alone is not predictive of bacterial infection

Possible signs and symptoms of acute bronchitis ("chest cold"):
- Productive cough (may be dry the first few days)
- Chest soreness
- Wheezing
- Fatigue
- Mild headache
- Mild body aches
- Low-grade fever (less than 102°F)

Acute exacerbation of COPD not covered in this guideline

Differential diagnosis:
- Non-specific URI
- Asthma
- Community-acquired pneumonia
- Acute exacerbation of COPD
- Post-nasal drip

Clinical picture consistent with acute bronchitis

Any of the following present? (may suggest pneumonia)
- Ill-appearing
- High fever or other constitutional symptoms
- Tachypnea
- Tachycardia
- Evidence of lung consolidation on physical exam

Yes

Chest X-ray (if available)

Infiltrate

Refer to guideline for community-acquired pneumonia

No infiltrate

No

Uncomplicated acute bronchitis likely*

Antibiotic therapy not indicated*

Recommend specific symptomatic therapy:

Children
- Encourage fluids
- Fever control (acetaminophen or NSAIDs)

Adults
- Bronchodilator (β-agonist) therapy shortens the duration of cough
- Dextromethorphan or codeine for cough
- Acetaminophen or NSAIDs for fever/pain

Implement communication tips from page 1

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment

References: http://www.cdc.gov/getsmart/campaign-materials/info-sheets/adult-acute-cough-illness.html (accessed 12/30/09); *Ann Intern Med 2000; 133:981-991*

*If pertussis or influenza are suspected clinically, initiate diagnostic testing and consider empiric therapy

Nonspecific Upper Respiratory Tract Infection in Children, Adolescents, and Adults

Key points
- Nonspecific upper respiratory tract infection (URI), or the "common cold," is caused by viral pathogens
- Symptoms may last up to 10-14 days
- Treatment with an antibiotic does not shorten duration of illness or prevent bacterial sinusitis
- Purulent green or yellow secretions alone are not predictive of bacterial infection

Possible signs and symptoms of nonspecific URI or the "common cold":
- Sore throat
- Nasal congestion or discharge
- Cough
- Sneezing
- Sore throat
- Headache
- Malaise
- Low-grade fever

Differential diagnosis:
- Acute bronchitis
- Acute rhinosinusitis
- Acute pharyngitis
- Allergic rhinitis
- Pertussis*
- Influenza*

Clinical picture consistent with nonspecific URI

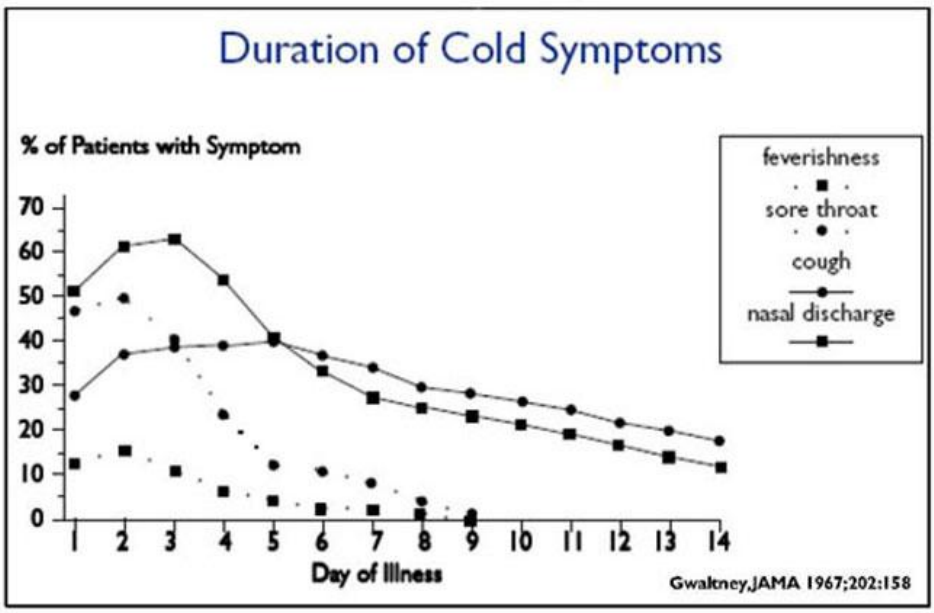
Antibiotic therapy not indicated*

Recommend specific symptomatic therapy:

Children
- Encourage fluids
- Fever control (acetaminophen or NSAIDs)

Adults
- Dextromethorphan or codeine for cough
- Acetaminophen or NSAIDs for fever/pain
- Consider decongestant

Implement communication tips from page 1



Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment

References: http://www.cdc.gov/getsmart/campaign-materials/info-sheets/adult-nurti.html (accessed 12/30/09); http://www.cdc.gov/getsmart/campaign-materials/info-sheets/child-rhin-vs-sinus.html (accessed 12/30/09)

*If pertussis or influenza are suspected, initiate diagnostic testing and consider empiric therapy

Acute Rhinosinusitis in Non-Pregnant Adults

Key points
- Most cases of acute rhinosinusitis are due to viral infections
- Purulent yellow or green nasal discharge alone is not predictive of bacterial infection
- Antibiotic therapy for acute viral sinusitis will not shorten duration of illness or prevent bacterial infection
- Use the strict criteria below for diagnosis of bacterial sinusitis

Possible signs and symptoms of acute rhinosinusitis (present <4 weeks):

1) Nasal discharge
2) Nasal congestion
3) Facial pressure/pain
4) Maxillary dental pain
5) Fever
6) Cough
7) Ear pressure or fullness
8) Anosmia

Clinical picture suggestive of acute rhinosinusitis? (clinical diagnosis – radiographs are not necessary)

Yes / **No**

No: Consider alternative etiologies

Yes: Present for more than 7-10 days and not improving OR Worsening after initial improvement OR Severe symptoms (moderate-severe pain or temperature >/= 38.3 C or 101 F)

No: **Likely viral etiology, antibiotic therapy not indicated**

- Start therapy to relieve obstruction and alleviate symptoms
- ▪ NSAIDs or acetaminophen for pain
- ▪ Nasal saline washes

Consider:

- ▪ Topical glucocorticoid (nasal)
- ▪ Decongestants (nasal or systemic)

Duration more than 10 days OR Worsening symptoms* → **Bacterial etiology more likely, initiate antibiotic therapy**

Yes: Antibiotic treatment within last 4-6 weeks?

Yes: **1st line:** **Amoxicillin-clavulanate** 875mg BID for **7-10 days** OR **Levofloxacin** 500mg QDay for **7-10 days**

No: **1st line:** **Amoxicillin** 500mg TID for **7-10 days**

Alternatives (7-10 days): Doxycycline 100mg BID or TMP-SMX 1DS BID

Absence of clinical response within 7 days

Consider drug-resistant infection, alternative etiologies, or complications*

Change antibiotic therapy if drug-resistant infection suspected

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

References: Clinical Practice Guideline: Adult Sinusitis. Otolaryngology – Head and Neck Surgery 2007; 135:S1-S3; http://www.cdc.gov/getsmart/campaign-materials/info-sheets/adult-acute-bact-rhino.html (accessed 12/30/09)

*Complications of acute sinusitis may include meningitis, orbital cellulitis, osteomyelitis of sinus bones, invasive fungal superinfection

Acute Pharyngitis in Children >5 years, Adolescents, and Adults

Key points
- Group A streptococci cause 15%–30% of cases of acute pharyngitis in pediatric patients, but only 5%–10% of such illnesses in adults
- Diagnosis of Group A streptococcal pharyngitis requires diagnostic testing as clinical assessment alone is not sufficiently accurate
- Limit antibiotic therapy to patients with a positive test for Group A streptococcus
- Penicillin is the preferred therapy

Suspected uncomplicated acute pharyngitis

Any factors associated with Group A streptococcal pharyngitis present?
- Fever (>38 C or 100.3 F)
- Tonsillar swelling or exudates
- Tender anterior cervical lymph nodes
- Absence of a cough, coryza, conjunctivitis, diarrhea
- Palatine petechiae

Yes → Possible Group A streptococcal pharyngitis → Perform rapid antigen detection test, if available

- Positive → **Initiate antibiotic therapy**
- Negative → Perform throat culture
  - Positive → **Initiate antibiotic therapy**
  - Negative → **Antibiotic therapy not indicated**

No → Viral etiology likely** → **Antibiotic therapy not indicated**

Recommend specific symptomatic therapy:
- Acetaminophen or NSAIDS for fever/pain

Implement communication tips from page 1

****Other etiologies of acute pharyngitis to consider:**
- *F. necrophorum*
- *C. diphtheriae*
- *M. pneumoniae*
- *N. gonorrhea*
- Infectious mononucleosis
- Primary HIV infection
- HSV
- Influenza

		Antibiotic	Adults/Adolescents >60lbs	Children <60lbs
1st line:		**Penicillin V**	**500mg TID**	**50mg/kg divided BID or TID** (max 500mg/dose)
	or	Amoxicillin	500mg TID	50mg/kg divided BID or TID (max 1gm BID)
	or	Benzathine PCN G	1.2 million units IM once	600,000 units IM once
Alternatives:		Cephalexin	500mg BID	25-50mg/kg divided BID (max 500mg/dose)
		Azithromycin†	500mg x 1, then 250mg QDay	12mg/kg QDay (max 500mg/day)

Recommended duration of oral therapy: 10 days†

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

Reference: Practice Guidelines for the Diagnosis and Management of Group A Streptococcal Pharyngitis. *Clin Infect Dis* 2002; 35:113-25; American Academy of Pediatrics. *Red Book 2009: Report of the Committee on Infectious Diseases,* 28th ed.

† recommended duration of azithromycin is 5 days

Urinary Tract Infection in Non-Pregnant Adults

Key points
- *E.coli* remains the most common cause of both simple cystitis and complicated urinary tract infection
- Heavy fluoroquinolone use has led to widespread emergence of quinolone-resistant *E. coli* at DH
- Screen for risk factors for fluoroquinolone resistance when considering their use

Possible signs and symptoms of urinary tract infection:
1) Urinary frequency
2) Urgency
3) Dysuria
4) Suprapubic pain
5) Hematuria

Clinical picture suggestive of urinary tract infection?

Yes

Any complicating factors present? (associated with broader spectrum of bacteria and/or increased risk of complications)

Male gender	Immunosuppression	Renal insufficiency
Systemic symptoms	Nephrolithiasis	Urinary catheter
Symptoms >7 days	Urinary obstruction	Recent treatment failure
Diabetes mellitus	Anatomical GU abnormality	Recent hospitalization
Evidence of pyelonephritis	Recent GU instrumentation	

No

Consider alternative etiologies

No

Simple cystitis

Urine culture generally not indicated†

1st line:
Nitrofurantoin§ 100mg PO BID for **5 days**[a]

Alternatives:
Ciprofloxacin 250mg PO BID for 3 days

Trimethoprim-sulfamethoxazole DS 1 tab PO BID for 3 days (if *E.coli* resistance rate<15%)

Yes

Complicated infection

- Obtain urinalysis and culture
- Blood cultures if systemic signs/symptoms

Clinical evidence of pyelonephritis?
- Fever
- Nausea/vomiting
- Leukocytosis
- Flank pain
- CVA tenderness

No

Complicated UTI

Yes

Pyelonephritis

Risk factors for fluoroquinolone (FQ) resistance present?[b]:
1) Hospitalization in previous 12 months OR
2) Fluoroquinolone use in previous 12 months OR
3) Prior documented FQ-resistant organism

Yes

Moderate to severe illness

If appropriate for outpatient therapy:
Ceftriaxone 1gm IV or IM daily **OR**
Amikacin 10mg/kg IV or IM daily if *Pseudomonas* likely or if serious cephalosporin allergy

Yes

Mild illness

No

Levofloxacin 500mg PO daily (use 750mg if risk for FQ resistance) OR
Ciprofloxacin 500mg PO BID (use 750mg BID if risk for FQ resistance)

Adjust antibiotics based on cultured organism and susceptibilities

If quinolone-resistant **AND** ceftriaxone-susceptible organism:
Cefixime 400mg PO daily
*not for empiric use for *suspected* quinolone resistance

Treatment duration varies by clinical scenario: 5-14 days*

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested doses are for normal renal function; adjust for renal impairment.
†Consider evaluation for gonorrhea and chlamydia in sexually active patients; treat appropriately if confirmed
§Nitrofurantoin is contraindicated in patients with a creatinine clearance of less than 60 mL/min
*5 days of levofloxacin 750mg daily effective for complicated UTI/acute pyelonephritis (*Urology* 2008; 71:17-22)

References: [a]*Arch Intern Med* 2007;167:2207-12; [b]*Am J Med* 2008;121:876-884

Skin and Soft Tissue Infection in Non-Pregnant Adults

Key points
- Beta-hemolytic streptococci are the most common cause of cellulitis without abscess
- MRSA is the most common cause of simple abscess
- Drainage is the primary therapy for simple abscess; several studies show that antibiotic therapy does not add benefit to drainage alone
- Short-course antibiotic therapy has been shown to be as effective as longer courses

Possible signs and symptoms of skin and soft tissue infection (SSTI):

1) Cutaneous erythema
2) Cutaneous warmth
3) Swelling
4) Pain
5) Tenderness to palpation
6) Fever

Clinical picture consistent with SSTI?

Yes → Severe infection or systemic illness?

Yes → Hospital admission

No → Consider alternative etiologies

No → Fluctuant mass consistent with **cutaneous abscess?**

Yes → **Simple abscess** (MRSA most common pathogen)

- Incision and drainage
- If antibiotics to be initiated, send purulent material for gram stain/bacterial culture
- Extensive surrounding cellulitis
- Inadequate drainage
- Diabetes mellitus
- Valvular heart disease
- Immunosuppressing condition or medication

Yes → **1st line:**
Clindamycin 300-450mg PO TID
OR
Doxycycline 100mg PO BID*
OR
TMP-SMX DS 1-2 tabs PO BID*

No → **Antibiotic therapy not indicated†**

No → Purulent drainage?

Yes → **Purulent SSTI** (MRSA common)

No → **Simple cellulitis** (Streptococci most common)

β-lactam allergy
OR
Recent treatment with recurrence

Yes → **1st line:**
Clindamycin 300-450mg PO TID
OR
Doxycycline 100mg PO BID*
OR
TMP-SMX DS 1-2 tabs PO BID*

No → **1st line:**
Dicloxacillin 500mg PO 4x/daily
OR
Cephalexin 500mg PO 4x/daily

Duration of antibiotic therapy: 5 days**

Encourage adjunctive therapies:
1) **Elevate affected area**
2) **Ibuprofen 600mg PO Q8hrs** if no contraindication to NSAIDs

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

*Trimethoprim-sulfamethoxazole and doxycycline may lack sufficient coverage against Grp A streptococci; not recommended for simple cellulitis

**duration of therapy may be extended for poorly responsive disease

†several studies suggest incision and drainage alone may be sufficient for immunocompetent patients with skin abscess: *Antimicrob Agents Chemother* 2007;51:4044-8; *NEJM* 2006;355:666-74; *Arch Surg* 2006;141:850-4

Other references: *Clin Infect Dis* 2005;41:1373-1406

Community-Acquired Pneumonia in Non-Pregnant Adults

Key points
- Avoid diagnosing CAP without radiographic evidence of pneumonia
- Multiple studies suggest short-course antibiotic therapy is as effective as longer courses

Possible signs and symptoms of community-acquired pneumonia (CAP):

1) Cough
2) Shortness of breath
3) Fever
4) Sputum production
5) Pleuritic chest pain
6) Tachycardia
7) Tachypnea
8) Rales, egophany, or fremitus

Clinical picture suggestive of CAP

Yes → Obtain chest radiograph (CXR) Consider complete blood count

No → Consider alternative etiologies

Obtain chest radiograph (CXR) Consider complete blood count

- **Infiltrate present on CXR**
- **No infiltrate on CXR*** → **Does not meet criteria for CAP*** → Consider alternative etiologies

Infiltrate present on CXR

2 or more *CURB-65* criteria?
- **C**onfusion – new onset disorientation to person, place, or time
- **U**remia – BUN >20
- **R**espiratory rate >30
- **B**lood pressure – systolic <90 OR diastolic <60
- **65** – age >65

Yes → **Consider hospital admission**

No → Appropriate for outpatient therapy based on other medical and social needs?

Appropriate for outpatient therapy based on other medical and social needs?

Yes

Any risk factors for drug-resistant *S. pneumoniae*?†
- Use of antibiotics within 3 months
- Uncontrolled diabetes mellitus
- Chronic medical condition with frequent health care contact
- Alcoholism
- Asplenia
- Immunosuppressing conditions or medications

Yes

1st line: Levofloxacin 750mg QDay for 5 days**

Alternative: Amoxicillin 1gm TID *plus* Doxycycline 100mg BID for 7 days

No

1st line: Doxycycline 100mg BID for 7 days

Alternative: Azithromycin 500mg QDay for 3 days

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

*CXR may be negative early in the course of pneumonia; consider a repeat CXR in 24 hours if suspicion for CAP remains high

**Avoid use of fluoroquinolones if risk factors for *M. tuberculosis* present (born outside United States), as may lead to delay in TB diagnosis

†Conditions associated with drug-resistant *Streptococcus pneumoniae* warrant expanded coverage

Reference: Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults. *Clin Infect Dis* 2007; 44:S27-72

Acute Otitis Media (AOM) in Children and Adolescents

Key points
- Most cases (>80%) of AOM are viral and resolve spontaneously
- Consider observation for 48-72hrs in children >6 months
- Middle ear effusion and inflammation must be present for diagnosis

Signs and symptoms of acute otitis media (not all may be present):
1) Recent onset of symptoms
2) Otalgia (more common age>2)
3) Fever (30-50%)
4) Crying, fussiness
5) Ear pulling (non-specific)
6) URI symptoms
7) Loss of appetite
8) Vomiting, diarrhea

Middle ear effusion* **AND** signs of middle ear inflammation** present

No → Not AOM

Yes

***Middle ear effusion**
- decreased mobility tympanic membrane (TM)
- bulging TM – air fluid level
- otorrhea

****Middle ear inflammation**
- TM erythema
- otalgia interfering with normal activity or sleep

Treat pain
- acetaminophen (or NSAID if >6 months)
- warm compresses
- topical anesthetic (if TM intact)

TM intact AND non-severe illness
(mild otalgia and fever <39 C)

Consider observation for 48-72hrs (if >6 months)
OR
Delayed antibiotic prescription† to fill if symptoms don't improve in 48-72hrs

- **Resolution**
- **Observation failure or treatment chosen**

†**1st line initial therapy:**
Amoxicillin 80-90mg/kg/day divided BID (max 1gm BID) for:
- **10 days if <6 years**
- **5 days if >/=6 years**

Alternatives for non-severe PCN allergy:
Cefdinir 14mg/kg/d divided BID (max 300mg BID) OR
Cefpodoxime 10mg/kg/day divided BID (max 400mg BID) OR
Cefuroxime 30mg/kg/day divided BID (max 500mg BID)

Immediate hypersensitivity PCN allergy:
Azithromycin 10mg/kg on day 1 (max 500mg), then 5mg/kg (max 250mg) days 2- 5

Perforated TM OR severe illness
(mod-severe otalgia or fever ≥ 39 C)

Failed initial antibiotic therapy

1st line:
Amoxicillin/clavulanate 90/6.4 mg/kg/day divided BID (max 875mg BID) for **10 days**

Alternatives for non-severe PCN allergy:
Cefpodoxime 10mg/kg/day divided BID (max 400mg BID) OR
Cefuroxime 30mg/kg/day divided BID (max 500mg BID)

If severe illness:
Ceftriaxone IM 50mg/kg/day for 3 days (max 1gm/day)

Immediate hypersensitivity PCN allergy:
Clindamycin 30mg/kg/day divided TID (max 450mg TID) or consider tympanocentesis

No improvement after 48-72 hours

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

References: Diagnosis and Management of Acute Otitis Media (AAP/AAFP Clinical Practice Guideline). *Pediatrics* 2004;113:1451-1465; American Academy of Pediatrics. *Red Book 2009: Report of the Committee on Infectious Diseases,* 28th ed.

Acute Rhinosinusitis in Children and Adolescents

Key points
- Most cases of acute rhinosinusitis are due to viral infections
- Purulent yellow or green nasal discharge alone is not predictive of bacterial infection
- Antibiotic therapy for acute viral sinusitis will not shorten duration of illness or prevent bacterial infection
- Use the strict criteria below for diagnosis of bacterial sinusitis

Possible signs and symptoms of acute rhinosinusitis (present <4 weeks):

1) Nasal discharge
2) Nasal congestion
3) Facial pressure or pain
4) Maxillary dental pain
5) Fever
6) Cough
7) Ear pressure or fullness
8) Anosmia

Clinical picture suggestive of acute rhinosinusitis? (clinical diagnosis – radiographs are not necessary)

Yes

Present for more than 10 days and not improving
OR
Worsening after initial improvement
OR
Severe symptoms (temperature >/= 39 C or 102.2 F with purulent discharge, facial pain/tenderness, periorbital swelling)

If severe, consider further evaluation/hospitalization

No

Consider alternative etiologies

No

Likely viral etiology, antibiotic therapy not indicated

Start therapy to relieve obstruction and alleviate symptoms

- NSAIDs or acetaminophen
- Nasal saline washes

Duration more than 10 days
OR
Worsening symptoms*

Initiate antibiotic therapy as above

Yes

Bacterial etiology more likely, initiate antibiotic therapy

Antibiotic treatment within last 4-6 weeks **OR**
Severe symptoms **OR**
Daycare attendee

Yes

1st line:
Amoxicillin-clavulanate 90/6.4 mg/kg/day divided BID (max 875mg BID) OR
Cefdinir 14mg/kg/d divided BID (max 300mg BID) OR
Cefpodoxime 10mg/kg/day divided BID (max 400mg BID) OR
Cefuroxime 30mg/kg/day divided BID (max 500mg BID)

Duration: **7-10 days**

No

1st line:
Amoxicillin 80-90mg/kg/day divided BID or TID (max 1gm BID) for 7 -10 days

If immediate hypersensitivity PCN allergy:
Azithromycin 10mg/kg on day 1 (max 500mg), then 5mg/kg (max 250mg) days 2- 5

Absence of clinical response within 7 days

Consider drug-resistant infection, ongoing sinus obstruction, alternative etiologies, or complications*

Change antibiotic therapy if drug-resistant infection suspected

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

References: American Academy of Pediatrics Clinical Practice Guideline: Management of Sinusitis. *Pediatrics* 2001; 108:798-808;
http://www.cdc.gov/getsmart/campaign-materials/info-sheets/child-rhin-vs-sinus.html (accessed 12/30/09)

*Consider complications of acute sinusitis: may include meningitis, orbital cellulitis, osteomyelitis of sinus bones, invasive fungal superinfection

Urinary Tract Infection in Children and Adolescents (age >/= 3 months)

Key points

- *E.coli* is the predominant cause of UTI in children and adolescents
- UTI can present with nonspecific symptoms or fever alone in younger children
- Undiagnosed UTI can lead to renal scarring and future sequelae
- Do not culture bag specimens (high false positive rate) – catheterize or suprapubic aspirate if too young to do clean catch
- Obtain clean-catch sample if toilet-trained
- Consider chlamydia and other sexually transmitted infections in adolescents

Signs, symptoms, and risk factors for urinary tract infection:

	Non-verbal children	Verbal children
1)	Fever (temperature >39 C) and no other source infection	1) Dysuria
2)	Ill-appearing, irritable, poor feeding	2) Abdominal pain
3)	Suprapubic tenderness	3) Back or flank pain
4)	Uncircumcised	4) New onset incontinence
5)	History of UTI	
6)	Family history of genitourinary (GU) abnormality or vesicoureteral reflux (VUR)	

***Pyelonephritis is difficult to distinguish from simple cystitis in younger children**

Any complicating factors present?

Anatomical GU abnormality or VUR
Nephrolithiasis or Renal Disease
Recent treatment failure
Immunosuppression or Diabetes
Urinary catheter
Recent GU instrumentation

Yes → Not covered in this guideline

Any of the following present?

- Ill-appearing→clinical urosepsis or potential bacteremia
- Vomiting or inability to tolerate oral medication
- Failure to respond to outpatient therapy
- Lack of adequate outpatient follow-up

Yes → **Hospital admission**

Diagnostic evaluation

- **Culture should be performed**
- Dipstick analysis 88% sensitivity for UTI – UTI less likely if dip negative, culture if clinically suspicious
- Leukocyte esterase-positive bag specimen – catheterize or suprapubic aspiration
- WBC, ESR, CRP do not distinguish upper tract from lower tract infection

Treatment options (choice varies with local resistance rates)

Amoxicillin-clavulanate: 40 mg/kg/day divided BID (max 875mg BID) OR
Cephalexin 50 mg/kg/day divided BID-TID (max 500mg TID) OR
Cefixime 8 mg/kg/day divided BID (max 400mg/day) OR
Cefpodoxime 10 mg/kg/day divided BID (max 400mg BID) OR
TMP-SMX 6-12 mg/kg/day TMP divided BID (max 1 DS tab BID)

Total duration of therapy: 7-10 days

In children >13 years with cystitis and no upper tract signs:

Nitrofurantoin* 5 to 7 mg/kg/day divided 4 times/day (max 200mg/day) for 7 days OR
Levofloxacin 250mg daily for 3 days

Culture result
- **Positive** → Complete therapy - consider further evaluation in appropriate patients
- **Negative** → Call to discontinue antibiotics

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

*Not recommended for males. Contraindicated in patients with a creatinine clearance of less than 60 mL/min

References: *Pediatrics* 1999; 103:843-52; American Academy of Pediatrics. *Red Book 2009: Report of the Committee on Infectious Diseases,* 28th ed.

Skin and Soft Tissue Infection in Children and Adolescents

Key points
- Beta-hemolytic streptococci are the most common cause of cellulitis without abscess
- MRSA is the most common cause of simple abscess
- Drainage is the primary therapy for simple abscess; antibiotic therapy does not add benefit to drainage alone for small abscesses
- Short-course antibiotic therapy has been shown to be as effective as longer courses

Possible signs and symptoms of skin and soft tissue infection (SSTI):

1) Cutaneous erythema
2) Cutaneous warmth
3) Swelling
4) Pain
5) Tenderness to palpation
6) Fever

Clinical picture consistent with SSTI?

Yes → Severe infection?

Yes → Hospital admission

No → Consider alternative etiologies

No → Fluctuant mass consistent with **cutaneous abscess?**

Yes → **Simple abscess** (MRSA most common pathogen)

- Incision and drainage
- If antibiotics to be initiated, send purulent material for gram stain/bacterial culture
- Diameter >5cm
- Extensive surrounding cellitis
- Inadequate drainage
- Valvular heart disease
- Immunosuppressing condition or medication

Yes → **1st line:**
Clindamycin 30mg/kg/day in 3-4 divided doses (max 450mg/dose)

Alternatives:
TMP-SMX 8-12 mg/kg/day of TMP, divided BID* (max 1DS tab BID) OR
Doxycycline 2 to 4 mg/kg/day divided BID (max 100mg BID) (if age >7 years)*

No → **Antibiotic therapy not indicated†**

No → Purulent drainage or pustules?

Yes → **Purulent SSTI** (MRSA common)

No → **Simple cellulitis** (Streptococci most common)

Severe PCN allergy
OR
Recent treatment with recurrence

Yes → **1st line:**
Clindamycin 30mg/kg/day in 3-4 divided doses (max 450mg/dose)

Alternatives:
TMP-SMX 8-12 mg/kg/day of TMP, divided BID* (max 1DS tab BID) OR
Doxycycline 2 to 4 mg/kg/day divided BID (max 100mg BID) (if age >7 years)*

No → **Dicloxacillin** 25-50 mg/kg/d in 4 divided doses (max 2gm/day)
OR
Cephalexin 25-50 mg/kg/d in 3-4 divided doses (max 500mg/dose) (if non-severe PCN allergy)

Duration of antibiotic therapy: 5 days**

Encourage adjunctive therapies:
1) **Elevate affected area**
2) **Ibuprofen** if no NSAID contraindication

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

*TMP-SMX and doxycycline may lack sufficient coverage against group A streptococci, therefore not optimal for simple cellulitis

**duration of therapy may be extended for poorly responsive disease

† incision and drainage alone may be sufficient for immunocompetent patients with abscess <5 cm: *Ped Infect Dis J* 2004;23:123-7

Reference: Baker, CJ. *AAP News* 2007; 28:1

Community-Acquired Pneumonia in Children (age >4 months) and Adolescents

Key points
- S*. pneumoniae* is the most common bacterial cause of pneumonia in childhood
- Viruses are common causes of CAP in younger children (<5 years)
- Atypical organisms (*M. pneumoniae, C. pneumoniae*) are common in older children (>/= 5 years)
- Microbiologic studies are not indicated for children with CAP treated as outpatients

Signs and symptoms suggestive of CAP

If bacterial pneumonia suspected, consider:
- chest radiograph
- complete blood count
- C-reactive protein

Diagnosis of bacterial pneumonia supported?

Yes / **No**

Appropriate for outpatient therapy by clinician assessment?

No → Hospital admission

Consider alternative etiologies (viral etiology common in children <5 years)

Yes

1st line:
Amoxicillin 50mg/kg/day divided BID (max 1gm/dose) for **7 days**

Alternatives for non-severe PCN allergy:
Cefdinir 14mg/kg/d divided BID (max 300mg BID) OR
Cefpodoxime 10mg/kg/day divided BID (max 400mg BID) OR
Cefuroxime 30mg/kg/day divided BID (max 500mg BID)

Immediate hypersensitivity PCN allergy:
Azithromycin 10mg/kg on day 1 (max 500mg), then 5mg/kg (max 250mg) days 2- 5

Re-evaluate in 48 hours

Clinically improved → Complete antibiotic course prescribed

Failure to improve AND appropriate for ongoing outpatient therapy → Consider atypical organisms, resistant *S. pneumoniae*, complication of pneumonia, or alternative etiology of clinical syndrome

Consider changing therapy to:
Amoxicillin-clavulanate 90/6.4 mg/kg divided BID (max 875mg BID) OR
If age >5 years, azithromycin 10mg/kg on day 1 (max 500mg), then 5mg/kg (max 250mg) days 2- 5

Disclaimer: This is intended only as a guide for evidence-based decision-making; it is not intended to replace clinical judgment. Assess for antibiotic allergies and use alternative agents as appropriate. Suggested antibiotic doses are for normal renal function; adjust for renal impairment when necessary.

References: British Thoracic Society guidelines for the management of community acquired pneumonia in childhood. *Thorax* 2002; 57 Suppl 1:i1; American Academy of Pediatrics. *Red Book 2009: Report of the Committee on Infectious Diseases,* 28th ed.; *NEJM* 2002; 346:429-37