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INSTITUTE FOR CLINICAL SYSTEMS IMPROVEMENT

Health Care Guideline:

Diagnosis and Treatment of Respiratory Illness in Children and Adults

Second Edition
January 2008

The information contained in this ICSI Health Care Guideline is intended primarily for health professionals and the following expert audiences:

- physicians, nurses, and other health care professional and provider organizations;
- health plans, health systems, health care organizations, hospitals and integrated health care delivery systems;
- health care teaching institutions;
- health care information technology departments;
- medical specialty and professional societies;
- researchers;
- federal, state and local government health care policy makers and specialists; and
- employee benefit managers.

This ICSI Health Care Guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. If you are not one of the expert audiences listed above you are urged to consult a health care professional regarding your own situation and any specific medical questions you may have. In addition, you should seek assistance from a health care professional in interpreting this ICSI Health Care Guideline and applying it in your individual case.

This ICSI Health Care Guideline is designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition. An ICSI Health Care Guideline rarely will establish the only approach to a problem.

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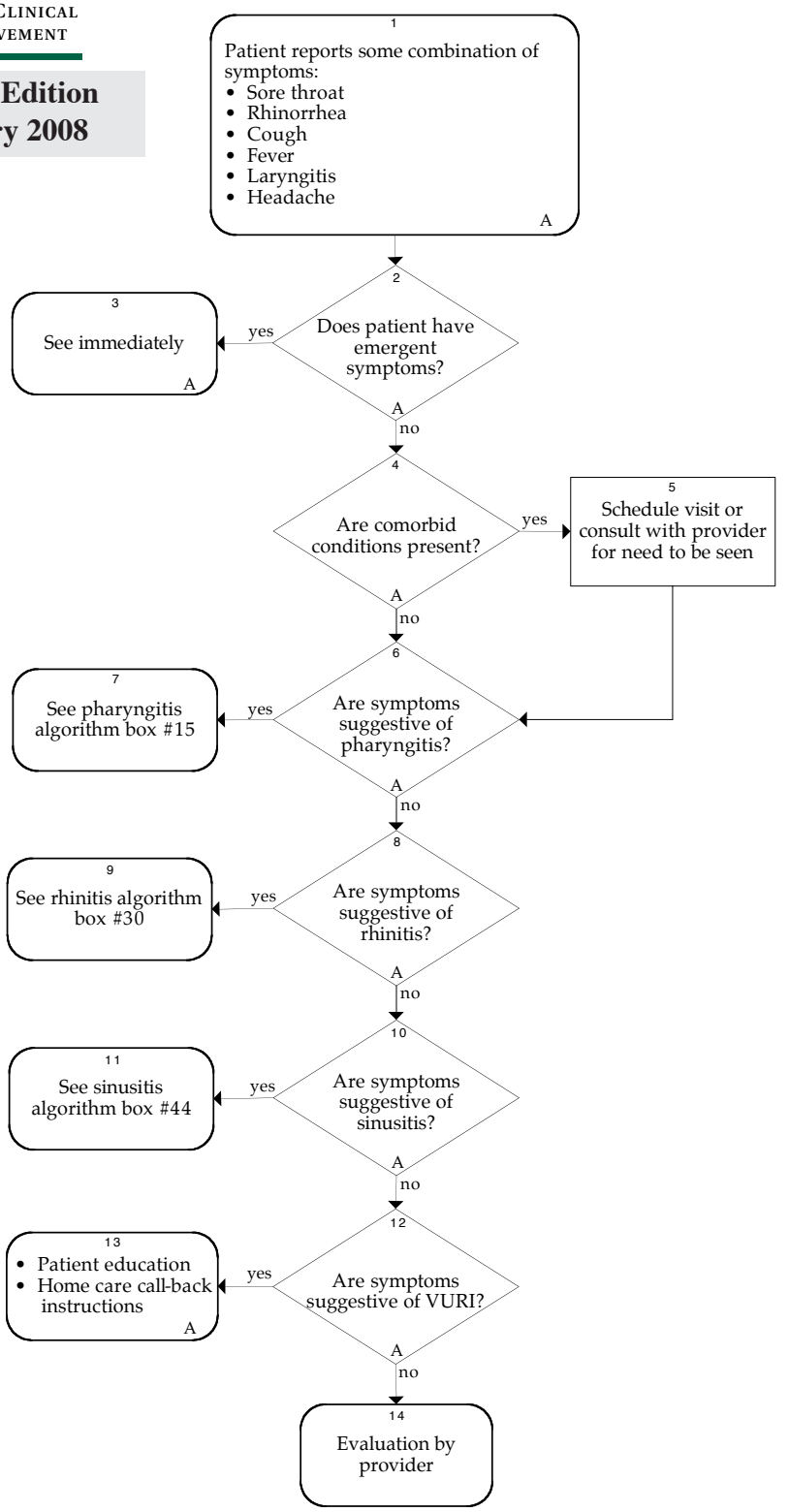
A = Annotation

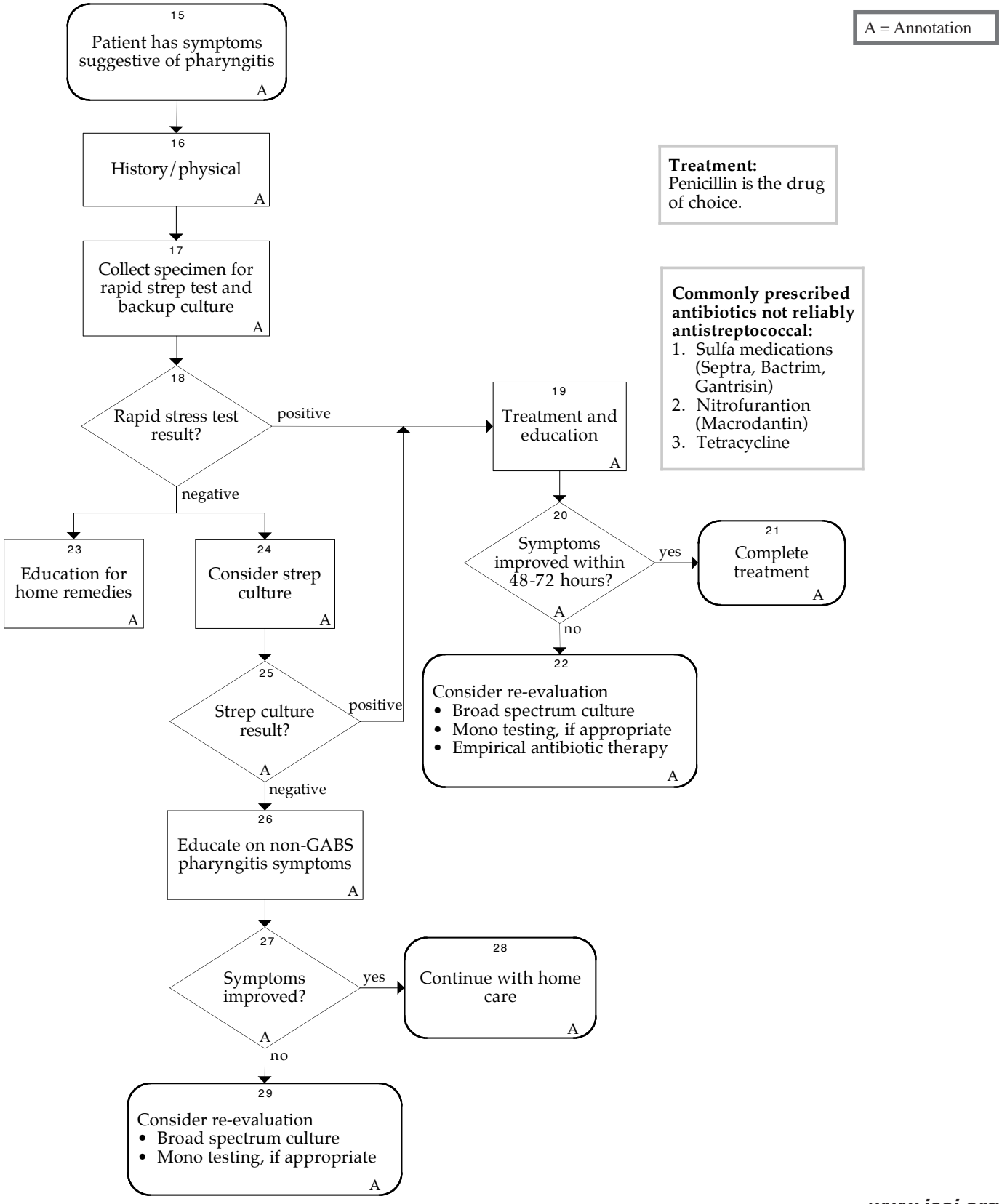


6
Symptoms of pharyngitis:
- Sudden onset of sore throat
- Exudative tonsilitis
- Tender anterior cervical adenopathy
- History of fever
- Headache
- Abdominal pain
- No rhinorrhea, cough, hoarseness

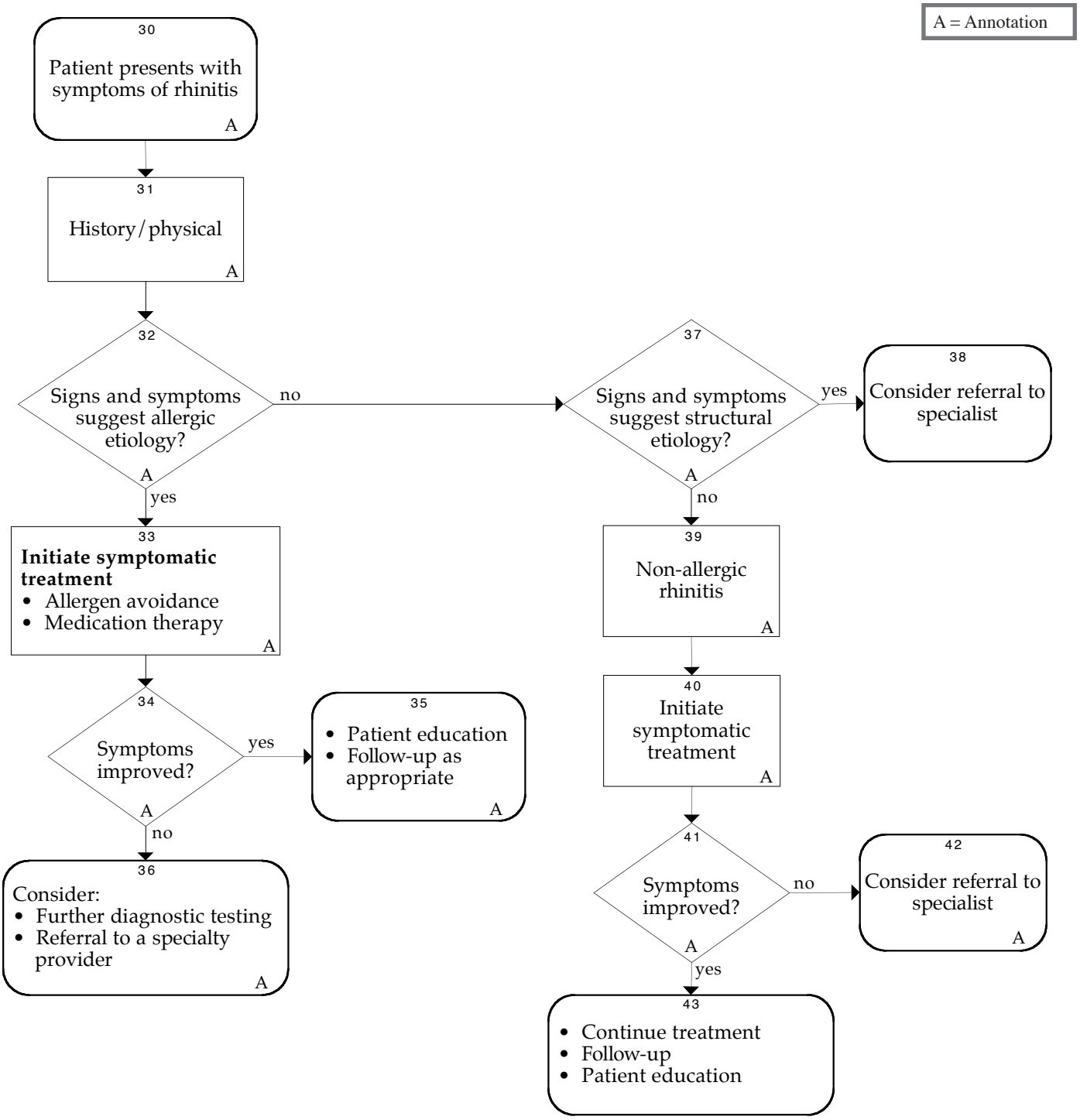
8
Symptoms of rhinitis:
- Pruritis of the eyes, nose, palate, ears
- Watery rhinorrhea
- Sneezing
- Seasonal changes
- Family history of allergies
- Sensitivity to specific allergens, especially dust, animal dander, pollen and mold
- Atopy
- Nasal congestion
- Postnasal drip

10
Symptoms of sinusitis:
Upper respiratory symptoms present greater than 7 days. Two or more of the following factors present at a point of greater than 7 days after onset:
- Cough
- Documented past history of sinusitis
- Ear pressure/fullness
- Facial pain, particularly if aggravated by postural changes or by valsalva maneuver
- Fatigue
- Fever
- Hyposmia/anosmia
- Known anatomical nasal blockage
- Nasal congestion
- Nasal drainage
- Poor response to decongestive
- Postnasal drip
- Tenderness over sinus area
- Tooth pain

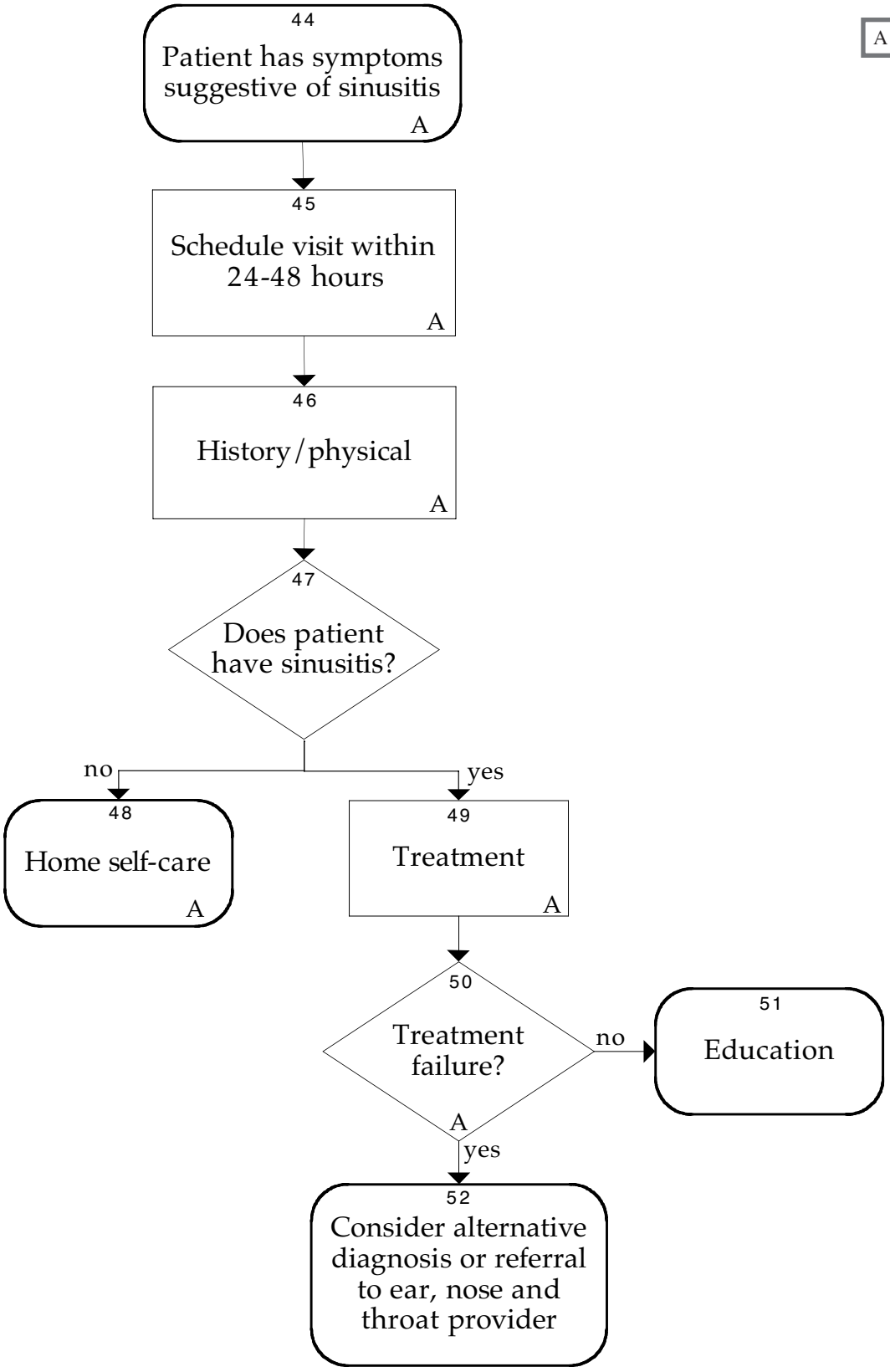
Pharyngitis Algorithm



Rhinitis Algorithm



Sinusitis Algorithm



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Work Group Leader
Leonard Snellman, MD
Pediatrics, HealthPartners Medical Group

Work Group Members

Allergy
David Graft, MD
Park Nicollet Health Services

ENT
William Avery, DO
Sanford Health

Family Practice
Jeffrey Jenkins, MD
Sanford Health

Heather Krueger, MD
Quello Clinic

Carolyn Sparks, MD
University of Minnesota Physicians

Pharmacy
Peter Marshall, PharmD
HealthPartners

Measurement/ Implementation Advisor
Teresa Hunteman, RRT, CPHQ
ICSI

Facilitator
Melissa Marshall, MBA
ICSI

Foreword

Scope and Target Population

The Diagnosis and Treatment of Respiratory Illness in Children and Adults guideline encompasses acute conditions in infants greater than three months, children, adolescents and adults who are in good health.

Clinical Highlights and Recommendations

- Patients and/or parents of children presenting or calling with symptoms suggestive of the common cold should be evaluated for other symptoms and the presence of more serious illness. *(Annotations #2, 4)*
- The primary treatment of viral upper-respiratory infection is education based; education is to take place in the clinic, on the telephone, at the work site and in newsletters. Patients and/or parents should receive home care and call-back instructions. *(Annotation #13)*
- Reduce unnecessary use of antibiotics. Antibiotic treatment should be reserved for a bacterial illness. *(Annotations #13, 26, 49)*
- Diagnosis of group A beta streptococcal pharyngitis should be made by laboratory testing rather than clinically. *(Annotations #17, 24)*
- Patients should be educated on strep pharyngitis, including the importance of following the prescribed medication regimen, use of home remedies to relieve symptoms, actions to take if symptoms worsen, and the importance of eliminating close contact with family members or visitors to the home while group A beta streptococcal may be contagious. *(Annotations #19, 23, 26)*
- Prescribe intranasal steroids for moderate or severe allergic rhinitis. *(Annotation #33)*
- Treat patients diagnosed as having allergic seasonal rhinitis with prophylactic medications and educate about avoidance activities. *(Annotation #33)*
- Consider limited coronal computed tomography scan of sinuses and/or referral to ear, nose and throat provider for patients when three weeks of antibiotic therapy have not produced a response. *(Annotation #50)*

Priority Aims

1. Increase the appropriateness of patient visits for viral upper-respiratory infection, increase patient/caregiver knowledge of effective home treatment of cold symptoms and eliminate the inappropriate use of antibiotics in patients presenting with cold symptoms.
2. Reduce excessive antibiotic treatment through decreased empiric treatment of patients with pharyngitis.
3. Increase the use of recommended first-line medications for patients with pharyngitis.
4. Increase patient/caregiver knowledge about pharyngitis and pharyngitis care.
5. Increase the use of prophylactic medications for patients with seasonal allergic rhinitis.
6. Decrease the use of injectable corticosteroid therapy for patients with allergic rhinitis.
7. Increase the use of first-line antibiotics when indicated for patients diagnosed with sinusitis.

Related ICSI Scientific Documents

Related Guidelines

- Diagnosis and Management of Asthma
- Diagnosis and Treatment of Otitis Media in Children
- Preventive Services in Adults
- Preventive Services in Children and Adolescents

Patient and Family Guidelines

- Preventive Services in Adults for Patients and Families
- Preventive Services in Children and Adolescents for Patients and Families

Disclosure of Potential Conflict of Interest

ICSI has adopted a policy of transparency, disclosing potential conflict and competing interests of all individuals that participate in the development, revision and approval of ICSI documents (guidelines, order sets and protocols). This applies to all work groups (guidelines, order sets and protocols) and committees (Committee on Evidence-Based Practice, Cardiovascular Steering Committee, Women's Health Steering Committee, Preventive & Health Maintenance Steering Committee, Respiratory Steering Committee and the Patient Safety & Reliability Steering Committee).

Participants must disclose any potential conflict and competing interests they or their dependents (spouse, dependent children, or others claimed as dependents) may have with any organization with commercial, proprietary, or political interests relevant to the topics covered by ICSI documents. Such disclosures will be shared with all individuals who prepare, review and approve ICSI documents.

David Graft received consulting or speaker fees, conference fees and travel support for asthma-related projects.

No other work group members have potential conflicts of interest to disclose.

Introduction to ICSI Document Development

This document was developed and/or revised by a multidisciplinary work group utilizing a defined process for literature search and review, document development and revision as well as obtaining and responding to ICSI members.

For a description of ICSI's development and revision process, please see the Development and Revision Process for Guidelines, Order Sets and Protocols at http://www.icsi.org.

Evidence Grading System

A. Primary Reports of New Data Collection:

Class A: Randomized, controlled trial

Class B: Cohort study

Class C: Non-randomized trial with concurrent or historical controls
Case-control study
Study of sensitivity and specificity of a diagnostic test
Population-based descriptive study

Class D: Cross-sectional study
Case series
Case report

B. Reports that Synthesize or Reflect upon Collections of Primary Reports:

Class M: Meta-analysis
Systematic review
Decision analysis
Cost-effectiveness analysis

Class R: Consensus statement
Consensus report
Narrative review

Class X: Medical opinion

Citations are listed in the guideline utilizing the format of *(Author, YYYY [report class])*. A full explanation of ICSI's Evidence Grading System can be found at http://www.icsi.org.

Algorithm Annotations

Introduction

The goal of the guideline is a threefold education: to assist patients to be competent and comfortable with home care of respiratory illness; to assist medical personnel to differentiate respiratory illness from more severe illness; to improve the appropriateness of care and antibiotic use for respiratory illness while decreasing the cost of that care.

Main Algorithm Annotations

1. Patient Reports Some Combination of Symptoms

Patients may present for an appointment, call into a provider to schedule an appointment or nurse line presenting with respiratory illness symptoms. The symptoms of respiratory illness may include sore throat, rhinorrhea, cough, fever, headache and/or laryngitis.

2. Does Patient Have Emergent Symptoms?

Key Points

- It is recommended that patients with upper-airway obstruction, lower-airway obstruction and severe headache be seen immediately.

Recognizing the signs of a serious illness before it becomes life threatening is usually the medical provider's key concern. Patients should be assessed for upper-airway obstruction, lower-airway obstruction, severe headache and then the symptoms in Table 1, "Symptoms of Serious Illness." An important purpose of Table 1 is to assist providers and triage personnel in distinguishing between respiratory illness and more serious illness. The urgency index increases with the number and severity of symptoms. Symptoms in Table 1 indicate which patients presenting with respiratory illness symptoms need to be seen immediately by a provider.

Upper-Airway Obstruction

Patients with epiglottitis or peritonsillar/retropharyngeal abscess may have signs of upper airway obstruction (stridor, air hunger, respiratory distress, toxic appearance, cyanosis, drooling with epiglottis) and require immediate medical evaluation with combined ear, nose and throat/anesthesia management in emergency room or operating room setting.

Severe symptoms – including inability to swallow liquids, trismus, drooling without respiratory distress – should receive prompt evaluation by a physician within a reasonable amount of time, depending on the symptoms.

Lower-Airway Obstruction

Lower-airway obstruction signals an underlying or condition different from respiratory illness. If moderate to severe distress is present, this suggests pneumonia, chronic obstructive pulmonary disease, asthma, foreign body, cardiac condition or other underlying conditions requiring specific evaluation and treatment in an intensive setting. Such symptoms indicate the need for urgent evaluation and/or the need for intensive treatment, supplemental oxygen, and prolonged observation.

Severe Headache

Severe headache (usually described as the worst headache of their life) could indicate subarachnoid hemorrhage, complications of sinusitis such as cavernous sinus thrombosis or sphenoid sinusitis, meningitis, encephalitis or other conditions. Such symptoms require prompt, intensive evaluation and care.

Table 1. Symptoms of Serious Illness

Less than three months	Three months - three years	Four years - adult
Respiratory distress • grunting • retractions • cyanosis • stridor with croup symptoms not relieved by conservative measures	**Respiratory distress** • retractions • cyanosis • marked dyspnea • rapid respiratory rate • shallow respirations • difficulty swallowing • choking • foreign body inhalation • stridor with croup symptoms not relieved by conservative measures	**Respiratory distress** • retractions • cyanosis • moderate to severe dyspnea • rapid rate • shallow respirations • difficulty swallowing • choking • foreign body inhalation • drooling • dysphonia • feeling that throat is closing
Responsiveness and activity • flaccid • lethargic • cannot awaken or keep awake • weak cry or weak suck • inconsolable • refuses feedings	**Responsiveness and activity** • unresponsive • decreased level of consciousness • cannot awaken or keep awake • markedly decreased activity • very lethargic • sleeps excessively • inconsolable • weak suck or weak cry (if infant) • refuses feedings	**Responsiveness and activity** • altered mental state • decreased level of consciousness • markedly decreased activity • refuses to eat • very lethargic • sleeps excessively • cannot awaken or keep awake • unresponsive
Dehydration and vomiting • reduced wet diapers greater than 8 hrs	**Dehydration and vomiting** • no urine older than 6-8 hrs if younger than one year • no urine more than 12 hrs if older than one year	**Dehydration and vomiting** • no urine more than 12 hrs
	Meningeal signs • stiff neck • persistent vomiting	**Meningeal signs** • stiff neck • persistent vomiting • severe headache
Other • petechial or purpuric rash	**Other** • petechial or purpuric rash	**Other** • increased urination with decreased intake • petechial or purpuric rash

(Haugen, 1993 [R]; Ingraham, 1992 [R]; Nelson, 1992 [R]; Simon, 1997 [R])

3. See Immediately

Use algorithm to triage patient symptoms; begin at algorithm box #6.

4. Are Comorbid Conditions Present?

Key Points:

- Patients with complicating factors should consult with a provider.

This guideline applies to patients in normal health and without severe complicating health factors.

Patients with complicating factors should consult with a provider. The guideline should be applied with great care, if at all, to any patients with complicating factors. A list of potential complicating factors, though not comprehensive, may include:

- Chronic illness/disease (congestive heart failure, chronic obstructive pulmonary disease, sickle-cell disease, etc.)
- Elderly
- History of rheumatic fever
- Human immunodeficiency virus positive
- Immunocompromised/immunosuppressed
- Patient on chemotherapy
- Asthma
- Diabetes
- Patient started antibiotics prior to diagnosis
- Treatment failure is defined as recurrence of symptoms within seven days of completing antibiotic therapy. Possible reasons include medication non-compliance, repeat exposure, antibiotic resistance, copathogen *(Hayes, 2001 [R])*.
- Pregnancy*
- Recurrent streptococcal pharyngitis – recurrence of culture positive group A beta streptococcal pharyngitis more than seven days but within four weeks of completing antibiotic therapy
- Smokers
- Sore throat for more than five days duration

* This guideline should be applied with caution to pregnant women.

History of Rheumatic Fever

An individual with a previous history of rheumatic fever who develops group A beta streptococcal pharyngitis is at high risk for a recurrent attack of rheumatic fever. The infection does not need to be symptomatic to trigger a recurrence. Rheumatic fever recurrence can also occur when a symptomatic infection is optimally treated. Therefore, prevention of recurrent rheumatic fever requires continuous antimicrobial prophylaxis, and group A beta streptococcal infections in family members should be diagnosed and treated promptly *(Dajani, 1995 [R])*.

Human Immunodeficiency Virus Positive, Patient on Chemotherapy, Immunosuppressed, Diabetes Mellitus, Pregnant

These complicating factors were arrived at by the consensus of the guideline work group and may involve different diagnostic possibilities and/or treatment.

Patient Started Antibiotics Prior to Diagnosis

Occasionally, patients may have started "leftover" antibiotics at home on the assumption that the diagnosis is group A beta streptococcal pharyngitis prior to presenting for diagnosis. This can make the diagnosis of group A beta streptococcal more difficult. Snellman et al. have reported that cultures of patients on anti-group A beta streptococcal active antibiotics may remain positive for a short period of time.

If the patient has started antibiotics (two or more doses) before a laboratory test is done, the laboratory test results may be invalidated; therefore, a provider should be consulted *(Snellman, 1993 [A])*.

Sore Throat for More Than Five Days Duration

Patients with pharyngitis persisting over five days are less likely to have group A beta streptococcal pharyngitis and should be seen to be evaluated. Infectious mononucleosis can be difficult to differentiate from group A beta streptococcal pharyngitis on clinical grounds, and some patients with infectious mononucleosis may have a positive throat culture for group A beta streptococcal. Serologic evidence of infectious mononucleosis should be sought in patients when splenomegaly is present or if pharyngitis symptoms persist over five to seven days. Other possibilities include other viral etiologies, bacterial sinusitis and other causes of postnasal drip.

Persistent Infection/Treatment Failure

Patients who have been treated with antibiotics for streptococcal pharyngitis within the last month may represent a treatment failure, recurrent disease or carrier state, and further evaluation may be necessary.

Treatment failure is defined as recurrence of symptoms within seven days of completing antibiotic therapy. Possible reasons include:

- medication non-compliance, and
- pharyngeal flora producing beta-lactamase.

Recurrent Strep Pharyngitis

Recurrent strep pharyngitis is defined as recurrence of culture-positive group A beta streptococcal pharyngitis greater than seven days but within four weeks of completing antibiotic therapy. In patients with culture-positive group A beta streptococcal pharyngitis, the patient is likely to be experiencing recurrent episodes of acute group A beta streptococcal pharyngeal infection when:

- clinical findings suggest group A beta streptococcal as the etiology,
- epidemiologic findings suggest group A beta streptococcal as etiology (e.g., age 5-15 and winter/spring season),
- there is a repeated marked clinical response to antibiotic therapy,
- throat cultures are negative between episodes of pharyngitis, and
- there is a serologic response to group A beta streptococcal extra cellular antigens (ASO, anti-DNAase B) if measured.

6. Are Symptoms Suggestive of Pharyngitis?

Patients report a sore throat without rhinorrhea, cough or hoarseness.

Patients with recent strep exposure may be more likely to have group A beta streptococcal pharyngitis.

Signs and symptoms associated with group A beta streptococcal include:

- sudden onset of sore throat;
- exudative tonsillitis;
- tender anterior cervical adenopathy;
- history of fever;
- headache;
- abdominal pain; and
- no rhinorrhea, cough, hoarseness.

Other symptoms sometimes associated with group A beta streptococcal pharyngitis include:

- vomiting,
- malaise,
- anorexia, and
- rash or urticaria.

8. Are Symptoms Suggestive of Rhinitis?

Rhinitis is defined as inflammation of the membranes lining the nose and is characterized by nasal congestion, rhinorrhea, sneezing and itching of the nose and/or postnasal drainage *(Dykewicz, 1998 [R])*.

Symptoms of allergic rhinitis include:

- pruritis of the eyes, nose, palate and ears;
- watery rhinorrhea;
- sneezing;
- seasonal changes;
- family history of allergies;
- sensitivity to specific allergens, especially dust mites, animal dander, pollen and mold;
- atopy;
- nasal congestion; and
- postnasal drip.

10. Are Symptoms Suggestive of Sinusitis?

Symptoms include:

- Upper respiratory symptoms present greater than seven days, and
- Two or more of the following factors present at a point of greater than seven days after onset.
  - Cough
  - Documented past history of sinusitis

- Ear pressure/fullness
- Facial pain particularly if aggravated by postural changes or by valsalva maneuver
- Fatigue
- Fever
- Hyposmial/anosmia
- Known anatomical nasal blockage
- Nasal congestion
- Nasal drainage
- Poor response to decongestive
- Postnasal drip
- Tenderness over sinus area
- Tooth pain

12. Are Symptoms Suggestive of Viral Upper-Respiratory Infection?

A viral upper-respiratory infection (common cold) is a self-limited illness typically lasting 5 to 14 days manifested by rhinorrhea, cough and fever.

The symptoms may include general malaise, laryngitis, injection of the conjunctiva, decreased appetite, headache and increased fussiness. Onset of symptoms is rapid. Fever, more commonly seen in children, usually lasts one to three days. Nasal discharge is initially clear and usually becomes yellow or green toward the end of the viral upper-respiratory infection; this does not signify a bacterial infection, and the patient does not need to be seen. The symptoms of a viral upper-respiratory infection usually peak in 3 to 5 days and should resolve in 7 to 14 days. A mild cough may persist at night for two to three weeks.

There was consensus within the work group regarding the symptoms of the viral upper-respiratory infection that are not indicative of more serious illness. Medical textbooks and a widely used self-care source also listed essentially the same constellation of symptoms.

For children:

It is not unusual for a child to have five to eight colds a year.

Children with viral upper-respiratory infections have some combination of the following symptoms: nasal congestion and discharge, fever, sore throat, cough, laryngitis, mild fussiness or irritability, decrease in appetite, sleep disturbance, and mild eye redness or drainage.

(Szilagyi, 1990 [R]; Walson, 1984 [R]; Wood, 1980 [R])

Table 2. Illnesses to Be Differentiated from Viral Upper-Respiratory Infection

The table utilizes a diagnostic-based approach and a more complete summary of illnesses to be differentiated from the viral upper-respiratory infection and associated symptoms.

Diagnosis	Symptoms	Caution
Otitis media**	• Otalgia (ear pain) • Otorrhea (ear drainage) • Hearing loss • Ear popping • Ear fullness • Dizziness	
Pneumonia/bronchitis	• Deep cough • Deep mucus • Fever • Pleuritic chest pain • Wheezing • Rhonchi • Mild dyspnea • Chest tightness	Be particularly concerned if person has asthma, is a smoker or has lung disease.
Epiglottitis	• Alteration in voice • Severe sore throat • Severe dysphagia • Stridor • Drooling	Needs immediate evaluation at appropriate site

** Refer to the corresponding ICSI guideline.

It is essential to recognize symptoms that indicate an illness other than – or in addition to – pharyngitis, rhinitis, sinusitis, and viral upper-respiratory infection that should be evaluated and treated (refer to the ICSI Diagnosis and Treatment of Otitis Media in Children guideline for a more complete summary of illnesses to be differentiated from the viral upper-respiratory infection and associated symptoms) *(Wood, 1980 [M])*.

13. Patient Education/Home Care Call-Back Instructions

Key Points:

- It is recommended that patients, parents and caregivers be educated on prevention, comfort measures and treatment recommendations for the common cold.
- Patients with a viral illnesses may be aware of measures to relieve symptoms and reduce spread of infection. It is important to provide them with practical, preferably evidence-based, advice.

The goal is to provide solid, useful advice to patients without putting them at undue risk or expense. The guideline recommendations should provide improved comfort or otherwise proven benefit and not just represent "something to do."

Studies of effectiveness of patient/parent education: a number of investigators have found that health care consumer education resulted in appropriate self-care for the common cold specifically, or illness in general, with less unnecessary medical treatment and with lowered cost of care *(Roberts, 1983 [A]; Terry, 1993 [A])*.

Other investigators failed to find that health care consumer education reduced health care visits and cost of care. However, no negative effects of such education were found and some other benefits were reported *(Kemper, 1982 [A]; Moore, 1980 [A])*.

Prevention

Although the viral upper-respiratory infection is a respiratory illness, researches have found that viral upper-respiratory infections are spread more by hands of the person with a cold and by very close contact than by droplets in the air. Hand washing is the most effective way to prevent the spread of the common cold (viral upper-respiratory infection). Viral upper-respiratory infection is most contagious at the onset of symptoms and while febrile *(Carabin, 1999 [A])*.

For many parents, day care for their infant is a necessary fact of life, but there are some issues to consider. Day care has been shown to increase the frequency, severity and duration of upper-respiratory infections and the risk of secondary upper- and lower-respiratory infections *(Fleming, 1987 [C]; Wald, 1988 [B])*.

Otitis, sinusitis, pneumonia and wheeze-associated respiratory illnesses such as bronchiolitis have been shown to be more frequent among children who attend day care *(Denny, 1986 [C]; Goodman, 1984 [R]; Loda, 1972 [D])*.

Viral shedding continues for up to two weeks after the onset of initial upper-respiratory symptoms *(Szilagyi, 1990 [R])*.

Suggestions for limiting exposure are appropriate guidance for parents of children attending day care. Care provided in private home care has a lower rate of infectious disease. Children who are cared for in their own home by baby-sitters have the lowest rate of infection. Children under one year of age are at the highest risk for infections such as respiratory syncytical virus, and prudent counseling about day care attendance for this group would seem appropriate *(Schmitt, 1992 [R])*. Palivizumab, humanized monoclonal antibody against respiratory syncytial virus F glycoprotein, is available. Please see referenced article for details *(American Academy of Pediatrics, 2003a [R])*.

The first winter of the infant's life is the time when most caution should be exercised. Another measure that may be helpful for those in day care settings is segregation of infants and toddlers.

Encouraging continued breast-feeding may offer further protection from recurrent otitis and prolonged duration of upper-respiratory illnesses *(Duncan, 1993 [B]; Frank, 1982 [B])*.

For infants and toddlers

- Discourage visitors who have an acute illness, a fever or contagious disease.
- Prevent child with viral upper-respiratory infection from sharing toys and pacifier with other children and clean these items with soap and hot water as feasible to reduce opportunities for viral transmission.
- Use and teach good hand washing.
- Ask visitors to wash their hands before holding baby.
- Day care with three or more families represented is associated with higher incidence of viral upper-respiratory infections, ear infections and lower-respiratory infections; therefore:
    - check to see if staff and children at your child's day care are being taught good hand washing and other infection control measures (excellent educational materials are available that day care providers can obtain), and

- consider day care options that reduce exposure to other children:
  - Relative or friend
  - In-home nanny shared by two families.

- Because human milk contains ingredients that help protect babies from infections, encourage and support mothers to continue breast-feeding for an appropriate period.

Comfort Measures

Parents have comfort and convenience, personal plans and work to contend with, as well as a fear of the unknown potential of their child's illness. These factors drive parents to seek help (and sometimes antibiotics) as early as possible to minimize the impact of the illness. Health care providers need to help parents gain knowledge about childhood respiratory illnesses and develop decision-making skills and realistic expectations *(Cowan, 1987 [D]; Zapka, 1979 [M])*.

To relieve nasal congestion for infants less than three months, suction gently with a blunt tipped bulb syringe before feedings and sleep. Using a bulb syringe to aspirate nasal secretions may promote drainage and comfort. When using a blunt-tipped bulb syringe, compressing the bulb before placing the syringe over the nose prevents pushing mucus farther into nasal passage. Proper cleaning and air drying of bulb syringe reduces the opportunity for growth of organisms inside the syringe. Wash bulb syringe with hot, soapy water, rinse and allow to air dry.

Avoid using honey-lemon preparations for children under one year because of the risk of botulism.

How a person feels is an indication of the amount of rest needed. When a person with a viral upper-respiratory infection is afebrile and feels like being up and about, normal activity should not prolong the illness.

The effects of steam inhalation on viral upper-respiratory infection symptoms using a specifically designed device have been tested in several clinical trials, with mixed results. An easily detectable placebo was a threat to the internal validity in at least one of the studies in which a significant treatment effect was detected. Although this work is of interest, it has not been conclusive enough to date to guide treatment decisions.

Mist inhalation does serve as an effective comfort measure for some people. Because of burns that have occurred when people use steam vaporizers, and the potential for microorganism growth in vaporizers, the recommended method for steam inhalation is standing in a hot shower or sitting in the bathroom when the hot shower is running. "Cool mist" vaporizers avoid the burn risk, though not the potential for growth of microorganisms *(Macknin, 1990 [A]; Ophir, 1987 [A]; Tyrrell, 1989 [A])*.

Microorganisms grow easily in humidifiers/vaporizers unless they are cleaned properly and often. Health care providers often advise against using steam humidifiers/vaporizers because of the risk of the child getting burned with the hot water in the device. Also, added humidity can cause the growth of mildew in the home. These well-known risks should be weighed against the potential benefits of using humidifiers and the parents' ability and willingness to use and clean the device properly.

Saline nose drops and gargling salt water provide relief to many people without the cost and side effects associated with over-the-counter preparations. Saline nose drops help loosen secretions, making it easier to clear nares *(Gadomski, 1992 [D]; Szilagyi, 1990 [R])*. Commercial or homemade saline nose drops/sprays may be used. Home remedy: 1/4 teaspoon salt dissolved in eight ounces warm water.

Maintain adequate humidity in the home.

Consume extra fluids. Warm fluids are especially soothing for irritated throats (e.g., chicken soup).

Consume nutritious diet as tolerated.

Elevate head of bed.

Use salt water gargle for sore throat with homemade salt water (1/4 teaspoon dissolved in 8 ounces warm water) or a store version.

Use hard candy or throat lozenge for sore throat or cough (not recommended for children 12 and under).

Get adequate rest.

Treatment Recommendations

Antibiotics

Antibiotics are effective only for treating bacterial infections. Because colds are viral infections, antibiotic use will not cure or shorten their length *(Soyka, 1975 [R])*.

Antibiotics cause side effects such as gastrointestinal discomfort, diarrhea, allergic reactions, diaper rash, and yeast infections. Unnecessary use of antibiotics can lead to the development of antibiotic-resistant strains of bacteria.

Over-the-counter medications

Over-the-counter cold and cough medications and acetaminophen do not shorten the duration of viral upper-respiratory infection.

Children

In April 2007 the Food and Drug Administration issued a warning on using cough and cold medicines in young children. Parents and other caregivers should only administer cough and cold medications to children under two when following the exact advice of their doctor. Clinicians should be certain that caregivers understand both the importance of administering these medications only as directed and the risk of overdose if they administer additional medications that might contain the same ingredient *(Federal Drug Administration, 2007 [R])*.

The Food and Drug Administration does not have approved dosing recommendations for clinicians prescribing cough and cold medications for children two and under *(Centers for Disease Control and Prevention, 2007 [R])*.

The Cochrane Collaboration conducted an extensive search of studies involving over-the-counter preparations for acute cough. It concluded that there is no good evidence for or against the effectiveness of over-the-counter cough medications *(Schroeder, 2007 [M])*.

Decongestants also have not clearly shown benefit in shortening or ameliorating symptoms *(Hutton, 1991 [A])*.

A phenol-type throat spray (e.g., Chloraseptic) appears to be effective in relieving coughs and sore throats associated with colds, but no pertinent research could be located. Many coughs associated with colds respond to the non-pharmacological measures listed above and do not require an over-the-counter preparation *(Pruitt, 1985 [R])*.

Because of the risk of Reye's syndrome associated with aspirin use in children, acetaminophen should be suggested as the drug of choice for home use.

The fever that frequently accompanies a viral upper-respiratory infection in children is not harmful and is usually gone in two to three days. Parents/caregivers should be educated on fevers, signs, symptoms and treatment. It is the consensus of the work group that fevers persisting beyond that time should be evaluated by a provider. Work group members also agree that infants under three months with fevers should be thoroughly evaluated. Fever can only be evaluated in the specific context of the whole illness and the accompanying circumstances. By itself, the magnitude of fever bears little or no relationship to the severity of the illness *(Schmitt, 1984 [R])*.

Adults

For adults with a cold, over-the-counter products such as nasal sprays, decongestants and analgesics may provide temporary relief of sore throat, runny nose, coughing, minor aches and fever. Because of potential side effects, however, be sure to follow the recommended dosage and precautions. Patients who have high blood pressure, diabetes, thyroid disease or who are pregnant should check with their physician regarding recommendations for decongestant use.

Use medication for discomfort as recommended by a physician or nurse for fever.

General discomfort, headache and fever reduction

Graham et al. (1990) conducted a double-blind, placebo-controlled study to test the effects aspirin, acetaminophen and ibuprofen in 56 volunteers who were infected with the cold virus. Use of aspirin and acetaminophen was associated with suppression of serum-neutralizing antibody response and increased nasal symptoms and signs. There were no significant differences in viral shedding among the four groups. Sperber et al. (1992) compared the effects of naproxen with a placebo in a randomized, double-blind, controlled trial. Persons in the naproxen group had significant reductions in headache, malaise, myalgia and cough, but viral titers and antibody responses were similar in the two groups *(Graham, 1990 [A]; Sperber, 1992 [A])*.

Aspirin, ibuprofen and naproxen should be avoided by persons who are not eating well (risk of gastrointestinal), have a history of peptic ulcer or related disorder, have aspirin-sensitive asthma, and have renal dysfunction. For these reasons, plus the risk of Reye's syndrome associated with aspirin use in young, healthy adults, acetaminophen should be suggested as the drug of choice. However, it should be used only as needed because of the effects described by Graham et al. (1990).

The most helpful source located to guide decisions about over-the-counter cold preparations is a major review article published in 1993. It includes clinical trials published between 1950 and 1991. Only 27 articles of the 106 retrieved met the study criteria and were judged to have adequate scientific validity to be included in the final review. In the adolescent/adult studies, the following drugs were found to reduce nasal symptoms: chlorpheniramine maleate (e.g., Chlor-Trimeton®), pseudoephedrine HC1 (e.g., Sudafed®), and oxymetazoline HC1 (e.g., Afrin®) *(Smith, 1993 [M])*.

Atrovent is not effective when there is documented significant nasal obstruction. The cost/benefit relationship for Atrovent Nasal Spray is rarely supportive for use of this medication. In addition, it requires physician intervention that consists of phone calls and/or office visits, which significantly increases the cost of care for a benign condition.

Echinacea

Findings in the medical literature do not support the use of echinacea in preventing viral upper-respiratory infection. Some preliminary data indicate that echinacea may shorten the course of viral upper-respiratory infection; however, studies that produced this data are small. Methods by which echinacea is prepared are not standardized, and actual dose delivered by specific products varies widely. Hence, the work group cannot recommend the use of echinacea in preventing or shortening the duration of viral upper-respiratory infection at this time. The work group will continue to evaluate the data on this and other herbal preparations *(Grimm, 1999 [A]; Turner, 2005 [B])*.

Vitamin C

There is no consistent evidence in the medical literature that high doses of vitamin C help shorten the course of viral upper-respiratory infections. Hence, it was the consensus of the work group that high doses of vitamin C should not be recommended.

Zinc

In adults there is some evidence that zinc gluconate may decrease the duration of a cold if started within 24 hours of onset; however, adverse reactions including nausea and bad taste may limit its usefulness. Zinc is not indicated and may be dangerous during pregnancy.

Mossad et al. conducted a randomized, double-blind, placebo controlled study to test this. They found that zinc gluconate did reduce the duration of symptoms of the common cold *(Mossad, 1996 [A])*.

Two clinical trials involving experimental rhinovirus colds and natural colds tested the efficacy of zinc acetate for the treatment of the common cold. Three preparations were used in the study: zinc acetate lozenges, zinc gluconate lozenges and placebo lozenges. The study concluded that zinc gluconate did reduce the duration of symptoms with experimental rhinovirus. Please note that during the first three days the severity of symptoms was not affected, and it had no effect for the natural cold. Zinc acetate had no effect on duration or severity on either experimental or natural colds *(Turner, 2000 [A])*.

According to the Cochrane Collaborative, overall results of studies of the effect of zinc gluconate on upper-respiratory infection duration and severity have been inconclusive *(Marshall, 2000 [M])*.

A randomized control trial of 249 students in grades 1 through 12 were studied for the effects of zinc gluconate lozenges for treating the common cold. The study found that zinc gluconate lozenges, in 10 mg, orally dissolved, were ineffective in relieving symptoms *(Macknin, 1998 [A])*.

Call Back Instructions

Children three months to 18 years of age.

Call back if:

- fever lasts three days or more;
- symptoms worsen after 3 to 5 days or if new symptoms appear (e.g., increasing symptoms of illness, lethargy, decreased responsiveness, poor eye contact, difficulty breathing); or
- symptoms have not improved after 7 to 10 days; it is not unusual, however, for a mild cough and congestion to continue 14 days or more

Adults

Call back if symptoms worsen after 3 to 5 days, new symptoms develop or symptoms do not improve after 14 days.

Pharyngitis Algorithm Annotations

15. Patient Has Symptoms Suggestive of Pharyngitis

Patients with recent strep exposure may be more likely to have group A beta streptococcal pharyngitis.

See Annotation #6, "Are Symptoms Suggestive of Pharyngitis?" for the signs and symptoms associated with group A beta streptococcal.

After viral upper-respiratory infection and otitis, acute pharyngitis and/or tonsillitis is the third most common illness diagnosed by U.S. pediatricians. The major issue in most cases of acute pharyngitis is differentiating between group A beta streptococcal infection and other self-limited etiologies. Group A beta streptococcal pharyngitis requires appropriate antimicrobial therapy to prevent rheumatic fever and suppurative complica-

tions, minimize the secondary spread of the illness, and shorten the course of the illness. Many of the other causes of acute pharyngitis can be treated symptomatically *(Bisno, 1997a [R]; Randolph, 1985 [A])*.

Group A beta streptococcal pharyngitis is uncommon in children younger than three years of age and rare in children younger than 18 months old. Rheumatic fever is uncommon in children younger than three years of age *(Peter, 2003 [R])*.

Viral Causes of Acute Pharyngitis

Acute pharyngitis can be caused by both bacterial and viral pathogens. Most cases of acute pharyngitis are viral in etiology. Viral pathogens can cause pharyngitis clinically indistinguishable from group A beta streptococcal pharyngitis and can also cause distinct clinical syndromes, including adenovirus (pharyngoconjunctival fever), parainfluenza (hoarseness, croup), rhinovirus (coryza), herpes simplex type 1 and 2 (gingivitis and stomatitis), respiratory syncytial virus (hoarseness, wheezing), Epstein-Barr virus (infectious mononucleosis), influenza, coxsackievirus A (herpangina), enteroviruses (diarrhea), human immunodeficiency virus, coronavirus (viral upper-respiratory infection symptoms) and cytomegalovirus *(Lang, 1990 [R]; Paradise, 1992 [R])*.

Although it has been recognized that group A beta streptococcal and mononucleosis can be present together, most of the time this is felt to be because of the strep carrier state in those with mononucleosis. The acute symptoms of mononucleosis are nearly identical to those of group A beta streptococcal pharyngitis; thus, many patients with mononucleosis present initially for a throat culture. If the culture is positive, they are treated, and then return when symptoms persist. With the prevalence of the carrier state being between 10% and 25%, it would be expected that a similar percentage of patients with mononucleosis would have positive throat cultures. Since there is no practical way to differentiate these patients as carriers, a full course of antibiotics is recommended. However, if the patient on antibiotics is not recovering as expected, he/she should be reevaluated.

Bacterial Causes of Acute Pharyngitis

Bacterial pathogens (along with associated syndromes) other than group A beta streptococcal that can cause pharyngitis include group C and group G strep, mixed anaerobes (Vincent's angina), Neisseria gonorrhoea, Corynebacterium diptheriae (diphtheria), Yersinia pestis (plague), Treponema palladium (secondary syphilis), Francisella tularensis (tularemia), Mycoplasma pneumoniae (atypical pneumonia), and several chlamydial species *(Lang, 1990 [R]; Paradise, 1992 [R])*.

Noninfectious causes of sore throat, such as thyroiditis, are relatively uncommon considerations in the differential diagnosis of acute febrile pharyngitis.

Group A beta streptococcal pharyngitis has a number of characteristic features, including odynophagia, high fever, scarlatiniform rash, pharyngeal exudates, petechiae on the soft palate, tender anterior cervical lymphadenopathy, and malodorous breath. Few patients display all the classic signs and symptoms of group A beta streptococcal *(American Academy of Pediatrics, 2003b [R])*.

Complications Associated with Untreated Group A Beta Streptococcal

Rheumatic fever is a non-suppurative complication of group A beta streptococcal pharyngitis *(Gordis, 1973 [C])*. The risk of developing rheumatic fever is about 3% under epidemic conditions and approximately 0.3% under endemic conditions. First attacks of rheumatic fever are rarely seen in children younger than three years of age or adults over 40 years of age because of the relative infrequency of group A beta streptococcal infections in these age groups. One reason for identifying and treating patients with group A beta streptococcal pharyngitis is to decrease the incidence of rheumatic fever *(Dajani, 1995 [R])*. The only controlled study demonstrating the possibility of preventing rheumatic fever was done in 1950 in military camps *(Denny, 1950 [C])*. Further longitudinal studies have shown evidence of prevention of rheumatic fever by treatment

of group A beta streptococcal with penicillian. Several studies have shown that treatment of patients with group A beta streptococcal pharyngitis shortens the course of the illness *(Krober, 1985 [A])*.

16. History/Physical

History and physical findings may increase or decrease the likelihood of group A beta hemolytic strep as the cause of pharyngitis. Factors increasing the likelihood include abrupt onset, associated fever, headache, abdominal pain (especially in children), presence of tonsillar exudate, primarily anterior cervical adenopathy and the absence of cough and nasal congestion. These findings are not specific enough for group A strep to allow empiric treatment without testing. On the other hand, lack of these physical findings and history may eliminate the need to do strep testing and focus treatment instead on symptomatic measures.

17. Collect Speciman for Rapid Strep Test and Backup Culture

Several scoring systems have been developed to assist in predicting which patients will have a positive throat culture, but none has a high enough predictive value to allow treatment without a positive rapid strep test or strep throat culture. Historically these scoring systems were used to identify patients likely enough to have group A beta streptococcal that a confirmatory throat culture was unnecessary. Now they are used to identify patients who are so unlikely to have group A beta streptococcal that rapid strep test or strep culture is unnecessary *(Breese, 1977 [C]; Seppälä, 1993 [C])*.

Rapid strep test and strep culture both require proper collection technique by trained professionals and must be performed according to the Federal Clinical Laboratory Improvement Act (CLIA) regulations. Poor collection procedures reduce accuracy of either test. Rapid strep test must also be performed according to the manufacturer's guidelines. An appropriately performed throat swab touches both tonsillar pillars and the posterior pharyngeal wall. The tongue should not be included (although its avoidance is sometimes technically impossible). Backup strep culture is needed if rapid strep test is negative. The best yield is obtained by using separate swabs for rapid strep test and strep culture.

Backup systems such as polymenase chair reaction (PCR) may also be used.

Rapid strep test has the following advantages:

- It has nearly 100% specificity.
- Rapid turnaround time reduces unnecessary short-term treatment while awaiting test results and the associated complexity of interim treatment strategies.
- It potentially reduces need for callbacks.
- It allows the initiation of antibiotic in the timeliest fashion, reducing acute morbidity and contagion.
- Overall, rapid strep test may be more cost effective through reduced rework and reduced cycle time *(Lieu, 1990 [M])*.
- Rapid strep test has high patient satisfaction, even with associated wait time for results.

Rapid strep test has the following disadvantages or limitations:

- Lab costs are increased.
- Current technology requires that negative rapid strep tests be backed up with strep culture because of relatively low sensitivities. Recent reports of new technology for optical immunoassay (OIA) are encouraging for ultimately being able to use rapid strep test without culture backup. However, to date, results of studies on optical immunoassay are limited and conflicting. Until more data

is available, it is recommended that all negative rapid strep tests be backed up with strep culture *(Gerber, 1997 [C]; Schlager, 1996 [C])*.

- Recent study indicates the utility of a real-time polymerase chain reaction assay as a replacement for both rapid antigen testing and culture *(Uhl, 2003 [C])*. The polymerase chain reaction method requires a minimum of 30 to 60 minutes to perform the test, and in order to be used efficiently, it would require batch testing. It is unlikely that this polymerase chain reaction method would be used as a waiting/rapid test.
- Clinics may need to arrange new patient flow in the office and need to determine who will perform rapid strep test.
- False positives may occur with retesting for up to 14 days following antibiotic course completion (presumably due to incomplete clearing of strep antigen fragments that are still detected after clinical recovery).
- It does not differentiate between illness and carrier states.

19. Treatment and Education

Key Points:

- Penicillin (PCN) is the drug of choice for treatment of culture positive cases of group A beta streptococcal pharyngitis.
- In penicillin-allergic patients, options include cephalosprins (for some types of allergies), erythromycin and clindamycin.

Persistent Infections/Treatment Failure

Treatment of persistent infection should be directed toward eradication of both group A beta streptococcal and beta lactamase-producing protective organisms.

Note: All episodes consist of clinical findings and positive lab tests within seven days after completion of a course of antibiotic therapy.

Recommendations

- Erythromycin
- Cephalexin
- Clindamycin
- Amoxicillin/clavulanate
- Rocephin

(Bass, 1991 [R]; Gerber, 1990 [A]; Peter, 1992 [R])

A discussion of referral criteria for tonsillectomy in patients with recurrent tonsillitis is outside the scope of this guideline. As a result, the work group suggests physicians refer to one or more sources that offer a detailed discussion of referral criteria *(Lan, 2000 [M]; Paradise, 1984 [A])*.

Carrier State

Two alternative treatment protocols have been established in the literature as effective in eliminating the carrier state. Clindamycin 20 mg/kg/day in three divided doses (maximum 450 mg/day) x 10 days is the

treatment of choice if the decision is made to treat the carrier state. If clindamycin is not a suitable therapeutic choice, consideration can also be given to penicillin and rifampin *(Chaudhary, 1985 [A]; Kaplan, 1980 [A]; Tanz, 1985 [A]; Tanz, 1991 [A])*.

Patients currently on antistreptococcal antibiotics are unlikely to have streptococcal pharyngitis. Antibiotics not reliably antistreptococcal include sulfa medications, nitrofurantoin and tetracycline.

Patients who are chronically colonized with group A beta streptococcal are called carriers. These patients are at very low risk, if any, for developing suppurative (e.g., peritonsillar abscess) or non-suppurative (e.g., rheumatic fever) complications and are unlikely to spread group A beta streptococcal to close contacts. Therefore, most carriers require no medical intervention.

In the patient with recurrent culture positive group A beta streptococcal pharyngitis, the patient is likely to be a streptococcal carrier if:

- clinical findings suggest a viral etiology,
- epidemiologic findings (e.g., age, season) suggest a viral etiology,
- there is little clinical response to antibiotic therapy,
- throat cultures done between episodes of acute pharyngitis are also positive, or
- there is no serologic response to group A beta streptococcal antigens if measured (ASO, anti-DNAase B).

Situations in which identification and eradication of streptococcal carrier state may be desirable include *(Kaplan, 1980 [R])*:

- family history of rheumatic fever,
- ping-pong spread within a family,
- family with significant anxiety about group A beta streptococcal,
- outbreaks of group A beta streptococcal pharyngitis in closed or semiclosed community, and
- when tonsillectomy is being considered solely because of chronic carrier state.

Antibiotics for Strep Pharyngitis (GABS) (not all-inclusive)

Drug	Comments
Penicillin	Preferred antibiotic due to narrow spectrum (less likely to promote resistance) FDA-approved
Amoxicillin	Often chosen for children because the suspension is better tasting than penicillin 6 days duration with amoxicillin is acceptable
Amoxicillin/ clavulanate (Augmentin®)	Generally not a first-line drug due to broad spectrum and concerns about promoting resistance
Cephalexin	Acceptable option for some penicillin allergies* FDA-approved
Cefprozil (Cefzil®)	Acceptable option for some penicillin allergies* FDA-approved
Cefdinir (Omnicef®)	Acceptable option for some penicillin allergies* FDA-approved
Clindamycin	Acceptable option for penicillin allergies
Erythromycin	Acceptable option for penicillin allergies Some resistance, still low-level
Clarithromycin	Acceptable option for penicillin allergies Some resistance, still low-level
Azithromycin	Acceptable option for penicillin allergies Some resistance, still low-level FDA-approved
Sulfonamides (including Bactrim®)	Not recommended due to higher rates of resistance
Tetracyclines	Not recommended due to higher rates of resistance

* cross-sensitivity between penicillin and cephalosporins

20. Symptoms Improved Within 48-72 Hours?

After initiating a course of an appropriate antibiotic, improvement in symptoms related to group A streptococcal pharyngitis should be seen by 48 to 72 hours.

It is suggested that the patient be instructed to call in to the provider's office by 72 hours to confirm, or that the provider's office contacts the patient to verify improvement.

21. Complete Treatment

It is important to emphasize to the patient that completion of the course of antibiotic is important to reduce risk of recurrence.

22. Consider Re-Evaluation/Broad Spectrum Culture/Mono Testing, If Appropriate/Empirical Antibiotic Therapy

Strep Group A testing may, if positive, reflect a carrier state in which case the antibiotic used may not be effective. The prevalence of the carrier state has been estimated to vary between 10% and 25%. For this reason, if symptoms have not improved by 72 hours, there should be consideration of re-evaluation of the patient. This may be needed particularly to exclude peritonsillar cellulitis or abscess. The causative organisms in those cases are unlikely to be strep, and therefore an empiric change in antibiotic or referral to ear, nose and throat provider may be indicated. A broad spectrum culture can be obtained to exclude other potential pathogens such as group C or group G strep. If clinically indicated, testing for mononucleosis may be appropriate, keeping in mind that screening tests for mononucleosis may not be positive until several days into the illness.

23. Education for Home Remedies

Key Points:

- Treatment failure for group A beta streptococcal is rare.
- Education is needed on home remedies for sore throats.
- The patient should be instructed to call back if the symptoms worsen or if they persist beyond five to seven days.

When a patient currently on antibiotics (other than sulfa, tetracycline, nitrofurantoin or other non-strep antibiotics) is taking the medication as prescribed and develops a sore throat, chances are that the sore throat is caused by something other than group A beta streptococcal.

Home remedies include the following:

- Take acetaminophen or ibuprofen. Do not use aspirin with children and teenagers because it may increase the risk of Reye's syndrome.
- Gargle with warm salt water (1/4 teaspoon of salt per 8 ounce glass of water).
- Adults or older children may suck on throat lozenges, hard candy or ice.
- Eat soft foods.
- Drink cool beverages or warm liquids.
- Suck on flavored frozen desserts (such as popsicles).

Health education resources are listed in the Support for Implementation section of this guideline.

24. Consider Strep Culture

Key Points:

- Empiric treatment of group A beta streptococcal is discouraged due to poor diagnostic accuracy even with elaborate clinical scoring systems.
- Poor sample collection reduces the accuracy and clinical value of both rapid strep test and strep culture. Separate swabs should be used to collect the samples for rapid strep test and strep culture.

- Rapid strep test is useful but does not have sufficient sensitivity to be used alone. Strep culture is the most sensitive test for group A beta streptococcal, but treatment needs to be delayed until the test results are available.
- Rapid strep test followed by strep culture has the highest positive predictive value that the patient actually has the illness.

If a rapid strep test is not available or the results are negative, a strep culture should be performed. Generally treatment should be delayed until the culture results are available. Results are usually available within 24 hours or slightly less but may require incubation for longer periods of time. Some clinicians choose to initiate treatment prior to culture result availability, but a full course of treatment should not be prescribed until culture results confirm the presence of group A beta streptococcal *(Gerber, 1989 [R])*.

A less satisfactory strategy is empiric treatment. Using complex clinical scoring systems or in patients with the complete constellation of classic strep symptoms, empiric treatment may be justified but has significant limitations. If full-course treatment is initiated without intent to rely on the test results, laboratory testing is redundant and wasteful. Routinely culturing and prescribing antibiotic treatment for asymptomatic family members is not recommended. Routinely reculturing patients after treatment with antibiotics is not recommended.

Treatment of group A beta streptococcal pharyngitis is accurate when based on rapid strep test or strep culture results. Even with elaborate clinical scoring systems, diagnostic accuracy (probability of group A beta streptococcal) is only 50%, increasing to 75% if white blood count results are included in decision-making. For this reason, empiric treatment is discouraged; several professional societies recommend treatment based solely on culture results. Advantages and disadvantages for several modalities are listed below *(Breese, 1977 [C])*.

Strep culture has the following advantages:

- Even though strep culture is not a perfect test, it remains the "gold standard" by which other diagnostic methods are measured.
- It is less expensive to perform than rapid strep test.

Strep culture has the following disadvantages or limitations:

- Incubation time delays initiation of definitive treatment, reducing patient satisfaction.
- It does not differentiate between illness and carrier states.
- Culture sensitivity is dependent on technique and technical expertise.

Short-term treatment awaiting culture has the following advantages:

- It allows reduction of acute morbidity and associated lost productivity of patient or caregiver because of the early initiation of treatment.
- It does not promote saving of unused antibiotic if the culture is negative.

Short-term treatment awaiting culture positives has the following disadvantages:

- It may promote inappropriate drug sampling.
- It may cause additional patient co-pays due to need for secondary prescriptions.
- Additional callbacks are still required to report culture results.
- Many unnecessary antibiotics may be used with the potential risk of iatrogenic harm.

Empirical treatment of classic strep presentation has the following advantages:

- There is reduced time until initiation of definitive therapy.
- Redundant diagnostic tests are not performed.
- It gives high patient satisfaction to patients who are confident of their diagnosis prior to the test results.

Empirical treatment of classic strep presentation has the following disadvantages:

- It promotes overtreatment since clinical diagnostic accuracy is only 50%-75% with the best scoring systems.
- Due to overtreatment, other risks are enhanced, such as medication intolerance or serious allergy, including anaphylaxis.
- It reinforces mistaken beliefs about strep pharyngitis.

25. Strep Culture Result?

Whether or not the test is positive, patients and their families want to know results as soon as possible so that they can appropriately plan for their needs.

- If negative, they need educational information and a planned course of action if they do not recover in a reasonable time frame or if they become more ill.
- If positive, patients want to be started on medication as rapidly as possible, primarily as a comfort or convenience issue and to reduce contagion. Rheumatic fever prophylaxis is likely satisfactory if started within a week of the positive culture; however, patients and parents may perceive any delay in initiation of treatment as poor service.

26. Educate on Non-Group A Beta Streptococcal Pharyngitis Symptoms

If the rapid strep test and/or the strep culture is negative, the patient needs to be educated on non-strep sore throats. This includes the duration of the symptoms, ineffectiveness of antibiotic treatment, and home remedies that will ease the symptoms. The patient should be instructed to call back if the symptoms worsen or if they persist beyond five to seven days.

The benefit of treating non-group A beta streptococcal bacterial pharyngitis with erythromycin is small and of borderline statistical significance. Because of the small effect and the risk of promoting drug resistance, the use of erythromycin for the treatment of non-group A beta streptococcal pharyngitis is not recommended *(Peterson, 1997 [A])*.

Home remedies include the following:

- Eat soft foods.
- Drink cool beverages or warm liquids.
- Suck on flavored frozen desserts (such as popsicles).

Provide educational material about non-strep causes of sore throats and home remedies for the patient to take home. See Annotation #23, "Education for Home Remedies" for additional information. Health education resources are included in the Support for Implementation section of this guideline.

27. Symptoms Improved?

Non-group A beta streptococcal would generally be expected to be improving over a period of a few days. Patients should be instructed to contact their provider if symptoms are persisting.

28. Continue with Home Care

Home care measures to alleviate symptoms should be continued as needed. See Annotation #23, "Education for Home Remedies" for additional information.

29. Consider Re-Evaluation/Broad Spectrum Culture/Mono Testing, If Appropriate

See Annotation #22, "Consider Re-Evaluation" for details.

Rhinitis Algorithm Annotations

30. Patient Presents with Symptoms of Rhinitis

Rhinitis is defined as inflammation of the membranes lining the nose and is characterized by nasal congestion, rhinorrhea, sneezing and itching of the nose and/or postnasal drainage.

(Dykewicz, 1998 [R])

31. History/Physical

Rhinitis can present with any of the symptoms listed in the history of present illness. Allergic and non-allergic rhinitis can coexist and often do. Polyps and ASA/NSAID sensitivity can be seen in one third of patients with non-allergic rhinitis, but polyps occur in patients with allergic rhinitis only 5% of the time. Pregnancy and topical decongestant abuse can cause a form of rhinitis alone, or can be associated with worsening of other forms of rhinitis. Many antihypertensive agents, specifically alpha-adrenergics, beta-blockers and ACE inhibitors, have been reported to induce rhinitis. Finally, in the history of present illness, documentation of treatments used for rhinitis is important as trial and error is often the only way to determine each patient's needs.

Previous trauma or surgery make a structural etiology such as obstruction or a cerebrospinal fluid leak more likely. Suspicion of a cerebrospinal fluid leak as the cause of nasal discharge can be confirmed by testing for glucose in the discharge. If cerebrospinal fluid leak is seriously being considered, this would fall in the realm of specialty diagnosis.

Clues in the past medical history include history of facial trauma or surgery, previous history of asthma, rhinitis or atopic dermatitis, or thyroid disease. A family history of atopy or a history of other allergy associated conditions make allergic rhinitis more likely.

Exposure to triggers in the environment is a crucial point in the history. Home, school, work, day care and other frequent exposures should be reviewed.

The following points in the history and physical are relevant to rhinitis.

History of present illness:

- Congestion or obstruction
- Rhinorrhea (anterior nasal discharge)

- Pruritus of nose or eyes
- Sneezing
- Posterior nasal discharge with or without cough
- Sinus pressure/pain
- Snoring
- Episodic or seasonal or perennial symptoms; consider specific triggers*
- Pregnancy
- Current medications such as topical decongestants, hormones, antihypertensives, antibiotics
- Current and previous treatments for rhinitis

Past medical history:

- History of trauma or facial/sinus surgery
- Relevant medical conditions: asthma, dermatitis, chronic sinusitis, chronic or recurrent otitis media
- History of polyps and ASA/NSAID sensitivity

Family history:

- Asthma
- Rhinitis
- Atopic dermatitis

Social and environmental history:

- Occupational exposures*
- Home exposures*
- Active and passive smoking exposures
- School exposures
- Illicit drug exposures

* Refer to Appendix A, "Rhinitis Triggers"

Physical examination

The physical exam can have any combination of signs noted. Swollen nasal turbinates (congestion), rhinorrhea and pruritus tend to be the most common. Allergic conjunctivitis may also be present with red, watery, pruritic eyes.

Atrophic rhinitis is characterized by foul-smelling nasal crusting and sinus pain and is usually related to atrophy, excessive nasal and sinus surgery, radiation or one of several rare diseases such as Wegner's granulomatosis.

Nose:

- Swollen nasal turbinates (may be boggy, bluish or pale, hyperemic or purplish red); note size and color

- Clear, cloudy or colored rhinorrhea
- Nasal septal deviation or structural abnormality
- Nasal polyps
- Nasal crease or "salute"
- Sneezing
- Mouth breathing
- Unilateral obstruction
- Foreign body

Eyes:

- Conjunctivitis
- Allergic "shiners" (dark circles under the eyes from venous stasis)
- Dennie's lines (lower eyelid creases)
- Periorbital edema

Ears:

- Acute otitis media or otitis media with effusion (suggesting associated eustachian tube dysfunction)

Lungs:

- Wheezing or prolonged expiratory phase (suggesting associated asthma)

Skin:

- Atopic dermatitis

(Druce, 1993; Graft, 1995 [R]; Knight, 1995 [R]; Raphael, 1991 [R])

32. Signs and Symptoms Suggest Allergic Etiology?

With seasonal or episodic allergic rhinitis, common symptoms are sneezing, itching of the nose, palate or eyes, and clear rhinorrhea. However, nasal congestion is often the most significant complaint in patients with perennial rhinitis.

(Graft, 1995 [R]; Naclerio, 1991 [R])

Signs and symptoms suggestive of an allergic etiology include:

- Pruritus of the eyes, nose, palate, ears
- Watery rhinorrhea
- Sneezing
- Seasonal symptoms
- Family history of allergies
- Sensitivity to specific allergens, especially dust mites, animals, pollen and mold
- Coexistant asthma or eczema

Signs and symptoms suggestive of non-allergic rhinitis include:

- Sensitivity to smoke, perfume, weather changes and environmental irritants
- History of previous negative allergy testing
- Overuse of topical decongestants
- Adult onset of symptoms
- Nasal crusting or drying
- Facial pain

Signs and symptoms suggestive of either or both include:

- Perennial symptoms
- Episodic symptoms
- Nasal congestion
- History of frequent sinus infections/chronic sinusitis

33. Initiate Symptomatic Treatment/Allergen Avoidance/Medication Therapy

Diagnostic Testing

The clinician may choose to conduct diagnostic testing at this point if the results would change management. The following are recommended.

- **Skin tests and radioallergosorbent tests:** Skin tests and radioallergosorbent tests identify the presence of IgE antibody to a specific allergen. There are two major reasons to consider allergy testing: to differentiate allergic from non-allergic rhinitis, and to identify specific allergens causing allergic rhinitis. A limited panel of two to four radioallergosorbent tests should be considered. If a greater number of specific allergens is to be identified, skin tests are the preferred diagnostic tests. Skins tests are faster, more sensitive and more cost effective. Skin tests require experience in application and interpretation, and carry the risk of anaphylactic reactions. Therefore, only specially trained physicians should perform them. The precise sensitivity of specific IgE immunoassays such as radioallergosorbent test compared with prick/puncture skins tests has been reported to range from less than 50% to greater than 90%, with the average being about 70%-75% for most studies. Therefore, skin tests are presently the preferred test for the diagnosing of IgE-mediated sensitivity.

  The modified scoring system used in radioallergosorbent test testing does increase sensitivity but at the expense of specificity and therefore should be interpreted with care. The literature suggests that the lesser sensitivity of a serologic test, however, also raises the possibility that it may miss the presence of antibody in a patient at risk of a severe allergic reaction to a substance.

  (American Academy of Allergy and Immunology, 1983 [R]; Bernstein, 1988 [R]; Bernstein, 1995 [R]; DeClerck, 1986 [C]; Shapiro, 1988 [R])

- **Nasal smear for eosinophils:** Nasal smear may be a low-cost screening tool to detect eosinophils. While eosinophils may be present in both allergic and non-allergic rhinitis, eosinophlia predicts a good response to topical nasal corticosteroid medication. This test must be done during the actual symptomatic period to yield interpretable results.

In more than 80% of patients with allergic rhinitis, nasal cytology shows an increased number of eosinophils. In one study, secretion eosinophilia was found to correlate highly significantly with active immediate-type nasal allergy.

(Anderson, 1979 [R]; Malmberg, 1979 [D]; Meltzer, 1992 [A])

- **Other tests:** Blood eosinophilia has little diagnostic value in the evaluation of nasal allergies and is generally not helpful in the differential diagnosis. Total IgE concentrations provide only modest information about the risk of allergic disease. According to the American Academy of Allergy and Immunology and the National Center for Health Care Technology, sublingual provocation testing is unproven and experimental. These tests are therefore not recommended *(American Academy of Allergy, 1981 [R])*.

  A peripheral blood eosinophil count, total serum IgE level, Rinkel method of skin titration and sublingual provocation testing are not recommended.

  (Barbee, 1987 [B]; Bernstein, 1995 [R]; Brown, 1979 [C]; Mygind, 1978 [C])

Symptomatic Treatment

If the clinical diagnosis is obvious, symptomatic treatment should be initiated. Symptomatic treatment includes both education on avoidance and medication therapy.

Avoidance activities: Identifying avoidable allergens by skin test or radioallergosorbent test will enhance a patient's motivation to practice avoidance. Some avoidance activities require significant financial investment or substantial lifestyle changes by the patient. Before recommending such measures, it may be useful to recommend skin testing or limited radioallergosorbent test testing to confirm the diagnosis and to identify the specific allergen.

House dust mites: House dust mites are major allergens found in the house in carpets, mattresses, bedding, pillows, upholstered furniture, stuffed animals and clothing (especially children's clothing). They thrive on human epithelial scales.

Essential changes to reduce mite exposure include the following:

- Encase the mattress and box springs in an allergen-impermeable cover.
- Encase the pillow in an allergen-impermeable cover or wash it weekly.
- Wash the sheets and blankets on the patient's bed weekly in hot water. A temperature of greater than or equal to 130º F is necessary for killing house dust mites.

The following measure minimizes exposure to dust mites and is desirable:

- Reduce indoor humidity to less than 50%. (An air conditioner will reduce indoor humidity in the summer.)

Further measures are discussed in the Resources Available table located in the Support for Implementation section of this guideline.

Pets:

- Remove animals from the house.
- If the pet cannot be removed, a compromise to at least remove it from the bedroom can often be secured. Weekly washing of the pet may reduce allergens, but the usefulness of this practice remains controversial.

Indoor molds:

- Basements tend to have higher humidity levels and therefore have higher mold growth.
- Reduce indoor humidity to less than 50%.
- Remove sites for mold growth.
- Clean with fungicides.

Outdoor pollens and molds:

- Remain indoors on specific days when pollen counts are high.
- Keep doors and windows closed in the home and in automobiles.
- Air conditioning is recommended.

In general:

- Minimize contact with irritants such as cigarette smoke, perfumes, cosmetics, hair spray and various other odors.
- Discourage smoking by family members and visitors.

(D'Amato, 1996; Ehnert, 1992; Klucka, 1995; Kozak, 1979; McDonald, 1992; Platts-Mills, 1987; Wood, 1989)

Medication Therapy

As with the chronic use of any medications, special consideration of risk benefit may need to be given to elderly, fragile patients, pregnant women, athletes and children.

The following table provides information to assist in the selection of appropriate medical therapy for patients with allergic rhinitis.

Medication	**Symptom**			
	Sneezing	**Runny nose**	**Itching**	**Congestion**
Antihistamines	+++	++	+++	±
Decongestants	-	-	-	+++
Cromolyn sodium	+	+	+	±
Topical corticosteroids	+++	+++	+++	++
Anticholinergics	-	+++	-	-
Leukotrine receptor blockers				±

Key: - no effect ++ moderate effect
± negligible effect +++ pronounced effect
+ slight effect

Corticosteroids

With the exception of systemic steroids, intranasal corticosteroids are the most effective single agents for controlling the spectrum of allergic rhinitis symptoms and should be considered first line therapy in patients with moderate to severe symptoms.

They reduce nasal blockage, itching, sneezing and rhinorrhea in allergic and non-allergic rhinitis. Regular daily use of the medications is required to achieve optimal results. It may be best to start treatment one week before the beginning of the allergy season for prophylactic use. Recommended frequency for beclomethasone, flunisolide and budesonide is twice daily; for fluticasone, triamcinolone, and mometasone, it is once a day. Patients need to be carefully instructed on the correct method of administration.

The most common side effects of intranasal corticosteroids are nasal irritation (dryness, burning and crusting) and mild epistaxis. Nasal septal perforation has been reported. The likelihood of these side effects can be decreased by use of the proper technique for administration. Nasal mucosal atrophy and clinically significant suppression of the adrenal axis have not been demonstrated either in adults or children. However, the Food and Drug Administration reviewed data that suggested growth may be temporarily slowed in children. This issue remains under study and care should be used in prolonged use of these medications. (Consider giving children oral antihistamines or topical nonsteroid medications as the first line of treatment.) Systemic corticosteroid use should be reserved for severe cases not controlled by antihistamines or topical agents. A short course of oral corticosteroid (prednisone "burst": adult dose 40 mg/day as a single or divided dose, or pediatric dose 1-2 mg/kg/day in two divided doses for three to five days) may be helpful. Injectable corticosteroids are not preferred; they are more expensive and invasive and tend to have a longer duration of action than typical courses of corticosteroids.

Oral antihistamines are an effective alternative in patients who cannot use or prefer not to use intranasal corticosteroids. They can also be added to intranasal corticosteroids as an adjunctive agent. Some patients and physicians prefer to use antihistamines or antihistamine/decongestant combinations to treat mild or episodic disease, particularly when rapid onset of symptom relief is desired. Second-generation antihistamines are less sedating and cause less central nervous system impairment because they do not cross the blood brain barrier well. Topical cromolyn is less effective than intranasal corticosteroids. Decongestants, anticholinergics and eye drops are effective for targeted symptoms and can be used in combination with the above medication. In several studies, antileukotriene drugs have been proven as effective as second-generation antihistamines for treating symptoms of allergic rhinitis. They may not be as helpful as intranasal corticosteroids. Antileukotriene drugs are also helpful for coexisting bronchial asthma.

Oral steroids should be reserved for refractory or severe cases only. Injectable steroids are not generally recommended. As with the chronic use of any medications, special consideration of risk benefit may need to be given to elderly, fragile patients, pregnant women, athletes and children.

Patient education materials to support the various treatment options listed in the annotations can be found in the Support for Implementation section of this guideline.

(Brannan, 1995 [A]; Cave, 1999 [R]; Dykewicz, 1998 [R]; Fluticasone Propionate Collaborative Pediatric Working Group, 1994 [A]; Ganderton, 1970 [D]; Graft, 1996 [A]; Holopainen, 1982 [D]; Juniper, 1990 [A]; Juniper, 1989 [A]; Kennis, 1998 [R]; Pipkorn, 1987 [A]; Schenkel, 2000 [A]; Skoner, 2000 [A]; Soderberg-Warner, 1984 [D]; Vuurman, 1993 [C]; Weiner, 1998 [M]; Welsh, 1987 [A]; Wolthers, 1993 [A])

Antihistamines

Antihistamines are effective at controlling all symptoms associated with allergic rhinitis, with the exception of nasal congestion. They are somewhat less effective than intranasal corticosteroids, but they can be used either on a daily basis or on an as-needed basis. Common side effects of the first-generation antihistamines include somnolence, diminished alertness and anticholinergic effects such as dry mouth, blurred vision and urinary retention. The anticholinergic side effects are of more concern in people over 65 years old. Evidence supports that first-generation antihistamines cause central nervous system impairment even in the absence of overt symptoms. Some reports indicate that first-generation antihistamines clearly impair driving performances. The second-generation antihistamines are less sedating and cause less central nervous system impairment because they do not cross the blood brain barrier well.

See table at end of annotation.

(Bronsky, 1995 [A]; Bronsky, 1996 [A]; Klein, 1996 [A]; McCue, 1996 [R]; Meltzer, 2002 [R]; Meltzer, 2000 [A]; Mullarkey, 1988 [R]; Naclerio, 1991 [R]; Nayak, 2002 [A]; Pullerits, 1999 [A]; Ramaekers, 1992 [A]; Schoenwetter, 1995 [A]; Simons, 1994a [A]; Simons, 1994b [R]; Storms, 1989 [A]; Vermeeren, 1998 [A]; Walsh, 1992 [A]; Weiler, 2000 [A]; Wilson, 2000 [A])

Decongestants

Oral decongestants (such as pseudoephedrine) are effective in reducing nasal congestion and are available in short-acting and sustained-release preparations. Oral decongestants can be a useful addition to antihistamines, and the two are readily available in combined preparations. The combination products relieve nasal obstruction, itching, sneezing and rhinorrhea. Topical decongestants are effective for short-term relief of nasal congestion, but after three days of use may induce rebound congestion. They are also advantageous for use in very congested noses prior to instilling intranasal corticosteroids.

Adverse effects include irritability, tremor, insomnia, tachycardia and hypertension. Oral decongestants should not be used in patients with coronary heart disease, thyrotoxicosis, glaucoma or diabetes.

(Empey, 1976 [A]; Meltzer, 1995 [R]; Naclerio, 1991 [R]; Storms, 1989 [A])

Cromolyn

Cromolyn is less effective than intranasal corticosteroids. It is most effective when used regularly prior to the onset of allergic symptoms. Adverse effects are minimal and include nasal irritation, sneezing and unpleasant taste. The four times daily dosing can cause compliance problems. Cromolyn is a good alternative for patients who are not candidates for corticosteroids.

(Meltzer, 1995 [R]; Naclerio, 1991 [R]; Orgel, 1991 [A]; Welsh, 1987 [A])

Anticholinergics

Intranasal anticholinergics (ipratropium bromide) are effective in relieving anterior rhinorrhea in patients with allergic and non-allergic rhinitis. They have no effect on congestion, sneezing or itching. Most frequent side effects include epistaxis, blood-tinged mucus and nasal dryness. Other possible side effects include dry mouth and throat, dizziness, ocular irritation, blurred vision, precipitation or worsening of narrow angle glaucoma, urinary retention, prostatic disorders, tachycardia, constipation and bowel obstruction.

(Meltzer, 1995 [R]; Meltzer, 1992 [A]; Mullarkey, 1988 [R]; Naclerio, 1991 [R])

Ophthalmic Medications

Ophthalmic medications are available as topical solutions/suspensions and contain antihistamines, decongestants, combination antihistamines/decongestants, corticosteroids, or mast cell stabilizers (cromolyn sodium and lodoxamide). Side effects of ophthalmic medications (except corticosteroids) are generally mild and include a brief stinging, burning sensation. Topical antihistamines can be used as needed for acute symptomatic relief and prophylaxis of allergic rhinitis with minimal systemic side effects.

Contact lens users should consult their eye care provider regarding the use of these products.

(Bende, 1987 [A]; Caldwell, 1992 [A]; Leino, 1994 [A])

Drug	Examples	Comments
1st generation antihistamines	Chlorpheniramine	effective but commonly sedating available as single-ingredient products and combinations (with pseudoephedrine and phenylephrine)
2nd generation antihistamines	Loratadine (Claritin®) Fexofenadine (Allegra®) Cetirizine (Zyrtec®) Desloratadine (Clarinex®)	low- and non-sedating options loratadine is available as an OTC option available as single-ingredient products and as combinations (with pseudoephedrine)
Leukotriene blockers	Montelukast (Singulair®)	appear as effective as 2nd generation antihistamines and less effective than nasal steroids
Nasal steroids	Fluticasone (Flonase®) Mometasone (Nasonex®) Budesonide (Rhinocort®) Triamcinolone (Nasacort AQ®) Flunisolide (Nasarel®)	Flonase is available generically
Nasal antihistamine	Astelin	bitter taste and moderately sedating
Mast cell stabilizers	Cromolyn nasal (Nasalcrom®)	OTC, less effective than nasal steroids, must be used regularly
Anticholinergics	Ipratropium nasal (Atrovent nasal®)	can relieve rhinorrhea but has no effect on congestion or itching
OTC combinations	Opcon-A, Vasocon-A, Naphcon-A, OcuHist	
Rx combinations	Olopatadine (Patanol®), Azelastine (Optivar®), Ketotifen (Zaditor®), Epinastine (Elestat®)	BID products
Antihistamines	Levocabastine (Livostin®), Emadastine (Emadine®)	QID products
Mast cell stabilizers	Cromolyn (Crolom®), Pemirolast (Alamast®), Lodoxamide (Alomide®), Nedocromil (Alocril®)	

34. Symptoms Improved?

If symptoms have not improved after two to four weeks, the clinician should consider issues affecting compliance, and alternative medication therapy.

35. Patient Education/Follow-Up As Appropriate

If the patient has adequate relief of rhinitis and associated allergic symptoms either by instituting avoidance measures or through a medication trial, appropriate follow-up should include:

- Further education and review of information about avoidance activities
- Education and review of appropriate use of medications and possible side effects

- Advice to anticipate unavoidable exposure to known allergens by beginning use of medications prior to exposure. For example, taking oral antihistamines prior to visiting a home with a cat or dog, if sensitive to their dander, can prevent symptoms. Starting intranasal corticosteroids one to two weeks prior to the start of the ragweed pollen season will maximize benefits of the medication in people with seasonal allergic rhinitis symptoms in the late summer.

Adequate follow-up may require a separate provider visit or a follow-up phone call or may be accomplished during another clinic visit. Use of appropriate educational handouts and materials may be helpful.

Patient education materials can be found in the Support for Implementation section of this guideline.

36. Consider Further Diagnostic Testing/Referral to a Specialty Provider

When the patient has not experienced relief of symptoms within two to four weeks of adequate therapy, the provider should:

- review obstacles to compliance with current medication and discuss avoidance measures;
- consider a trial of another medication or add another agent for targeted symptoms;
- consider allergen skin testing by a qualified physician: if there are positive skin tests to allergens that correlate with the patient's timing of symptoms, immunotherapy may be considered;
- consider complete nasal examination (rhinoscopy) by a qualified individual to rule out a mass or lesion, particularly if obstruction and congestion are the major symptoms; or
- consider diagnosis of non-allergic rhinitis.

If the patient does not respond to medical treatment, a complete examination of the ears, nose and throat is indicated to rule out structural and extrinsic sources of obstruction and drainage. Allergy evaluation should be performed. This examination should include visualization of the entire nasal septum, inferior and middle nasal turbinates and possibly the middle meatus, and visualization of the nasopharynx. A topical decongestant spray may be used to shrink nasal tissues and allow better visualization of nasal structures. Endoscopic nasal and nasopharyngeal examination may be required.

Immunotherapy

Immunotherapy is a series of subcutaneous injections of extracts of allergenic materials in an attempt to decrease the severity of allergic symptoms that may occur upon future exposure to the allergen. It consists of weekly incremental doses usually over four to six months, followed by maintenance injections of the tolerated maximum dose every two to four weeks. If successful, this treatment regimen is normally carried on for three to five years. Immunotherapy should be generally reserved for patients with significant allergic rhinitis for whom avoidance measures and pharmacotherapy are insufficient to control symptoms. Other candidates for immunotherapy include patients who have experienced side effects from medication or who cannot comply with a regular (or prescribed) pharmacotherapy regimen or who develop complications such as recurrent sinusitis.

All immunotherapy injections should be administered in a medical facility where personnel, equipment and medications are available to treat an anaphylactic reaction to an injection. Because there is a risk of anaphylaxis with every injection during the buildup or maintenance phases of treatment, regardless of the duration of treatment, the patient should be advised to wait in the physician's office or clinic for 30 minutes after the injection.

Patient education materials can be found in the Support for Implementation section of this guideline.

Immunotherapy injections are most effective for allergic rhinitis caused by pollens and dust mites. They may be less effective for mold and animal dander allergies.

(Lichtenstein, 1971 [A]; Lowell, 1965 [A]; Norman, 1978 [A]; Norman, 1990 [R]; Van Metre, 1980 [A]; Varney, 1991 [A])

37. Signs and Symptoms Suggest Structural Etiology?

Malignant tumors of the nose and sinuses can be difficult to detect. Recent onset of pain; decreased sensation of the face, palate or teeth; decreased sense of smell; bleeding; and facial swelling and/or nasal obstruction may all be signs of a nasal or sinus cancer.

Structural abnormalities most often present with symptoms of obstruction. Deviated nasal septum, deformity of nasal bones, nasal turbinates or nasal cartilage may be detected on physical examination and may cause significant obstruction. Nasal polyps and adenoidal hypertrophy can cause obstruction.

Unilateral nasal obstruction is often indicative of a structural or extrinsic source of nasal obstruction. The most common cause of chronic unilateral nasal obstruction in an adult is a deviated septum; however, nasal tumors such as inverting papilloma and carcinomas must be ruled out. In the pediatric population, unilateral nasal obstruction and/or rhinorrhea require that an intranasal foreign body be ruled out.

Juvenile angiofibroma is a benign vascular tumor found in adolescent males. It may present with nasal obstruction or epistaxis and can cause torrential nosebleeds.

Another structural defect resulting from trauma that should be considered is a cribiform plate defect that can result in CSF rhinorrhea.

Suspicion of one of these abnormalities requires a complete nasal examination including visualization of the posterior nasopharynx.

39. Non-Allergic Rhinitis

Symptoms of non-allergic rhinitis are similar to those of allergic rhinitis and may include nasal congestion, postnasal drainage, rhinorrhea and even sneezing. Examples of non-allergic rhinitis include hormonal, such as rhinitis of pregnancy; sensitivity to smells and temperature changes; non-allergic rhinitic eosinophilic syndrome; rhinitis medicamentosa from regular use of topical nasal decongestants; and atrophic rhinitis.

40. Initiate Symptomatic Treatment

Treatment of symptomatic nasal obstruction due to non-allergic rhinitis includes the following:

- Azelastine hydrochloride nasal spray
- Intranasal corticosteroid spray

  Topical nasal steroid sprays can be used to treat chronic nasal obstruction secondary to non-allergic rhinitis. Side effects seem to be related to application of the spray and are usually limited to intranasal dryness, crusting, and bleeding. Documented systemic side effects are rare. Topical nasal steroid sprays have a relatively long onset of action (up to four weeks) and are therefore better suited to patients with chronic, rather than sporadic, symptoms.

- Oral decongestant

  The use of oral decongestants may cause central nervous system stimulation, hypertension and cardiac arrhythmias. However, some patients find them helpful at relieving symptomatic nasal obstruction secondary to non-allergic rhinitis. Oral decongestants, which have a relatively rapid

onset of action, are particularly useful for sporadic symptoms. Patients using oral decongestants should be monitored for side effects, particularly hypertension.

Chronic nasal obstructive symptoms secondary to non-allergic rhinitis can be managed with intranasal steroid sprays, oral decongestants or a combination of the two.

- Oral antihistamines

  The drying effect of antihistamines may be useful in controlling rhinorrhea associated with non-allergic rhinitis. Antihistamines are contraindicated for patients with recurrent or chronic sinusitis as they may cause ciliary paresis and drying of secretions, thereby impairing sinus drainage.

- Breathe Right® nasal strips

  Breathe Right® nasal strips are effective for some patients with only nocturnal symptoms (dependent nasal obstruction). Breathe Right® nasal strips are more effective for patients with narrow noses or with anterior septal deviations. Daytime use is not usually practical.

- Topical antihistamines

  Topical anthistamines have been shown to be effective in controlling rhinorrhea associated with non-allergic rhinitis. Side effects include drowsiness and bitter taste.

  (Banov, 2001 [A])

Treatment of symptomatic nonpurulent chronic posterior nasal drainage (postnasal drip) includes the following.

Conservative treatment:

- Increase water intake
- Decrease caffeine and alcohol intake (both have a diuretic effect)
- Nasal saline irrigation. Nasal saline irrigations can be purchased over the counter (brand names: Ocean, Salinex). A saline nasal irrigation solution can be made at home by mixing 1/4 teaspoon table salt into one cup of water.
- Determine whether the patient is using any medications that may cause oral or nasal dryness.
- Vaseline or antibiotic ointment may be used for nasal crusting.
- Add humidity in bedroom if significantly less than 50%.

Medical treatment:

- Intranasal corticosteroids

Treatment of symptomatic bilateral chronic anterior rhinorrhea due to non-allergic rhinitis includes the following:

- Avoidance of offending irritants such as smoke and perfume
- Intranasal corticosteroids
- Atrovent spray
- Nasal saline

41. Symptoms Improved?

If symptoms have not improved within two to six weeks, the clinician should consider issues of compliance, alternative medical treatment, or referral to a specialty provider.

42. Consider Referral to Specialist

Nasal examinations are generally done by an ear, nose and throat specialist but may be done by a physician trained in endoscopic fiberoptic rhinoscopy. A computed tomography scan may be helpful at this time.

If chronic sinusitis remains in the differential diagnosis, antibiotic therapy should be instituted prior to radiological examination.

Coronal computed tomographies are used rather than plain sinus films mainly because plain sinus films do not adequately delineate intranasal and sinus anatomy. Plain films rarely adequately visualize the ethmoid sinuses, which are the sinuses most commonly involved in chronic sinusitis. Also, at this stage of the protocol, medical treatment has already failed, so if surgery is indicated for chronic sinusitis, etc., a coronal computed tomography will be needed prior to surgery.

Sinusitis Algorithm Annotations

44. Patient Has Symptoms Suggestive of Sinusitis

Acute sinusitis may be present when:

- upper respiratory symptoms have been present for at least seven days, **AND**
- two or more of the following four factors are present at a point seven days or more after the onset of the illness.
  - Colored nasal drainage
  - Poor response to decongestant
  - Facial pain or sinus pain, particularly if aggravated by postural change or valsalva maneuver
  - Headache

The diagnosis of acute sinusitis is based primarily on the patient's presenting symptoms and history, and is supported by the physical exam.

The clinician's overall clinical impression has been found to accurately predict acute sinusitis when the probability of sinusitis is high. Physical examination may assist in diagnosis (i.e., purulent upper-respiratory secretions, maxillary dental pain/facial pain, nasal congestion and/or polyposis) *(Williams, 1992 [C]; Williams, 1993 [R])*.

The diagnosis of "bacterial" sinusitis on clinical and radiographic grounds is difficult at best. In studies where antral puncture was performed for clinical or radiographically suspected sinusitis, up to 30%-50% of patients had sterile aspirates *(Axellson, 1973 [C]; Edelstein, 1993 [A]; Gwaltney, 1992 [R]; Gwaltney, 1981 [D])*.

Moreover, viruses may produce all of the clinical manifestations of acute sinusitis *(Dohlman, 1993 [A]; Gwaltney, 1994 [D]; Hamory, 1979 [D]; Rantanen, 1973 [C]; Winther, 1990 [R])*.

The seven-day criteria is taken from a symposium consensus and is somewhat arbitrary. Patients who meet these criteria have a higher likelihood of having bacterial sinusitis as opposed to a viral upper-respiratory

infection. There is disagreement among the literature about the time period past which acute sinusitis is indicated *(Druce, 1992 [R]; Willett, 1994 [R]; Williams, 1992 [C]; Williams, 1993 [R]).*

45. Schedule Visit Within 24-48 Hours

An individual reporting symptoms for acute sinusitis has a reasonably high likelihood of having the disease.

- Fever greater than 102º and a documented past history of sinusitis in addition to the above symptoms are supportive of a sinusitis diagnosis.
- Tooth pain not of dental origin with any of the above findings is a more specific indication of sinusitis.
- Severe symptoms should be considered for treatment before seven days.
- Known anatomical blockage (e.g., chronic nasal polyps, severely deviated septum, recurrent sinusitis) may need immediate treatment.
- Patients on antibiotics for two or more days, whose sinus symptoms are worsening, should be scheduled for a provider visit.

It is the opinion of the work group that phone management/home care of the patient with presumed sinusitis should be limited to a select group of patients. This group includes patients with the following characteristics.

Generally good health

Patients who have multisystem disease are generally more complicated/complex to treat by phone because their illnesses and medications need to be taken into consideration as the treatment plan is developed.

Mildly ill

Any patient who is determined by the phone triage person to be more than mildly ill should be scheduled for a visit. The provider may determine if more intensive therapy is required (i.e., whether the initial therapy may include a ß-lactamase-resistant antibiotic if the patient is more severely ill).

Established patient

Generally patients who do not have an office record should not be considered for phone management because background data is insufficient for appropriate treatment of the patient.

Patient is comfortable with phone management

The patient's acceptance of treatment by phone is necessary for successful treatment.

History of previous sinusitis treated successfully

An office record documenting that a physician has made a previous diagnosis of sinusitis would allow the patient to be familiar with the previous symptoms of sinusitis and the physician to be more confident that sinusitis is again present.

Earlier visit for treatment of viral upper-respiratory infection

Patients recently seen by a care provider who call back to the office to report symptoms of sinusitis are appropriate candidates for phone management, as the physician is already familiar with the patient.

Patients with any one of the following complicating factors require emergent care:

- Orbital pain
- Visual disturbances
- Periorbital swelling or erythema
- Facial swelling or erythema
- Signs of meningitis or "worst headache of my life"

46. History/Physical

Review History

Regional exam of the head and neck

The following physical findings may be present:

- Purulent nasal drainage
- Sinus tenderness
- Decreased transillumination (optional)

Assess for complicating factors – more intensive treatment may be indicated

- **Local**

  External facial swelling/erythema over involved sinus

  Involvement of frontal sinus or symptoms of sinus impaction

- **Orbital**

  Visual changes

  Extraocular motion abnormal

  Proptosis

  Periorbital inflammation/soft tissue edema

  Periorbital erythema/cellulitis

  - Subperiosteal abscess
  - Orbital cellulitis
  - Orbital abscess

- **Intracranial, central nervous system complications**

  Cavernous sinus thrombosis

  Meningitis

  Subdural empyema

  Brain abscess

Plain sinus x-rays and other imaging are usually not necessary in making the diagnosis of acute sinusitis.

Maxillary antrum aspiration for culture is indicated only when precise microbial identification is required.

Transillumination

Transillumination is of limited usefulness and is dependent on the skill level of the provider performing the exam *(Williams, 1992 [C])*.

As a single finding, transillumination cannot be relied upon to rule sinusitis in or out.

Transillumination requires a completely darkened room, adequate time for dark adaptation, and practice *(Williams, 1993 [R])*.

Plain sinus x-rays and other imaging

Plain films offer little additional information in this setting *(Roberts, 1995; Williams, 1993)*.

Poor sensitivity and specificity limit the usefulness of a sinus x-ray series. The presence of opacification or air-fluid levels, although fairly predictive of bacterial infection, is seen in only 60% of patients with sinusitis. If one includes mucosal thickening as an indication of sinusitis, the specificity drops to as low as 36% *(Willett, 1994 [R])*.

Maxillary antrum aspiration for culture

The "gold standard" for the diagnosis of acute sinusitis is antral puncture and cultures. However, this is not clinically practical *(Gwaltney, 1981 [D]; Hamory, 1979 [D]; Herr, 1991 [R])*.

The goal of treatment is to promote adequate drainage of the sinuses. This in turn will provide relief of symptoms associated with sinusitis. This may require a combination of home care and medical treatments.

48. Home Self-Care

Patients who are in generally good health and only mildly ill may be appropriate candidates for home care/phone management of presumed acute sinusitis. Both the patient and the provider should be comfortable with home care/phone management. The following factors are also supportive of home care/phone management:

- Established patient (has been seen by primary care physician within the past year)
- History of previous sinusitis treated successfully
- Earlier visit with viral upper-respiratory infection that has progressed to probable acute sinusitis

Many patient sources discuss the benefits of comfort measures even though no studies have been conducted on the sinusitis population to document the actual effects of these measures on the treatment of sinusitis. Therefore, non-pharmacologic measures are aimed at symptom relief and providing comfort.

The patient should be instructed to implement the following comfort and prevention measures.

Home self-care measures

Maintain adequate hydration (drink 6-10 glasses of liquid a day to thin mucus).

Steamy shower or increase humidity in the home. Because of burns that have occurred when people use steam vaporizers, and the potential for microorganism growth in vaporizers, the recommended method for steam inhalation is steam from a hot bathtub or shower.

Apply warm facial packs (warm wash cloth, hot water bottle or gel pack) for 5-10 minutes three or more times per day.

Localized pain and tenderness are common and may require analgesics.

Saline irrigation (saline nose drops, spray to thin muscus) can provide moisture and improve mucocilary function.

- Homemade (1/4 teaspoon salt dissolved in one cup of water; if water is drinkable, it is safe to use as a saline irrigation. Use bulb syringe or dropper purchased from drug store.)
- Saline nasal drops/spray, commercial (e.g., Ocean, Salinex, Nasal)

Decongestants (topically or orally)

- Pseudoephedrine HCL (e.g., Sudafed) 60 mg. every 4-6 hours, not to exceed four doses per 24 hours
- Decongestant nasal sprays for no longer than three days, e.g., oxymetazoline (e.g., Afrin), phenylephrine HCl (Neosynephrine)

No controlled trials have assessed the efficacy of decongestants for the treatment of acute sinusitis. Numerous authorities recommend their use for symptomatic relief *(Druce, 1990 [R]; Willett, 1994 [R])*.

Decongestants are known to increase ostial diameter and thus have the potential to promote sinus drainage *(Gwaltney, 1981 [D]; Melen, 1986 [C])*.

The overall weight of clinical experience supports the use of decongestants as adjunctive therapy for sinusitis; however, further studies are needed.

Antihistamines

Antihistamines are not recommended for the treatment of sinusitis because they cause further inspissation of secretions *(Willett, 1994 [R])*.

Get adequate rest.

Sleep with head of bed elevated.

Avoid cigarette smoke and extremely cool or dry air.

Prevention measures

Appropriate treatment of allergies and viral upper-respiratory infections can prevent the development of sinusitis.

Environmental factors that affect the sinuses include cigarette smoke, pollution, swimming in contaminated water, and barotrauma.

49. Treatment

Nasal Steroid Spray

Intranasal corticosteroid spray may be rational but is an unproved adjunctive therapy for acute sinusitis. The spray may be appropriate for selected cases of recurrent sinusitis, especially in the presence of an allergy or inflammation etiology *(Meltzer, 2000 [A])*.

A recent study looked at amoxicillin and topical budesonide for the treatment of acute maxillary sinusitits. 240 adults were randomized into four treatment groups over a four-year study period. The study concluded that an antibiotic, a topical steroid or a combination of both does not alter the severity of symptoms, the duration or the natural history of the condition *(Williamson, 2007 [A])*.

Antibiotics

According to one study, the natural history of the majority of the patients with acute sinusitis is resolution without the use of antibiotics. The study was a randomized placebo-controlled trial of the treatment of acute sinusitis in the primary care setting. It was the first to be done in the primary care setting and concluded that antibiotic treatment did not improve the clinical course of acute sinusitis. The antibiotic used in the treated group was amoxicillin, 750 mg, three times a day, for seven days. The only other placebo-controlled trial done treating acute sinusitis was conducted in an ear, nose and throat practice. The antibiotics used were penicillin and lincomycin. In this study, antibiotics seemed to accelerate resolution of radiographic abnormalities, but the difference between the antibiotic and the placebo-treated groups was small. Another randomized study supports the use of amoxicillin and Pen VK in the treatment of sinusitis *(Axelsson, 1970 [A]; Lindbaek, 1996 [A]; Van Buchem, 1997 [A]; Williams Jr, 2000 [M])*.

Antibiotics should be reserved for those patients who failed decongestant therapy, those who present with symptoms and signs of a more severe illness, and those who have complications of acute sinusitis *(Snow, 2001 [R])*.

Typical organisms isolated from patients with acute sinusitis include *Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, Staphylococcus aureus*, other streptococci, anaerobes, and (rarely) other gram negative organisms. S. Pneumoniae and H. influenzae account for 70% of the isolates in adults *(Willett, 1994 [R])*.

In our area, 30%-40% of the *H. influenzae* and most of the *M. cattarhalis* produce ß-lactamase and are considered resistant to amoxicillin.

Since antral puncture on all patients suspected of bacterial sinusitis is clinically impractical, the diagnosis rests on clinical impression and antibiotic therapy is empiric. A 7- to 10-day course of antibiotics leads to symptomatic and bacteriologic improvement in 80%-90% of patients *(Willett, 1994 [R])*.

Amoxicillin is the initial drug of choice. Antibiotics such as amoxicillin/clavulanate, cephalosporins and the newer macrolides have theoretic advantages when ß-lactamase producing organisms are present. However, numerous studies have shown no efficacy advantage with these extended spectrum antibiotics compared to amoxicillin even when ß-lactamase producing organisms are present. As these drugs typically are five to seven times more expensive than amoxicillin, their use cannot be justified as first-line therapy for acute sinusitis. In patients who are allergic to penicillin, trimethoprim-sulphamethoxazor should be the alternative. Generally quinolone antibiotics should not be used since they are relatively inactive against pneumococci *(Adelglass, 1999 [A]; Agency for Health Care Policy and Research, 1999 [R]; Edelstein, 1993 [A]; Gwaltney, 1992 [R]; Hickner, 2001 [R]; Huck, 1993 [A]; Lasko, 1998 [A]; Sydnor, 1989 [C]; Wald, 1984 [A]; Wald, 1986 [A]; Willet 1994 [R])*.

The Sinus and Allergy Partnership has developed guidelines for the antimicrobial treatment for acute bacterial rhinosinusitis *(Sinus and Allergy Health Partnership, 2000 [R])*.

Duration of antibiotics

The duration of antibiotic therapy is controversial, with recommendations from various sources being anywhere from 3 to 14 days. An excellent study comparing 3 days versus 10 days of trimethoprim/sulfamethoxazole reported no difference in clinical response. Further studies will need to be done using 3-day therapy before this can be recommended. A 10-day course of antibiotics is recommended since this duration of antibiotics has been used in the vast majority of clinical trials in sinusitis. Also it has been shown that 10 days of antibiotics will achieve a bacteriologic cure as defined by follow-up sinus puncture *(Gwaltney, 1992 [R])*.

Amoxicillin

For those allergic to amoxicillin.

Trimethoprim-sulphamethoxazole (trimethoprim-sulphamethoxazor).

Amoxicillin is a potential first-line agent. Yet, in areas of *S. Pneumonial* resistance greater than 10%, providers should consider high-dose amoxicillin or a second-line agent.

Trimethoprim-sulphamethoxazor is a potential first-line antibiotic. However, some providers may choose to avoid this medication because of concerns about resistant *S. Pneumoniae*. As a result, trimethoprim-sulphamethoxazor should primarily be considered for patients who are allergic to amoxicillin unless there are specific clinical circumstances in which its use is warranted.

For patients allergic to both amoxicillin and trimethoprim-sulphamethoxazore, macrolides can be prescribed. A cephalosporin could be considered, but there is approximately a 10% cross-reaction between cephalosporins and amoxicillin.

It is important to instruct the patient to complete the course of antibiotics.

The duration of antibiotic therapy is controversial. Studies have shown effectiveness within 3 to 14 days. Most studies have used a 10-day course of antibiotics.

Call-Back Instructions

The patient should be instructed to call back if symptoms worsen, or if symptoms have not resolved within one week.

50. Treatment Failure?

Complete response

Patient is symptomatically improved to near normal.

Partial response

Patient is symptomatically improved but not back to normal at the end of the first course of antibiotics.

An additional 10-14 days of amoxicillin 500 mg three times a day or 875 mg twice daily.

or

Trimethoprim-sulphamethoxazor.

One double-strength tab twice daily x 10-14 days.

Reinforce the comfort and prevention measures outlined in Annotation #48, "Home Self-Care."

Partial response is assessed at the end of 10-14 days by provider visit or phone call.

There are no randomized clinical trials documenting the efficacy or necessity of further antibiotic therapy with the same drug in patients who have a partial response. However, numerous experts support this practice, and clinical experience suggests its efficacy *(Wilett, 1994 [R])*.

Failure or no response

Patient has little or no symptomatic improvement after finishing a 10-day course of first-line antibiotic therapy (amoxicillin or trimethoprim-sulphamethoxazor).

Failure or no response to initial antibiotic

After 10-14 days of failure of first-line antibiotic (amoxicillin or trimethoprim-sulphamethoxazor), an antibiotic that covers resistant bacteria should be prescribed.

Amoxicillin/clavulanate (Augmentin®).

or

For patients allergic to both amoxicillin and trimethoprim-sulphamethoxazor:

Macrolides can be prescribed as outlined below.

A cephalosporin may be considered; however, there is approximately a 10% cross-reaction between cephalosporins and amoxicillin.

A fluoroquinolone with pneumococcal coverage may also be considered.

Patients who have been treated with multiple courses of either amoxicillin or trimethoprim-sulphamethoxazor over the past year, even if not within the past month, would likely be best treated with an agent that is more likely to cover resistant organisms including penicillin-resistant pneumococci.

Penicillin resistance and trimethoprim-sulphamethoxazor resistance are often linked. If one fails amoxicillin, it is highly likely that one will also fail trimethoprim-sulphamethoxazor. Agents appropriate in these situations include those listed below.

Additional second-line agents

Second-generation cephalosporin

- Cefuroxime (Ceftin®)
- Cefpodoxime (Vantin®)
- Cefprozil (Cefzil®*)
- Cefdinir (Omnicef®)
- Cefaclor (Ceclor®)
- Loracarbef (Lorabid®**)

* Cefprozil may be given at a dose of 500 mg every 12 hours for moderate to severe infection.

** Loracarbef is a carbacephen best classified as a cephalosporin.

Expanded spectrum macrolides

- Clarithromycin (Biaxin®)
- Azithromycin (Zithromax®)

Fluoroquinolones with pneumococcal coverage

- Levofloxacin (Levaquin®)
- Gatifloxacin*** (Tequin®)
- Moxifloxacin*** (Avelox®)

*** There is concern within the medical community about using these drugs because of their potential for QT prolongation that some other quinolones do not have.

FDA approval

- Amoxicillin/clavulanate (Augmentin®), cefuroxime (Ceftin®), cefpodoxime (Vantin®), loracarbef (Lorabid®), clarithromycin (Biaxin®), azithromycin (Zithromax®) and levofloxacin (Levaquin®) are FDA approved for the treatment of acute sinusitis.
- Cefaclor (Ceclor®) and trimethoprim-sulphamethoxazor (Septra®) are not approved by the FDA for acute sinusitis treatment.

Reinforce the comfort and prevention messages outlined in Annotation #48, "Home Self-Care."

Most cases of acute bacterial sinusitis affect the maxillary sinus. A sinus radiograph series, although quite nonspecific due to many false positives, is fairly sensitive in detecting maxillary sinusitis. A normal x-ray series in the above clinical context should raise serious questions about the diagnosis of sinusitis, and alternative diagnoses should be entertained. An abnormal sinus x-ray, especially if opacification or an air-fluid level is present, is suggestive of bacterial sinusitis.

After 10-14 days of failure of first-line antibiotic (amoxicillin or trimethoprim-sulphamethoxazor), an antibiotic should be prescribed that would cover potentially resistant bacteria occasionally seen in acute bacterial sinusitis. No randomized trials have been done supporting this practice. We know, however, that a substantial minority of patients will have infection from bacteria that are resistant in vitro to first-line therapy. Several studies have suggested that failure of therapy may be due to ß-lactamase producing organisms, anaerobes or staphlococci. It would seem reasonable, therefore, to give a trial of a broader spectrum antibiotic in the setting of clinical failure *(Agency for Health Care Policy and Research, 1999 [R]; Konen, 2000 [C]; Willett, 1994 [R]).*

Antibiotics for Sinusitis (not all-inclusive)

Drug	Comments
Amoxicillin	
Amoxicillin/ clavulanate (Augmentin®)	FDA approved
Cefuroxime (Ceftin®)	FDA approved
Cefpodoxime (Vantin®)	FDA approved
Cefprozil (Cefzil®)	
Cefdinir (Omnicef®)	
TMP/SMX	Some resistance concerns
Erythromycin	
Clarithromycin (Biaxin®)	FDA approved
Azithromycin (Zithromax®)	FDA approved
Levofloxacin (Levaquin®)	FDA approved
Moxifloxacin (Avelox®)	

Failure or no response in three weeks

In patients who have not responded to three weeks of continuous antibiotic therapy, consider limited coronal computed tomography scan of sinuses and/or referral to ear, nose and throat provider.

Please see individual health plan for formulary information.

In patients who fail to respond to three weeks of continuous antibiotic therapy, referral to an ear, nose and throat provider would be indicated to rule out a structural abnormality.

Appendix A – Rhinitis Triggers

Allergic Triggers:

Pollen (tree, grass, weed)

Mold

House dust mite

Animals

Cockroaches

Food (rare)

Occupational Allergens

Non-allergic triggers:

Smoke and other noxious fumes

Perfumes and sprays

Decongestant nasal sprays

Pregnancy/hormones

Medications (particularly antihypertensive agents)

Strong odors

Cold air/weather variable

Spicy food/alcohol

Bright light

Emotional upset

Snorting illicit drugs

Adapted from Druce HM. Allergic and non allergic rhinitis. *In* Allergy: Principles & Practice, 4th ed. Middleton Jr E, Reed CE, Ellis EF, et al., eds. St. Louis: Mosby, 1998;1005-16.

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Original Work Group Members

Greg Anderson, MD
Family Practice
Mayo Clinic

William Avery, DO
ENT
Sioux Valley Hospitals & Health Systems

Bruce Cunningham, DO
Family Practice, Work Group Leader
Family HealthServices MN

David Graft, MD
Allergy
Park Nicollet Health Services

Teresa Hunteman, RRT, CPHQ
Measurement/Implementation Advisor
ICSI

Jeffrey Jenkins, MD
Family Practice
Sioux Valley Hospitals & Health Systems

Heather Krueger, MD
Family Practice
Quello Clinic, Ltd.

Barbara Malone, MD
ENT
Midwest ENT

Melissa Marshall, MBA
Facilitator
ICSI

Peter Marshall, PharmD
Pharmacy
HealthPartners

Julie White, RN
Nursing
HealthPartners Medical Group

Contact ICSI at:
8009 34th Avenue South, Suite 1200; Bloomington, MN 55425; (952) 814-7060; (952) 858-9675 (fax)
Online at http://www.ICSI.org

Brief Description of Evidence Grading

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X.

A full explanation of these designators is found in the Foreword of the guideline.

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This section provides resources, strategies and measurement specifications for use in closing the gap between current clinical practice and the recommendations set forth in the guideline.

The subdivisions of this section are:

- Priority Aims and Suggested Measures
  - Measurement Specifications
- Key Implementation Recommendations
- Knowledge Resources
- Resources Available

Priority Aims and Suggested Measures

1. Increase the appropriateness of patient visits for viral upper-respiratory infection, increase patient/caregiver knowledge of effective home treatment of cold symptoms, and eliminate the inappropriate use of antibiotics in patients presenting with cold symptoms.

   Possible measures for accomplishing this aim:

   a. Percentage of patients with an office visit for cold symptoms who have had symptoms for less than seven days and for whom documentation in the medical record supports a viral upper-respiratory infection diagnosis alone who receive an antibiotic.

   b. Percentage of encounters for cold symptoms (phone care and/or office visits) for which there is documentation of home treatment education.

2. Reduce excessive antibiotic treatment through decreased empiric treatment of patients with pharyngitis.

   Possible measures for accomplishing this aim:

   a. Percentage of patients with pharyngitis treated with antibiotics who had a negative culture or no rapid strep test or strep culture.

   b. Percentage of patients with pharyngitis diagnosis who had a rapid strep test or strep culture.

3. Increase the use of recommended first-line medications for patients with pharyngitis.

   Possible measure for accomplishing this aim:

   a. Percentage of patients with pharyngitis treated with appropriate antibiotics.

4. Increase patient/caregiver knowledge about pharyngitis and pharyngitis care.

   Possible measures for accomplishing this aim:

   a. Percentage of patients with pharyngitis on antibiotics with documentation of education on 24-hour treatment prior to returning to work, school or day care.

   b. Percentage of patients with pharyngitis prescribed antibiotics with documentation of being educated on taking the complete course.

   c. Percentage of patients with pharyngitis instructed on actions to take if symptoms worsen.

5. Increase the use of prophylactic medications for patients with seasonal allergic rhinitis.

   Possible measure for accomplishing this aim:

   a. Percentage of patients with seasonal allergic rhinitis prescribed prophylactic medication.

6. Decrease the use of injectable corticosteroid therapy for patients with allergic rhinitis.

   Possible measure for accomplishing this aim:

   a. Percentage of patients with allergic rhinitis being treated with injectable corticosteroids.

7. Increase the use of first-line antibiotics when indicated for patients diagnosed with sinusitis.

   Possible measures of accomplishing this aim:

   a. Percentage of patients with an office visit for acute sinusitis given a first-line antibiotic when an antibiotic is prescribed.

   b. Percentage of patients with acute sinusitis who receive an antibiotic other than first-line for whom one of the following contraindications is documented:

      - Allergies to first-line antibiotics
      - Failure to respond to first-line antibiotics.

Measurement Specifications

Possible Success Measurement #1a

Percentage of patients with an office visit for cold symptoms who have had symptoms for less than seven days and who receive an antibiotic.

Population Definition

Patients with a visit to primary care (general internal medicine, pediatrics, family practice, urgent care) for cold symptoms.

Data of Interest

$$\frac{\text{\# of patients with cold symptoms receiving a prescription for antibiotic}}{\text{\# of patients with an office visit for symptoms of a cold present for less than seven days}}$$

Numerator/ Denominator Definitions

Numerator: Patients in the denominator who are prescribed an antibiotic.

Denominator: Patients with a visit with one or more of the following symptoms: cold, cough, sneezing, runny nose, congestion, sniffles (or URI or viral upper-respiratory infection noted) as the presenting complaint(s) who have had symptoms documented for less than seven days.

Method/Source of Data Collection

Medical record review. A minimum of 20 charts per month per medical group is recommended.

Time Frame Pertaining to Data Collection

Suggested data collection time frame is monthly.

Possible Success Measurement #1b

Percentage of encounters for cold symptoms (phone care and/or office visits) for which there is documentation of home treatment education.

Population Definition

Patients with a call or visit to primary care (general internal medicine, pediatrics, family practice, urgent care) for cold symptoms.

Data of Interest

$$\frac{\text{\# of records with documentation of home treatment education}}{\text{total \# of patients with cold symptoms whose medical records are reviewed}}$$

Numerator/ Denominator Definitions

Numerator: Documented is defined as any evidence in the medical record that education or educational materials were provided to the patient or parent or caregiver related to any of the following:

- Prevention of viral upper-respiratory infection
- Frequency, symptoms and natural course of viral upper-respiratory infection
- Treatment recommendations, including comfort measures
- Call-back instructions

Denominator: All patients with an encounter by phone or office visit to primary care with one or more of the following symptoms: Cold, cough, sneezing, runny nose, congestion, sniffles (or URI or viral upper-respiratory infection noted) as the presenting complaint(s). If the impression and/or discharge diagnosis in the medical record is sinusitis, do NOT include in denominator.

Method/Source of Data Collection

Data will be collected through medical record review. A minimum of 20 charts per month is recommended.

Time Frame Pertaining to Data Collection

Suggested data collection time frame is monthly.

Possible Success Measurement #2b

Percentage of patients with a diagnosis of pharyngitis who had strep screen testing.

Population Definition

Patients with pharyngitis diagnosis.

Data of Interest

$$\frac{\text{\# of patients with a diagnosis of pharyngitis who underwent strep testing}}{\text{\# of patients with a diagnosis of pharyngitis}}$$

Numerator/Denominator Definitions

Numerator: Patients who received a strep screen.

Denominator: Patients with a diagnosis of pharyngitis as identified by the following ICD-9 codes: 462.0 and 034.4.

Method/Source of Data Collection

Identify patients with pharyngitis diagnosis of 462.0 and 034.4. The medical record of each patient is reviewed to determine if the patient had either a rapid strep test or strep culture.

Time Frame Pertaining to Data Collection

The suggested time period is a calendar month.

Knowledge Resources

Criteria for Selecting Resources

The following resources were selected by the Diagnosis and Treatment of Respiratory Illness in Children and Adults guideline work group as additional resources for providers and/or patients. The following criteria were considered in selecting these resources.

- The site contains information specific to the topic of the guideline.
- The content is supported by evidence-based research.
- The content includes the source/author and contact information.
- The content clearly states revision dates or the date the information was published.
- The content is clear about potential biases, noting conflict of interest and/or disclaimers as appropriate.

Resources Available to ICSI Members Only

ICSI has a wide variety of knowledge resources that are ***only*** available to ICSI members (these are indicated with an asterisk in far left-hand column of the Resources Available table). In addition to the resources listed in the table, ICSI members have access to a broad range of materials including tool kits on CQI processes and Rapid Cycling that can be helpful. To obtain copies of these or other Knowledge Resources, go to http://www.icsi.org/knowledge. To access these materials on the Web site you must be logged in as an ICSI member.

The resources in the table on the next page that are not reserved for ICSI members are available to the public free-of-charge.

Resources Available

*	Author/Organization	Title/Description	Audience	Web Sites/Order Information
	American Academy of Asthma and Immunology	Offers education resources for patients and providers. This site includes special sections for children and seniors.	Patients and Families; Health Care Professionals	http://www.aaaai.org 1-800-822-2762
	American Academy of Family Practice	Clinical practice guidelines, clinical care, research, and quality improvement resources.	Patients and Families; Health Care Professionals	http://www.aafp.org
	Krames Communications	Patient education resources based on current practice guidelines and standards of care. Sinus Problems (#940270) Brochure for adult and pediatric patients. Includes sinus anatomy, diagnostic tests, antibiotics and other medications, nasal irrigation, endoscopic surgery and when to call the health care provider.	Patients and Families; Health Care Professionals	http://www.krames.com 800-333-3032
	Mayo Clinic	Health information on various diseases and conditions.	Patients and Families; Health Care Professionals	http://www.mayoclinic.com

* Available to ICSI members only.