INTRODUCTION

Allergic rhinitis is a global health concern affecting at least 10 percent to 25 percent of the population. From the 1960s to 1990s, a 100 percent increase in the incidence of allergic rhinitis in developed nations has led some researchers to pronounce it an epidemic. Millions of Americans suffer from allergic rhinitis. The most recent U.S. estimates establish that 10 percent to 30 percent of adults and 40 percent of children have allergic rhinitis. These estimates may be low because many patients self-medicate with nonprescription medications and herbal remedies, rather than seeking medical attention.

Although symptoms are not typically severe, they alter the quality of life of patients, affecting work productivity and school performance. In the Allergies in America survey, 85 percent of individuals reported that allergic rhinitis altered their quality of life during allergy season, while more than 40 percent stated that their nasal symptoms interfered with their work performance. Allergic rhinitis is estimated to account for 100 million days of lost work per year. Along with being responsible for 1.5 million missed school days per year, rhinitis symptoms are associated with decreased learning in children due to sleep disturbances, fatigue and irritability. Nearly $4 billion per year is exhausted by indirect costs, such as lost work days and school days. Allergic rhinitis is also responsible for $5.9 billion annually in direct healthcare costs, including 16.7 million physician office visits.

Allergic rhinitis is also a known risk factor for asthma, raising the risk of decreased quality of life and increased healthcare costs. The DREAMS study found asthma was present in nearly 25 percent of rhinitis patients, compared with 2 percent of the general population. Patients with allergic rhinitis due to both indoor and outdoor allergens are more likely to develop asthma than those who are only allergic to either indoor or outdoor allergens. Individuals with moderate or severe persistent rhinitis are more likely to develop asthma than those with mild or intermittent rhinitis.

PATHOPHYSIOLOGY

Allergy rhinitis symptoms occur due to an overproduction of immune globulin-E (IgE) resulting from a response to an environmental allergen. During the early- and late-phase responses to an allergen in these Type 1 allergic reactions, various inflammatory mediators are produced and released, along with activation and recruitment of cells to the involved mucosa.

In this type of reaction, the allergen is inhaled through the nose. Within minutes, the allergen interacts with T cell and B cell lymphocytes, resulting in production of IgE antibodies. The antibodies attach themselves to mast cells and basophils. When the same allergen is re-introduced, the IgE-coated mast cells cross the epithelium. As the an-
tibodies are activated, degranulation of the mast cell occurs leading to the release of mediators within the mast cells, including histamine, leukotrienes and bradykinin. These mediators stimulate various cells, causing the symptoms of rhinitis. Bradykinin causes the local blood vessels to broaden and leak, leading to mucosal edema and rhinorrhea. Inflammatory mediators in the mucosal glands stimulate sensory nerves, producing nasal itching and sneezing. The blood vessels in the mucosal glands also dilate, leading to sinusoidal filling and nasal congestion.

Several hours to a day later, white blood cells and inflammatory mediators migrate to the nasal mucosa. Chemoattractants, including interleukin-3 and interleukin-5, promote infiltration of the mucosa by eosinophils, neutrophils, basophils, T-lymphocytes and macrophages. As these cells are activated, earlier inflammatory mediators are reactivated, resulting in a hyper-responsive airway and worsening nasal symptoms. Tissue inflammation may last several weeks in intermittent allergy sufferers or become chronic in the case of persistent allergic rhinitis. When patients are repeatedly exposed to an allergen, the amount of allergen necessary to provoke a response decreases.13

**PATIENT CASE**

Tom H., a 25-year-old male, comes into the clinic complaining of nasal congestion, sneezing and nasal itching. He says that “he just can’t take this any longer” because the symptoms have lasted for 7 weeks, occurring nearly every day of the week. The symptoms are so bothersome that he is unable to function at work. To make matters worse, he is unable to sleep at night due to the symptoms. At first he thought he had developed a cold, but now that the symptoms have persisted for nearly two months, he felt he should seek help.

Based on an examination, the clinician makes the following notes:

**T:** 98.8°F, Orally  
**P:** 76, regular  
**R:** 19, unlabored, no nasal flaring  
**Skin:** Warm to touch, no excess moisture, no clamminess  
**Eyes:** PERLA, EOM intact, note increase in watering; clear watery discharge from both eyes. Mild conjunctival injection bilaterally; allergic shiners bilaterally  
**Ears:** External canal without obstruction, TM (tympanic membrane) with appropriate light reflex, normal movement  
**Nose:** Clear watery discharge bilaterally; pale, boggy mucosa and turbinates, small Lt nasal polyp  
**Mouth:** High arched palate; cobblestoning of posterior pharynx  
**Nodes:** No prominent or tender nodes of the head and neck  
**Lungs:** Clear, well expanded, no rales, wheezes or consolidation; no increase in A-P diameter  
**Heart:** Regular, no split S2; no S3, S4 or murmur; PMI not displaced  
**Abdomen:** Normal bowel sounds; no masses, tenderness or distension  
**Neuro:** No focal neurological symptoms.

**PATIENT DISCUSSION**

When evaluating Mr. H.’s symptoms, attention should be given to the severity and duration of the symptoms. Utilizing the ARIA guidelines, the severity of symptoms can be evaluated by the impact they have on the patient’s qual-
ity of life. Symptoms can be classified as mild if they do not impact sleep, impair daily activities (including work, school, sport and leisure) and are not troublesome. Symptoms can be classified as moderate to severe if they impair sleep or daily activities (work, school, sport and leisure) or are troublesome. Symptoms should also be classified as intermittent or persistent. Intermittent symptoms are those that occur less than four days per week or last less than four weeks. Persistent symptoms are those that occur more than four days per week and last more than four weeks. In Mr. H.’s case, his symptoms should be classified as persistent moderate to severe.

**Clinical Presentation**

The Allergic Rhinitis and its Impact on Asthma (ARIA)\(^4\) classifications for allergic rhinitis—intermittent and persistent—have replaced the traditional nomenclature of seasonal and perennial. These newer classifications utilize duration, symptoms and quality of life parameters to subdivide patients. A patient with intermittent allergic rhinitis exhibits symptoms less than four days per week or for less than four weeks. A patient with persistent allergic rhinitis exhibits symptoms more than four days per week or for more than four weeks. Patients are further subdivided as having mild or moderate to severe symptoms. A patient is diagnosed with mild symptoms if his symptoms do not impact sleep, daily activities, work, school, sports or leisure. A patient is diagnosed with moderate to severe symptoms if his symptoms impact sleep, daily activities, work, school, sports or leisure, as well as if troublesome symptoms exist.

When classifying a patient’s allergic rhinitis, the clinician would categorize it by both duration and severity. Therefore, a patient with symptoms lasting for six weeks that interfere with normal activities would be diagnosed with moderate to severe persistent allergic rhinitis. According to Bousquet and colleagues,\(^5\) 10 percent of patients can be classified with mild intermittent rhinitis, 14 percent with mild persistent rhinitis, 17 percent with moderate to severe intermittent rhinitis and 59 percent with moderate to severe persistent rhinitis.

Common symptoms exhibited by patients with allergic rhinitis include clear nasal discharge, sneezing, nasal congestion, itching of the nose and eyes, and postnasal drip. Nasal congestion may impair the patient’s ability to breathe through the nose, making them chronic mouth breathers. The nasal congestion may also lead to a decrease in the sensations of taste and smell. Some patients may also develop a cough due to the presence of postnasal drip. Patients who experience itching of the eyes often exhibit excessive tearing and develop red conjunctiva. The clinician may also notice that the patient has developed dark circles underneath the eyes due to venous stasis, often referred to as “allergic shiners.” The patient may also exhibit a nasal crease across the bridge of the nose due to constant rubbing of the nose or an accentuated line below the margin of the lower eyelid due to edema, commonly referred to as Dennie’s lines.

**Treatment Plan**

To assist in developing a treatment plan, a complete list of medications previously and currently used to treat rhinitis symptoms should be obtained. Patients with allergic rhinitis are known to change medications frequently, either due to ineffectiveness or adverse effects. In the Allergies in America survey,\(^6\) 37 percent of patients reported changing allergy medications due to lack of efficacy. Bothersome adverse effects from medications accounted for medication changes in another 21 percent of patients. When assessing the effectiveness of medications, the clinician should consider not only the resolution of clinical symptoms as the measure of successful treatment, but also the overall impact on the patient’s ability to function. A variety of methods are available to assist in determining the outcome of treatments, including the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ), a validated measurement of the effectiveness of treatment on daily living.\(^7\) Although not specific to rhinitis, the Medical Outcomes Study Short Form Health Survey (SF-36) has also been used to measure outcomes on physical and emotional well-being.\(^8\)

The clinician should also develop an environmental history to assess for occupational exposure or other precipitants. Symptoms from intermittent allergic rhinitis due to such allergens as trees and grass can be temporally related to the release of these pollens in a geographic region. The presentation of symptoms related to mold spores increases during harvesting, mowing or leaf raking.

In settings where diagnostic testing is available, diagnosis of IgE-mediated allergic rhinitis can be aided by immediate-hypersensitivity skin testing. Two types of tests, allergy skin testing and radioallergosorbent tests (RAST), are typically used for identifying al-
Allergens responsible for rhinitis symptoms. Allergy skin testing has the advantage of being relatively quick and inexpensive, along with being able to test for a wide variety of allergens. RAST tests, available through most laboratories, utilize serum, rather than skin response. The RAST test has the advantage of no interaction with antihistamine use. The measurement of total-serum IgE has a poor predictive value for screening for allergic rhinitis, but allergen-specific serum IgE testing can prove valuable.

**PATIENT CASE**

Carlynn J., a 30-year-old female in her third trimester of pregnancy, comes to in-store clinic at her local pharmacy. She explains that she has been experiencing significant sneezing, nasal itching and runny nose for the past two months. Although she has a history of allergies in the fall season, she has never had this problem in early spring. Ms. Jackson hopes her symptoms similar to allergic rhinitis. Although it is possible that Ms. J. is experiencing an allergic reaction to an allergen present in the spring season, her current pregnancy may also contribute to her symptoms. Hormone-induced rhinitis often occurs during pregnancy. This condition typically resolves soon after delivery.

**DIFFERENTIAL DIAGNOSIS**

Although rhinitis is typically associated with an allergic response, not all cases have an allergic component. A 2001 study reported that 57 percent of rhinitis patients do not have allergic or mixed disease rhinitis. Patients with nonallergic causes of rhinitis may be suffering from infectious rhinitis, rhinitis medicamentosa, atrophic rhinitis, GERD-induced rhinitis or nonallergic rhinitis with eosinophilia. Other more serious causes of rhinitis are nasal septum deviation, foreign body obstruction, cerebrospinal fluid rhinorrhea or sarcoidosis. Table 1 identifies symptoms that are more consistent with other causes of rhinitis than with allergic rhinitis.

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<thead>
<tr>
<th>TABLE 3</th>
<th>Causes of drug-induced rhinitis</th>
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<tr>
<td>• ACE inhibitors</td>
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<td>• Aspirin</td>
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<td>• Beta-blockers</td>
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<td>• Chlorpromazine</td>
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<td>• Conjugated estrogen</td>
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<td>• Guanethidine</td>
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<td>• Methyldopa</td>
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<td>• NSAIDs</td>
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<td>• Oral contraceptives</td>
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<td>• Phentolamine</td>
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<td>• Prazosin</td>
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<td>• Reserpine</td>
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Infectious rhinitis, classified as acute or chronic, is typically viral in origin but may be complicated by secondary bacterial sinus infections. Responsible viruses generally include rhinovirus, parainfluenza, influenza and adenovirus. Symptoms of acute viral rhinitis include rhinorrhea, nasal obstruction and fever. At onset, rhinorrhea is clear and watery but may become cellular and cloudy due to the presence of virus, white blood cells and epithelial cells. Patients may report facial pain due to occlusion of the sinus ostia, or ear fullness and discomfort due to occlusion of the Eustachian tube. Due to the potential for antibiotic resistance, the clinician should avoid prescribing antibiotics for patients with acute viral infections. Without secondary bacterial infection, acute infectious rhinitis is self-limiting, typically resolving within seven to 10 days. In contrast, chronic infectious rhinitis should be considered in patients experiencing eight to 12 weeks of symptoms. This condition is more common in patients with allergies, mucociliary disturbance or immune deficiency. The symptoms of chronic infectious rhinitis include purulent nasal discharge, nasal congestion, facial pain and pressure, olfactory disturbances, post-nasal drainage and cough.

Nonallergic rhinitis with eosinophilia syndrome (NARES) is characterized by perennial symptoms with paroxysmal episodes. The typical symptoms include sneezing, profuse watery rhinorrhea and nasal pruritus. Patients may report an increase in symptoms following exposure to strong odors, temperature changes or alterations in barometric pressure. These patients may also experience loss of the sense of smell. These patients lack a clinically significant positive skin test or serum IgE antibodies to a specific allergen. Table 2 compares typical characteristics of allergic versus nonallergic rhinitis.

Alternations in hormone levels—including those experienced during puberty—
ty, pregnancy, the use of hormone-based contraceptives or hormone replacement, or hypothyroidism—can precipitate rhinitis symptoms. These alterations in hormone levels cause intranasal vascular engorgement and mucosal hypertension.23 During pregnancy, these symptoms often develop during the second month and continue until delivery, resolving shortly after delivery.24

Food allergies typically present with a combination of symptoms. In these cases, respiratory symptoms will occur with gastrointestinal or dermatologic symptoms. The most common clinical manifestations of food allergy include abdominal pain, vomiting, tingling in the mouth, flushing, hives, itching, wheezing or tightness in the throat. When evaluating for potential allergic reactions to food, a reproducible temporal relationship between ingestion and symptoms should exist.

Numerous medications are associated with drug-induced rhinitis. The most frequently incriminated agents are antihypertensive medications. Table 3 lists some of the common medication-related causes of rhinitis. Illicit drugs, such as cocaine, have also been associated with rhinitis, due to nasal irritation and inflammation.

Repetitive use of vasoconstricting nasal decongestants, such as oxymetazoline and phenylephrine, may also produce rhinitis, known as rhinitis medicamentosa. Patients with rhinitis medicamentosa present with nasal mucosa that appears inflamed with areas of bleeding, accompanied by very little mucus. To avoid this condition, nasal decongestants should not be used for more than three consecutive days. The treatment of rhinitis medicamentosa involves withdrawal of the nasal spray, either by immediate discontinuation or by weaning the frequency. Symptoms can be alleviated by using nasal steroids or pseudoephedrine.

Although the incidence has declined in the United States, some elderly patients are prone to primary atrophic rhinitis, characterized by progressive atrophy of the nasal mucosa and underlying bone.25 These patients report persistent nasal congestion and bad smell in the nose, accompanied by headaches and chronic sinusitis. The bad smell is caused by thick crusts that form on the mucosa.

**ASTHMA COMORBIDITY**

Probably the most significant comorbidity of allergic rhinitis is asthma, a condition involving chronic inflammation of the airways. The NAEPP guidelines27 recommend a multifaceted approach to patient care. The four components of care should include patient education, medications, control of environmental factors and management of comorbid conditions that affect asthma. The presence of wheezing is a key symptom indi-
Other comorbIdItIes

The patient is sensitive to those allergens and irritants to which patients are exposed. The clinician should advise patients on ways to reduce exposure to allergens. The clinician should inquire about exposure to allergens and irritants, as well as a history of symptoms when exposed to such allergens. The clinician should advise patients on ways to reduce exposure to those allergens and irritants to which the patient is sensitive.

OTHER COMORBIDITIES

Allergic rhinitis is a risk factor for a variety of other conditions. These comorbidities can be due to similar allergic etiology or due to complications. Chronic cough and allergic conjunctivitis are associated with allergic rhinitis. Allergic conjunctivitis is more common with outdoor allergens, compared with indoor allergens. Although allergic conjunctivitis is a common comorbidity of allergic rhinitis, other forms of conjunctivitis are not associated with allergic rhinitis. The role of allergic rhinitis in chronic rhinosinusitis and otitis media with effusion remains a matter of debate. Epidemiologic studies concerning chronic rhinosinusitis are inconclusive, in part due to a lack of understanding by which mechanism the presence of allergic inflammation can predispose patients to rhinosinusitis. Patients with allergic rhinitis have a higher risk of eustachian tube dysfunction than nonallergic patients.

Environmental Control

When considering environmental controls, the clinician should consider potential causative allergens. Intermittent allergic rhinitis is commonly caused by allergies to seasonal pollen, outdoor molds or occupational irritants. Persistent allergic rhinitis is typically caused by allergies within the home or work, or outdoor allergies that are present year-round. (Table 4) Most environmental modifications involve the control of indoor allergens.

Dust mites are commonly found in bedding, carpets, upholstered furniture, curtains and soft toys. Dust mites are microscopic insects that thrive in warm, humid places. Avoidance of these mites can be accomplished by using plastic dust mite covers on pillows and mattresses. To avoid dust mites, the World Allergy Organization recommends washing bedding, including pillows and duvets, every one to two weeks at 55 to 60 degrees Celsius. Soft toys can also be washed at 55 to 60 degrees Celsius or put in the freezer to kill mites. Dust mites can also be killed by exposing mattresses, rugs and carpets to direct strong sunlight for more than three hours. Other recommendations to reduce dust mites include sufficient ventilation to decrease humidity, use of a dehumidifier or HEPA filter in the bedroom and removal of carpeting in the bedroom.

Mold is common in basements, bathrooms, plants and old newspapers. To reduce exposure to mold indoors, carpeting, wallpaper and houseplants should be removed from the bedroom or household. The use of a dehumidifier is recommended if the relative humidity is consistently above 50 percent. Appropriate maintenance of ventilation and air-conditioning systems are essential for reducing mold spores. Firewood should be stored outside because mold can be present in the bark of the wood. Piles of old newspapers should not be stored in the house. For contaminated surfaces, a 5 percent ammonia solu-

| TABLE 5 | Effect of various agents on symptoms |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Nasal itching   | Nasal obstruction | Ocular symptoms | Rhinorrhea      | Sneezing        |
| Anti-cholinergic agents | 0                | 0               | 0              | ++             | 0               |
| Anti-histamines (oral)    | +++              | 0/+             | ++             | ++             | ++              |
| Decongestants (intranasal) | 0                | +++             | 0              | 0              | 0               |
| Decongestants (oral)      | 0                | ++/+            | 0              | 0              | 0               |


tion is useful for removing mold.

When pet owners are found to be allergic to pet dander, pets should be sent to an alternative home if possible. If pet owners cannot bear to part with them, attempts should be made to control dander. Pet dander can remain in household dust for several months after the animal has left. Cat dander can remain airborne for six hours. Frequent pet shampoos, house cleaning utilizing a HEPA vacuum, removal of carpets and applying special sprays that help control pet shedding may help control symptoms. Pets should also be kept out of bedrooms or be kept outside.

Outdoor allergens can be avoided by closing car and home windows, as well as limiting outdoor activities during high pollen season or at peak hours (usually between 5 a.m. and 10 a.m.). When outdoor activities are necessary, wearing glasses or sunglasses may prevent pollen from entering the eyes. Patients can also consider wearing a mask over the nose and mouth to prevent inhalation of pollen. Air conditioners, with frequently changed filters, may also be helpful to decrease humidity and filter out mites, mold, pollen and dander.

**PATIENT CASE**

Michelle C., a 28-year-old female, who has come into the clinic, explains that she has seasonal allergies. During the last two weeks, her symptoms have been controlled by diphenhydramine capsules every eight hours. Although her symptoms have improved, she feels drowsy and is unable to function at work or while at home caring for her young child. She is hoping you can recommend something that will control her sneezing, rhinorrhea and itchy nose without making her drowsy.

Based on an examination, the clinician makes the following notes:

**T**: 98.2°F, Orally

**P**: 62, occasional premature beat

**R**: 16, unlabored, no nasal faring

**Skin**: Warn to touch, no excess moisture, no clamminess

**Eyes**: PERLA, EOM intact, mild bilateral watering; clear watery discharge

**Ears**: External canal without obstruction, TM with appropriate light reflex, normal movement

**Nose**: Clear watery discharge bilaterally; mildly boggy mucosa

**Mouth**: Cobblestoning of posterior pharynx

**Nodes**: No prominent or tender nodes of the head and neck

**Lungs**: Clear, well expanded, no rales, wheezes or consolidation; no increase in A-P diameter

**Heart**: Regular, no split S2; no S3, S4 or murmur; PMI not displaced

**Abdomen**: Normal bowel sounds; no masses, tenderness or distension

**Neuro**: No focal neurological symptoms.

**CASE DISCUSSION**

Tailoring therapy to provide treatment for the patient’s specific symptoms while minimizing adverse reactions is essential. For Ms. C.’s symptoms (sneezing, rhinorrhea and itchy nose), antihistamines are more effective than decongestants. Unfortunately, first generation antihistamines, such as diphenhydramine, are associated with significant sedation. A second generation antihistamine, such as

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<td><strong>Recommended treatment based on severity and duration</strong></td>
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<tr>
<td><strong>Initial treatment</strong></td>
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<tr>
<td>Oral or intranasal antihistamine and/or decongestant</td>
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<tr>
<td>Symptoms improved after 2-4 weeks</td>
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<tr>
<td>Treatment failure after 2-4 weeks</td>
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<tr>
<td>• Increase intranasal steroid dose</td>
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<tr>
<td>• Add antihistamine if itching/sneezing present</td>
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<tr>
<td>• Add ipratropium if rhinorrhea present</td>
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<tr>
<td>• Add decongestant or short-term oral steroids if nasal blockage</td>
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loratadine or cetirizine, would improve her ability to complete activities of daily living without significant sedation.

**OVER-THE-COUNTER TREATMENT OPTIONS**

A wide variety of treatment options are available for the treatment of allergic rhinitis. (Table 5) Many of these medications are available without a prescription. The ARIA guidelines recommend a stepwise approach to the treatment of allergic rhinitis, starting with allergen avoidance and then proceeding to medication therapy. (Table 6)

**Oral antihistamines**

Antihistamines have been used to treat allergic rhinitis for many decades. By blocking histamine at the H₁ receptor, they relieve the early-stage symptoms mediated by histamine that include itching, sneezing, rhinorrhea and allergic conjunctivitis, while having little effect on nasal congestion. Antihistamines are more effective in preventing the actions of histamine than they are at reversing the effects of histamine.

Antihistamines are classified as either first generation or second generation. The agents in these two classifications are differentiated by their selectivity for the H₁ receptor and by their ability to cross the blood brain barrier. Both classes of antihistamines are effective for long-term treatment and prophylaxis of allergic rhinitis. Oral antihistamines are readily absorbed, reaching peak concentrations within two to three hours. All antihistamines are metabolized via hepatic cytochrome P450 isoenzymes. With some antihistamines, histamine suppressive effects can persist for more than 24 hours even when serum levels have declined. This post-dose effect may be due to active metabolites.

First generation antihistamines are available without a prescription and include such familiar agents as diphenhydramine (Benadryl®), chlorpheniramine (Chlor-Trimeton®), brompheniramine and carboxinamne maleate. These agents easily cross the blood brain bar-

Patient counseling points on the use of first generation antihistamines should include a warning that the use of alcohol or other central nervous system depressants concurrently may heighten sedating effects.

Second generation antihistamines are highly selective for the H₁ receptor. Some second generation antihistamines may also inhibit release of mast cell and basophil inflammatory mediators. They do not cross the blood brain barrier or bind to cholinergic receptors, therefore they do not produce sedating or anticholinergic side effects. Another advantage of the second generation antihistamines is longer half-lives, allowing for once or twice daily dosing, rather every four to six hours as with diphenhydramine. Some of the second generation antihistamines are available by prescription only; however, loratidine (Claritin® and Alavert®) and cetirizine (Zyrtec®) are available over the counter.

**Mast cell stabilizer**

Intranasal cromolyn (Nasalcrom®) inhibits degranulation of sensitized mast cells and the release of preformed mediators. It is indicated for the prevention and treatment of rhinorrhea, nasal itching and sneezing due to allergies, although it is not as effective as intranasal corticosteroids. The recommended dose is one spray in each nostril three to four times daily. The maximum effectiveness of this product may not be seen for one to two weeks after initiation of therapy. Whenever possible, patients should initiate cromolyn prior to exposure to allergens. Adverse effects include sneezing, nasal stinging, irritation and burning.

**Decongestants**

Decongestants, approved for the
treatment of nasal and sinus congestion, stimulate alpha-adrenergic receptors in smooth muscle resulting in constriction of the blood vessels within the nasal sinuses. Available products include both oral and intranasal formulations. Oral products, such as phenylephrine and pseudoephedrine, act indirectly and generally have a longer duration of action but slower onset. Intranasal dosage forms, including phenylephrine, naproxen, tetrahydrozoline, oxymetazoline and xylometazoline, have direct action on alpha-adrenergic receptors and are often preferred to minimize systemic side effects. The use of intranasal formulations should be limited to three consecutive days to avoid rebound congestion. If extended use is necessary, some clinicians recommend cycling three days on and three days off therapy.

Patients commonly experience CNS and cardiovascular side effects with oral agents. Although this is also possible with nasal formulations, it typically only occurs with higher doses. CNS stimulation may cause insomnia, dizziness, anxiety, tremors and agitation. Cardiac effects can include elevation in blood pressure, rapid heart rate and palpitations. They should be used with caution in patients with a history of arrhythmias, coronary heart disease or hypertension. They should also be used with caution in patients with hyperthyroidism, glaucoma, diabetes or prostatic hypertrophy. Decongestants should not be used in patients who are taking tricyclic antidepressants or monoamine oxidase inhibitors, as they may be put at risk for hypertensive crisis.

Under the Combat Methamphetamine Epidemic Act of 2005, controls were put into place pertaining to the sale and purchase of medications containing pseudoephedrine. The intent is to limit the sale of large quantities of this key ingredient in the manufacturing of methamphetamine. All nonliquid formulations of pseudoephedrine must be sold in blister packs or unit-dose packets or pouches. The act limits the amount of pseudoephedrine a patient can purchase to 3.6 grams in a single day and 9 grams in a month at a retail store. These products must be stored such that customers do not have direct access before the sale is made, such as displaying them behind the pharmacy counter or in a locked cabinet that is located in an area to which customers do have direct access. These new regulations require the patient to show a government-issued photo identification, such as a driver’s license, and to sign a logbook. The store is mandated to keep a record of purchases of these products, including the product name, quantity sold, the name and address of purchaser, and the date and time of the sale for at least two years.

Use of medications in children
The Food and Drug Administration has raised questions about the safety of OTC cough-and-cold product use in children. In particular, the FDA is concerned whether the benefits justify the potential risks associated with these medications, especially in children under 2 years of age. After a thorough review, the FDA has recommended that these medications not be used to treat infants and children under 2 years of age due to the risk of life-threatening side effects.

A review of the information pertaining to the safety of these agents in children ages 2 to 11 years is still under review.

Until this review is complete, the FDA has made the following recommendations for parents:

- Check the “active ingredient” section of the DRUG FACTS label in order to better understand what ingredients are in the product and what symptom each ingredient is intended to treat.
- Be careful giving more than one OTC cough-and-cold medicine to a child. Many OTC cough-and-cold medicines have more than one “active ingredient.” If two medicines have the same or similar ingredients, a child could get too much of an ingredient which may harm the child.
- Carefully follow the directions in the DRUG FACTS part of the label on how much medicine to give and how often to give it.
- Only use the measuring spoons or cups that come with the medicine or those made specifically for measuring medications. Do not use common household spoons to measure medicines for children because household spoons come in different sizes.
- Choose OTC cough-and-cold medicines with childproof safety caps and store medicines out of the reach of children.
- Understand that OTC cough-and-cold medicines are intended only to treat symptoms. They do not cure the illness or shorten the length of time the child is sick.
- These medications should not be used to make the child sleepy.

Clinicians should consider the risk versus benefit of using these agents in children before recommending them. They should also reinforce the FDA’s warnings if these agents are necessary.

Conclusion
Not all patients who present with rhinorrea are suffering from an allergic reaction. With so many conditions exhibiting similar symptoms, the clinician should carefully review the patient’s symptoms before recommending OTC products. The clinician should evaluate the duration, severity and types of symptoms that each patient exhibits. With a variety of OTC medications available for the treatment of allergic rhinitis symptoms, the clinician can recommend OTC treatments to alleviate symptoms while limiting adverse effects.
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1. A patient who experiences rhinitis symptoms less than 4 days per week is classed as having _____ rhinitis
   a. intermittent
   b. persistent
   c. seasonal
   d. year-round

2. A patient whose symptoms interfere with daily activities is classed as having _____ symptoms
   a. intermittent
   b. persistent
   c. mild
   d. moderate-severe

3. Common symptoms exhibited by patients with allergic rhinitis include:
   a. nasal congestion
   b. rhinorrhea
   c. post-nasal drip
   d. all of the above

4. When mucosal edema is severe, the mucosa will appear:
   a. bluish-gray
   b. opaque
   c. red
   d. pale

5. The class of medications most often incriminated for medication-induced rhinitis is:
   a. antipsychotics
   b. NSAIDs
   c. antihypertensives
   d. benzodiazepines

6. Persistent allergic rhinitis is often caused by:
   a. allergens in the home
   b. pollen
   c. grass
   d. outdoor molds

7. Which of the following symptoms are not typically associated with allergic rhinitis?
   a. unilateral symptoms
   b. post-nasal drip
   c. cough
   d. ocular itching

8. Which of the following is not a characteristic of non-allergic rhinitis?
   a. onset later in life
   b. poor response to antihistamines
   c. hyperreactivity to strong odors
   d. seasonal exacerbation

9. Which of the following is most effective in the treatment of nasal itching?
   a. antihistamines
   b. anticholinergics
   c. oral decongestants
   d. intranasal decongestants

10. For moderate-severe persistent rhinitis, _____ can be added to reduce nasal blockage
    a. antihistamines
    b. anticholinergics
    c. decongestants
    d. ipratropium