This care process model (CPM) was developed by Intermountain Healthcare’s Antibiotic Stewardship team, Medical Specialty Clinical Program, Community-Based Care, and Intermountain Pediatrics. Based on expert opinion and the Infectious Disease Society of America (IDSA) Clinical Practice Guidelines, it provides best-practice recommendations for diagnosis and management of group A streptococcal pharyngitis (strep) including the appropriate use of antibiotics.

### KEY POINTS

- **Accurate diagnosis and appropriate treatment can prevent serious complications.** When strep is present, appropriate antibiotics can prevent acute rheumatic fever, peritonsillar abscess, and other invasive infections. Treatment also decreases spread of infection and improves clinical symptoms and signs for the patient.

- **Differentiating between a patient with an active strep infection and a patient who is a strep carrier with an active viral pharyngitis is challenging.** Treating patients for active strep infection when they are only carriers can result in overuse of antibiotics. Approximately 20% of asymptomatic school-aged children may be strep carriers, and a throat culture during a viral illness may yield positive results, but not require antibiotic treatment. Prescribing repeat antibiotics will not help these patients and can contribute to antibiotic resistance.

- **For adult patients, routine overnight cultures after a negative rapid strep test are unnecessary in usual circumstances** because the risk for acute rheumatic fever is exceptionally low. Physicians may continue to use overnight throat cultures when the patient's risk score is high or if the patient has an increased likelihood of exposure due to contact or employment (e.g., teachers, family member with strep, etc.).

### Why Focus on STREPTOCOCCAL PHARYNGITIS?

- **Antibiotic prescribing for acute pharyngitis has dropped, but further reduction is needed.** Approximately 37% of children presenting for medical visits with sore throat are group A streptococcus positive, but antibiotics are still prescribed about 56% of the time based on 2010-11 national data. For adults, approximately 18% are group A streptococcus positive and yet 72% of those aged 20 through 64 years are prescribed an antibiotic.

- **Unnecessary antibiotic prescribing is costly and dangerous.** From 1997 to 2010, the financial cost of unnecessary antibiotic prescribing to adults with sore throat was about $500 million in the United States. Antibiotics can also be expensive for patients and can have negative side effects. Between 5% and 25% of patients on antibiotics develop diarrhea, and 1 in 1,000 visit an emergency department for a serious adverse drug event.

### WHAT’S INSIDE?

- **ALGORITHM 1: DIAGNOSIS AND TREATMENT OF PEDIATRIC STREPTOCOCCAL PHARYNGITIS AGES 3 – 18**
- **ALGORITHM 2: DIAGNOSIS AND TREATMENT OF ADULT STREPTOCOCCAL PHARYNGITIS**
- **PHARYNGEAL CARRIERS**
- **RESOURCES AND REFERENCES**

### MEASUREMENT & GOALS

- Ensure appropriate use of throat culture for adult patients who meet high risk criteria
- Select appropriate antibiotics for patients who meet the diagnostic criteria for a group A strep throat infection.
- Reduce the unnecessary use of antibiotics for an unclear diagnosis of strep and for strep carriers.

Indicates an Intermountain measure

**GermWatch**

GermWatch is Intermountain’s source for up-to-date information about infectious diseases currently circulating in Utah communities. For Intermountain physicians

For parents and patients: (germwatch.org)
ALGORITHM 1
DIAGNOSIS AND TREATMENT OF PEDIATRIC STREPTOCOCCAL PHARYNGITIS
AGES 3 – 18 YEARS

Patient presents with signs/symptoms of acute pharyngitis

NOTE: For patients < 3 years of age, refer to page 3 note (a).

DIFFERENTIATE viral pharyngitis from possible group A streptococcal pharyngitis (b)

Do signs/symptoms strongly suggest viral etiology?

no

PERFORM group A streptococcus rapid antigen detection test (RADT) (c)

Is RADT positive?

no

INITIATE throat culture (e)

Is throat culture positive?

no

DO NOT TREAT for group A streptococcus
CONSIDER alternative etiologies (d)

yes

TREAT with antibiotics
SEE Table 1. Recommended antibiotics for treating group A streptococcal pharyngitis in pediatric patients on page 3

FOLLOW UP in 48-72 hours

RE_EVALUATE for possible complications (e.g., peritonsillar abscess, retropharyngeal abscess, etc.)
CONSIDER alternative etiologies (d)

Is patient improved?

no

INSTRUCT patient to complete antibiotic regimen; no follow up testing necessary

yes

NOTE: Recommend symptomatic relief to all patients. Avoid aspirin in children. Corticosteroids not recommended.

Symptom relief for children (0-12 )/( ≥12 )

DO NOT TEST or TREAT for group A streptococcus
CONSIDER alternative etiologies (d)

NOTE: for recurrent group A streptococcal pharyngitis see page 6.
ALGORITHM 1 NOTES AND ASSESSMENT TOOLS – PEDIATRIC

(a) Children <3 years of age
Group A streptococcal disease in children under 3 years of age has different presentation, course of disease and testing recommendations than that of older children and adolescents.
• Presentation often exhibits fever, mucopurulent rhinitis, excoriated nares, and diffuse adenopathy. Classical presentation is rare.
• Very low risk of acute rheumatic fever resulting from strep infection in children <3 years of age.
• Testing is NOT recommended unless known close contact with person/s diagnosed with group A streptococcal pharyngitis.

(b) Differentiation of acute pharyngitis

Viral pharyngitis
The signs and symptoms below are strongly suggestive of viral etiology.
• Conjunctivitis
• Coryza
• Cough
• Diarrhea
• Hoarseness
• Discrete ulcerative stomatitis
• Viral exanthema

Group A streptococcal pharyngitis
The signs and symptoms below are common in group A streptococcal pharyngitis but are not diagnostic. Diagnosis requires testing.
• Sudden onset of sore throat
• Fever
• Headache
• Nausea, vomiting, abdominal pain
• Tonsillopharyngeal inflammation
• Patchy tonsillopharyngeal exudates
• Scarlatiniform rash
• Edematous uvula
• Palatal petechiae
• Tender nodes
• Age 5 – 15 years
• Winter and early spring
• History of exposure to strep pharyngitis

(c) Rapid antigen detection test (RADT)
Consider the following when performing a RADT:
• Be careful to sample tonsils, tonsillar fossae or posterior pharyngeal wall, other surfaces are not appropriate.
• If RADT is positive, it is NOT necessary to initiate throat culture.
• Testing is NOT recommended for patients with overt viral features (b)
• Do not test asymptomatic contacts (e.g., close family).
• If a parent calls with a positive rapid strep from a take-home kit, confirm in the office with RADT before treating.

(d) Other common etiologies of acute pharyngitis
• Adenovirus
• Epstein–Barr virus
• Influenza A and B
• Parainfluenza
• Rhinovirus
• Group C and G Streptococci
• Neisseria gonorrhoea
• Fusobacterium necrophorum

(e) Throat culture
Consider the following when initiating a throat culture:
• Be careful to sample tonsils, tonsillar fossae or posterior pharyngeal wall, other surfaces are not appropriate.
• Do NOT prescribe antibiotics to patient while waiting for culture results unless there are compelling reasons to do so (e.g., confirmed household contact or scarlet fever).

TABLE 1. Recommended antibiotics for treating group A streptococcal pharyngitis in pediatric patients

<table>
<thead>
<tr>
<th>No penicillin allergy</th>
<th>Patient weight</th>
<th>Penicillin VK</th>
<th>Benzathine penicillin G</th>
<th>Amoxicillin (solution) if child can not swallow pills</th>
<th>Cephalexin</th>
<th>Azithromycin</th>
<th>Clindamycin</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60 lbs (&lt; 27 kg)</td>
<td>250 mg orally two times per day for 10 days</td>
<td>600,000 units intramuscularly 1 dose only</td>
<td>50 mg/kg/dose orally once per day for 10 days (max 1000 mg/day)</td>
<td>20 mg/kg/dose orally two times per day for 10 days (max 500 mg/dose)</td>
<td>20 mg/kg/dose orally once per day for 3 days (max 500 mg/dose)</td>
<td>7 mg/kg/dose orally three times per day for 10 days (max 300 mg/dose)</td>
<td></td>
</tr>
<tr>
<td>&gt; 60 lbs (&gt; 27 kg)</td>
<td>500 mg orally two times per day for 10 days</td>
<td>1,200,000 units intramuscularly 1 dose only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yes Penicillin allergy
ALGORITHM 2
DIAGNOSIS AND TREATMENT OF ADULT STREPTOCOCCAL PHARYNGITIS

Patient presents with signs/symptoms of acute pharyngitis

NOTE: Recommend symptomatic relief to all patients. Corticosteroids not recommended.

Symptom Relief for adults

IMPORTANT: Do not prescribe antibiotics for strep without a strep test.

DIFFERENTIATE viral pharyngitis from possible group A streptococcal pharyngitis (a)

Do signs/symptoms strongly suggest viral etiology?

yes

DO NOT TEST or TREAT for group A streptococcus

CONSIDER alternative etiologies (c)

no

PERFORM group A streptococcus rapid antigen detection test (RADT) (b)

Is RADT positive?

no

PERFORM group A streptococcus rapid antigen detection test (RADT) (b)

Is RADT positive?

no

Determining risk score and SCREEN for high-risk indicators (d)

Does risk score = 4?

OR

Are ANY high-risk indicators present?

no

INITIATE throat culture (e)

Is throat culture positive?

no

no

Is patient improved?

yes

INSTRUCT patient to complete antibiotic regimen; no follow up testing necessary

REvaluate for possible complications (e.g., peritonsillar abscess, retropharyngeal abscess, etc.)

CONSIDER alternative etiologies (c)

FOLLOW UP in 48–72 hours

YES

DO NOT TREAT for group A streptococcus

CONSIDER alternative etiologies (c)

NOTE: for recurrent group A streptococcus pharyngitis see page 6.
(a) Differentiation of acute pharyngitis

<table>
<thead>
<tr>
<th>Viral pharyngitis</th>
<th>Group A streptococcal pharyngitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>The signs and symptoms below are strongly suggestive of viral etiology.</td>
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<td>• Conjunctivitis</td>
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<td>• Coryza</td>
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<td>• Diarrhea</td>
<td>• Nausea, vomiting, abdominal pain</td>
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<tr>
<td>• Hoarseness</td>
<td>• Tonsillopharyngeal inflammation</td>
</tr>
<tr>
<td>• Discrete ulcerative stomatitis</td>
<td>• Patchy tonsillopharyngeal exudates</td>
</tr>
<tr>
<td>• Viral exanthema</td>
<td></td>
</tr>
</tbody>
</table>

(b) Rapid antigen detection test (RADT)

Consider the following when performing a RADT:
- Be careful to sample tonsils, tonsillar fossae or posterior pharyngeal wall, other surfaces are not appropriate.
- If RADT is positive, it is NOT necessary to initiate a throat culture.
- Testing is NOT recommended for patients with overt viral features (a)
- Do not test asymptomatic contacts (e.g., close family).
- If a parent calls with a positive rapid strep from a take-home kit, confirm in the office with RADT before treating.

(c) Other common etiologies of acute pharyngitis

- Adenovirus
- Epstein-Barr virus
- Influenza A, B
- Parainfluenza
- Rhinovirus
- Group C and G Streptococci
- Neisseria gonorrhoea
- Fusobacterium necrophorum

(d) Risk score determination and other high-risk indicators

To determine risk score, assign one point for each of the following:
- Fever > 100.4°F (38°C)
- Absence of cough
- Swollen, tender anterior cervical nodes
- Tonsillar swelling or exudate

Other high-risk indicators include:
- Contact risk (living with person/s with confirmed group A streptococcal pharyngitis).
- Employment risk (teacher or daycare employee)

(e) Throat culture

Consider the following when initiating a throat culture:
- Be careful to sample tonsils, tonsillar fossae or posterior pharyngeal wall, other surfaces are not appropriate.
- Do NOT prescribe antibiotics to patient while waiting for culture results unless there are compelling reasons to do so (e.g., confirmed household contact or scarlet fever).
**PHARYNGEAL CARRIERS**

Pharyngeal carriers are unlikely to spread streptococcal pharyngitis to close contacts, are at little or no risk of suppurative or nonsuppurative complications, and usually do not require antibiotic treatment. For these reasons, **routine treatment of strep carriers is not recommended.**

- **Reasons for recurrent streptococcal pharyngitis** can include:
  - Chronic pharyngeal carriage masquerading as an acute strep infection due to a culture done during a concurrent viral infection
  - Noncompliance with prescribed antibiotic therapy
  - A new streptococcal pharyngitis infection
  - Recrudescence of infection with the original infecting strain (less common)

- **Collecting specific information can give clues that will help differentiate patients with recurrent active strep infections from those that are strep carriers with repeated viral pharyngitis.** Consider the following:
  - Age of patient and season
  - Local epidemiological environment (GermWatch)
  - Clinical response to antibiotic therapy
  - Patient throat culture status when asymptomatic, between episodes

- **When antibiotics might be needed.** Carriers do not ordinarily require antibiotic therapy, however exceptions do occur. Some of these include:
  - Community outbreak of acute rheumatic fever, acute post-streptococcal glomerulonephritis, or invasive streptococcal pharyngitis
  - Outbreak of streptococcal pharyngitis in a closed or partially closed community
  - History of acute rheumatic fever (family or personal)
  - Tonsillectomy being considered only because of carriage

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**TABLE 2. Antibiotics treatment recommendation for group A streptococcus carrier**

<table>
<thead>
<tr>
<th>Pediatric</th>
<th>Patient weight</th>
<th>250 mg penicillin orally four times per day for 10 days + 20 mg rifampin/kg/dose orally once per day for last 4 days (max 600 mg/dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No penicillin allergy</td>
<td>&lt;60 lbs (&lt;27 kg)</td>
<td>250 mg penicillin orally four times per day for 10 days + 20 mg rifampin/kg/dose orally once per day for last 4 days (max 600 mg/dose)</td>
</tr>
<tr>
<td></td>
<td>&gt;60 lbs (&gt;27 kg)</td>
<td>500 mg penicillin orally four times per day for 10 days + 20 mg rifampin/kg/dose orally once per day for last 4 days (max 600 mg/dose)</td>
</tr>
<tr>
<td>benzathine penicillin G + rifampin</td>
<td>&lt;60 lbs (&lt;27 kg)</td>
<td>600,000 units intramuscularly 1 dose only + 10 mg rifampin/kg/dose orally two times a day for 4 days (max 300 mg/dose)</td>
</tr>
<tr>
<td></td>
<td>&gt;60 lbs (&gt;27 kg)</td>
<td>1,200,000 units intramuscularly 1 dose + 10 mg rifampin/kg/dose orally two times per day for 4 days (max 300 mg/dose)</td>
</tr>
<tr>
<td>amoxicillin/ clavulanate</td>
<td>15 mg amoxicillin/kg/dose orally three times per day for 10 days (max 500 mg/dose)</td>
<td></td>
</tr>
<tr>
<td>Yes penicillin allergy</td>
<td>clindamycin</td>
<td>10 mg/kg/dose orally three times per day for 10 days (max 300 mg/dose)</td>
</tr>
<tr>
<td>Adult</td>
<td></td>
<td>500 mg penicillin orally four times per day for 10 days + 600 mg rifampin orally once per day for last 4 days</td>
</tr>
<tr>
<td>No penicillin allergy</td>
<td></td>
<td>1,200,000 units penicillin intramuscularly 1 dose only + 300 mg rifampin orally two times per day for 4 days</td>
</tr>
<tr>
<td>benzathine penicillin G + rifampin</td>
<td></td>
<td>500 mg amoxicillin/125 mg clavulanate orally three times per day for 10 days</td>
</tr>
<tr>
<td>amoxicillin/ clavulanate</td>
<td>300 mg orally three times per day for 10 days</td>
<td></td>
</tr>
</tbody>
</table>
RESOURCES AND REFERENCES

Patient resources

Clinicians can order Intermountain patient education booklets and fact sheets for distribution to their patients from Intermountain’s Online Library and Print Store. Print it!

Upper Respiratory Infection: Symptom relief checklist (0 - 12)
Available in English and Spanish

Upper Respiratory Infection: Symptom relief checklist (> 12)
Available in English and Spanish

Colds and Coughs in Children and Adolescents: Managing Viral Infections
Available in English and Spanish

Colds and Coughs in Adults: Managing Viral Infections
Available in English and Spanish

Pediatric dosing Guide: Acetaminophen and Ibuprofen
Available in English and Spanish

Provider resources

To access this and other CPM’s as well as Best Practice Flash Cards, providers can go to intermountainphysician.org and access tools and resources. In order to access Utah’s current infectious disease environment, link to GermWatch.org.

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For physicians: intermountainphysician.org
For parents and patients: germwatch.org

CPM TEAM

Whitney Buckel, PharmD; Adam Hersh, MD; Jared Olson, PharmD; Heidi Porter. PhD (Medical writer)
Eddie Stenehjem, MD; Emily Thorell, MD; Anthony Wallin, MD; Park Willis, MD

This CPM presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Eddie Stenehjem MD, Intermountain Healthcare, Infectious Disease (Eddie.Stenehjem@imail.org).