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Take CME Exams

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Treatment of Allergic Rhinitis and Allergic Conjunctivitis

TABLES

ALLERGIC RHINITIS

Initial treatment of allergic rhinitis (AR) depends on the severity of symptoms and whether they are intermittent or persistent (see Table 1).[1]

H_1-ANTIHISTAMINES — Oral second-generation H_1-antihistamines (see Table 2) are effective for initial treatment of the nasal symptoms of AR (itching, sneezing, rhinorrhea). They can also reduce ocular symptoms (itching, tearing, redness).

Oral first-generation H_1-antihistamines such as diphenhydramine (*Benadryl,* and generics) are similar in efficacy to second-generation drugs, but they frequently cause anticholinergic effects and CNS impairment.

Intranasal H_1-antihistamines (see Table 3) are at least as effective as oral H_1-antihistamines for initial treatment of AR. Their onset of action (15-30 minutes) is more rapid than that of oral H_1-antihistamines (30-90 minutes) and intranasal corticosteroids (1-12 hours). Fixed-dose combinations of an intranasal H_1-antihistamine and an intranasal corticosteroid (INCS) have improved symptoms more than either drug alone in patients with seasonal AR.[2,3]

Adverse Effects — Oral second-generation H_1-antihistamines are significantly less likely than first-generation drugs to impair CNS function and cause sedation.[4] Fexofenadine (*Allegra*, and others) is nonsedating and does not cause CNS impairment, even in higher-than-recommended doses. Loratadine (*Claritin*, and others) and desloratadine (*Clarinex*, and generics; available only by prescription) are nonimpairing and nonsedating in recommended doses, but they may be sedating at higher doses. Cetirizine (*Zyrtec*, and others) and levocetirizine (*Xyzal*, and others) may be impairing or sedating in some patients in recommended doses.[5]

Oral first-generation H_1-antihistamines can cause anticholinergic effects and CNS impairment with or without sedation. They can interfere with learning and memory, impair performance, and increase the

Table 1. Initial Treatment of Allergic Rhinitis[1]

Severity	Recommended Regimens[2,3]
Intermittent	
Mild	▶ Oral 2nd-generation AH or intranasal AH[4] ▶ Oral 2nd-generation AH + pseudoephedrine[5] ▶ INCS
Moderate/Severe	▶ Oral 2nd-generation AH or intranasal AH[4] ▶ INCS ▶ Intranasal AH/INCS combination or intranasal AH + INCS ▶ Oral 2nd-generation AH + pseudoephedrine[5]
Persistent	
Mild	▶ INCS ▶ Oral 2nd-generation AH or intranasal AH[4] ▶ Oral 2nd-generation AH + pseudoephedrine[5] ▶ Intranasal cromolyn sodium
Moderate/Severe	▶ Intranasal AH/INCS combination or intranasal AH + INCS ▶ INCS ▶ Intranasal AH

AH = H_1-antihistamine; INCS = intranasal corticosteroid
1. Adapted from MS Dykewicz et al. J Allergy Clin Immunol 2020; 146:721; SK Wise et al. Int Forum Allergy Rhinol 2023; 13:293.
2. For patients ≥12 years old. Listed in preferential order.
3. If patient has severe mucosal edema or requests rapid relief from nasal congestion, an intranasal decongestant or oral pseudoephedrine can be added for up to 5 days. Any regimen may be combined with PRN intranasal saline.
4. Onset of action is slower with an oral AH than with an intranasal AH (30-90 minutes vs 15-30 minutes).
5. Pseudoephedrine should only be used short-term.

risk of on-the-job injuries, motor vehicle accidents, and even plane crashes.[6] When taken at night, their effects on wakefulness and psychomotor performance can persist the next day.[4] The adverse effects of these drugs may be more pronounced in older adults; cumulative exposure to first-generation H_1-antihistamines has been associated with an increased risk of dementia.[7] In a large cohort study, use of first-generation antihistamines in children, especially those 6-24 months old, was associated with an increased risk of seizures.[8]

Intranasal H_1-antihistamines can cause dysgeusia, dysosmia, nasal discomfort, epistaxis, and headache, and may cause somnolence.

INTRANASAL CORTICOSTEROIDS — INCSs are the most effective monotherapy for prevention and relief of the nasal symptoms of AR (itching, rhinorrhea, congestion, and sneezing). They are modestly effective in reducing ocular symptoms as well.[9,10] Most INCSs are effective when used once daily. They typically begin to take effect within 2-4 hours, but maximal effects may not be achieved for 2 weeks. Patients with seasonal AR should start treatment several days before the pollen season. Several INCSs are available without a prescription (see Table 3). In patients with moderate to severe symptoms, the combination of an intranasal antihistamine and an INCS is more effective than either drug alone[3]; fixed-dose combinations are available.[2] Adding an oral second-generation H_1-antihistamine to an INCS does not increase symptom relief.[1]

Adverse Effects – INCSs can cause mild dryness, irritation, burning, and bleeding of the nasal mucosa, sore throat, and headache. Mucosal atrophy and septal perforation have been reported rarely; patients should be examined periodically for changes in the nasal mucosa. Intranasal and/or oropharyngeal fungal infections have occurred. One meta-analysis of randomized controlled trials in patients with AR found that INCS use was not associated with a significant risk of increased intraocular pressure or cataract formation.[11] INCS use for ≥12 months in children has been associated with small decreases in growth velocity.[12]

MONTELUKAST — The oral leukotriene receptor antagonist montelukast (*Singulair*, and generics; available only by prescription) provides modest relief of nasal symptoms (itching, sneezing, rhinorrhea, and congestion). In clinical trials, the efficacy of montelukast has been equal to or less than that of an oral second-generation H_1-antihistamine, and less than that of an INCS.[13] Because suicidal behavior and other neuropsychiatric events continue to be reported in patients taking montelukast, it should be used for treatment of AR only when other treatments have been ineffective or intolerable.[14]

DECONGESTANTS — The **oral** decongestant pseudoephedrine and **intranasal** decongestants such as oxymetazoline (*Afrin*, and generics) act as vasoconstrictors in the nasal mucosa. They only relieve nasal congestion, not sneezing, itching, or rhinorrhea, and tolerance to their decongestant effects can develop. Oral phenylephrine (*Sudafed PE*, and others), which has replaced pseudoephedrine in many OTC decongestant products, has low bioavailability following oral ingestion, and the FDA has proposed removing it from oral products after a data review found that it is not effective as a nasal decongestant.[15]

The combination of pseudoephedrine and an oral second-generation H_1-antihistamine is effective for acute relief of AR symptoms.[1] Concurrent administration of an intranasal decongestant and an INCS may be considered in patients with nasal congestion that is unresponsive to an INCS alone or an intranasal H_1-antihistamine/INCS combination.

Decongestants should only be used short-term. Use of intranasal decongestants for >5 consecutive days can result in rhinitis medicamentosa (rebound nasal congestion); concomitant use of an INCS may reduce this risk.[1]

Adverse Effects – Oral decongestants can cause insomnia, excitability, headache, nervousness, anorexia, palpitations, tachycardia, arrhythmias, hypertension, nausea, vomiting, and urinary retention. They should be used cautiously in patients with cardiovascular disease, hypertension, diabetes, migraine, hyperthyroidism, closed-angle glaucoma, or bladder neck obstruction. Use of oral decongestants is not associated with rhinitis medicamentosa.

Intranasal decongestants are less likely than oral decongestants to cause systemic adverse effects, but they can cause sneezing and stinging, burning, and dryness of the nose and throat. If rhinitis medicamentosa develops, it is usually treated by replacing the intranasal decongestant with an INCS.[16]

INTRANASAL CROMOLYN — Intranasal cromolyn *(Nasalcrom)* inhibits mast cell degranulation and mediator release and is mainly used before allergen exposure to prevent the onset of AR symptoms. It is particularly useful when administered just before episodic allergen exposure, such as visiting a home

Table 2. Some Oral Drugs for Allergic Rhinitis

Drug	Some Available Formulations	Usual Adult Dosage[1]	Usual Pediatric Dosage[1]	Cost[2]
Second-Generation H_1-Antihistamines (including H_1-Antihistamine/Decongestant Combinations)				
Cetirizine[3,4] – *Zyrtec Allergy, Children's Zyrtec Allergy* (Johnson & Johnson)	5, 10 mg tabs and caps; 10 mg ODT; 5 mg/5 mL syrup	10 mg once/day[5]	6-11 mos: 2.5 mg once/day[6] 12-23 mos: 2.5 mg once/day-bid[6] 2-5 yrs: 2.5 or 5 mg once/day or 2.5 mg bid 6-11 yrs: 5 or 10 mg once/day	$20.00[7]
Cetirizine/pseudoephedrine[3,4] – *Zyrtec-D 12 hour* (Johnson & Johnson)	5 mg/120 mg ER tabs	1 tab bid[8]	≥12 yrs: 1 tab bid	49.50[7]
Desloratadine – generic *Clarinex* (MSD)	5 mg tabs; 2.5, 5 mg ODT 5 mg tabs	5 mg once/day	6-11 mos: 1 mg once/day[6] 1-5 yrs: 1.25 mg once/day[6] 6-11 yrs: 2.5 mg once/day	17.60 264.40
Desloratadine/pseudoephedrine – *Clarinex-D 12 hour* (MSD)	2.5 mg/120 mg ER tabs	1 tab bid	≥12 yrs: 1 tab bid	363.60
Fexofenadine[3,4] – *Allegra Allergy, Children's Allegra Allergy* (Chattem)	30, 60, 180 mg tabs and gel caps; 30 mg ODT; 30 mg/5 mL susp	60 mg bid or 180 mg once/day[8]	6-23 mos: 15 mg bid[9] 2-11 yrs: 30 mg bid	16.70[7,10]
Fexofenadine/pseudoephedrine[3,4] – *Allegra-D 12 hour* (Chattem) *Allegra-D 24 hour*	 60 mg/120 mg ER tabs 180 mg/240 mg ER tabs	 1 tab bid[8] 1 tab once/day[8]	 ≥12 yrs: 1 tab bid ≥12 yrs: 1 tab once/day	 42.70 34.70
Levocetirizine[3,4] – *Xyzal Allergy 24 hour, Children's Xyzal Allergy* (Chattem)	5 mg tabs; 2.5 mg/5 mL oral soln	5 mg once/day	6 mos-5 yrs: 1.25 mg once/day[11] 6-11 yrs: 2.5 mg once/day	20.00[7]
Loratadine[3,4] – *Alavert* (Pfizer) *Claritin, Children's Claritin* (Bayer)	10 mg ODT 10 mg tabs and caps; 10 mg ODT; 5 mg chewable tabs; 1 mg/mL syrup	10 mg once/day	2-5 yrs: 5 mg once/day ≥6 yrs: 10 mg once/day	12.00[7] 20.00[7]
Loratadine/pseudoephedrine[3,4] – *Claritin-D 12 hour* (Bayer) *Claritin-D 24 hour*	 5 mg/120 mg ER tabs 10 mg/240 mg ER tabs	 1 tab bid 1 tab once/day	 ≥12 yrs: 1 tab bid ≥12 yrs: 1 tab once/day	 27.70 40.60
Leukotriene Receptor Antagonist				
Montelukast[12] – generic *Singulair* (Merck)	10 mg tabs; 4, 5 mg chewable tabs; 4 mg granule packets	10 mg once/day	6 mos-5 yrs: 4 mg once/day 6-14 yrs: 5 mg once/day	7.00 275.60

ER = extended-release; ODT = orally disintegrating tabs

1. Dosage adjustments may be needed for renal or hepatic impairment.
2. Approximate WAC for 30 days' treatment at the lowest usual adult dosage. When multiple formulations are listed, price is for the first formulation unless otherwise indicated. WAC = wholesaler acquisition cost or manufacturer's published price to wholesalers; WAC represents a published catalogue or list price and may not represent an actual transactional price. Source: AnalySource® Monthly. March 5, 2025. Reprinted with permission by First Databank, Inc. All rights reserved. ©2025. www.fdbhealth.com/policies/drug-pricing-policy.
3. Available without a prescription. Products containing pseudoephedrine are subject to sales restrictions.
4. Individual retailers may have their own OTC generic products.
5. For patients ≥65 years old, the recommended dosage is 5 mg once/day.
6. Not FDA-approved for treatment of seasonal allergic rhinitis in children <2 years old.
7. Approximate cost at cvs.com or walmart.com. Accessed March 13, 2025.
8. OTC products not recommended for adults ≥65 years old without first consulting a physician.
9. Some prescription products are FDA-approved for treatment of chronic idiopathic urticaria in children ≥6 months old. Some OTC products are only recommended for children ≥2 years old.
10. Cost of 30 days' treatment with 180 mg once/day.
11. Some prescription products are FDA-approved for treatment of perennial allergic rhinitis and chronic urticaria in children ≥6 months old. Some OTC products are only recommended for children ≥2 years old.
12. The FDA recommends that montelukast be used for treatment of allergic rhinitis only when other treatments have been ineffective or intolerable.

with cats, because it can blunt the acute allergic response. For treatment of seasonal AR, cromolyn should be started 1-2 weeks before exposure to pollen and must be taken 3-4 times daily. Intranasal cromolyn is less effective than INCSs and intranasal H_1-antihistamines.[1] It is relatively free from adverse effects; nasal stinging can occur.

INTRANASAL IPRATROPIUM — The antimuscarinic agent ipratropium bromide is poorly absorbed systemically and does not readily cross the blood-brain barrier. Intranasal ipratropium (available only by prescription) is effective for treatment of rhinorrhea associated with AR. It does not relieve sneezing, nasal itching, or nasal congestion. Addition of ipratropium may be beneficial in patients with rhinorrhea that is inadequately controlled with an INCS.

Adverse Effects – Ipratropium can cause dryness of the nasal and oral mucosa, epistaxis, and pharyngeal irritation. Inadvertent instillation in the eye can increase intraocular pressure.

Table 3. Some Nasal Sprays for Allergic Rhinitis

Drug	Some Available Formulations	Usual Adult Dosage	Usual Pediatric Dosage	Cost[1]
H_1-Antihistamines				
Azelastine 0.1%[2] – generic	Metered-dose pump spray (137 mcg/spray)	1-2 sprays per nostril bid[3]	5-11 yrs: 1 spray per nostril bid	$11.30
Azelastine 0.15%[4,5] – *Astepro Allergy, Children's Astepro Allergy* (Bayer)	Metered-dose pump spray (205.5 mcg/spray)	1-2 sprays per nostril bid or 2 sprays per nostril once/day[6]	6-11 yrs: 1 spray per nostril bid	18.80
Olopatadine 0.6%[7] – generic	Metered-dose pump spray (665 mcg/spray)	2 sprays per nostril bid	6-11 yrs: 1 spray per nostril bid	27.60
Corticosteroids				
Beclomethasone dipropionate – *Qnasl* (Teva)	HFA metered-dose aerosol (80 mcg/actuation)	2 sprays per nostril once/day	≥12 yrs: 2 sprays per nostril once/day	319.60
Children's Qnasl	HFA metered-dose aerosol (40 mcg/actuation)		4-11 yrs: 1 spray per nostril once/day	319.60
Budesonide[5,8] – generic	Metered-dose pump spray (32 mcg/spray)	2 sprays per nostril once/day[9,10]	6-11 yrs: 1-2 sprays per nostril once/day[9,11]	19.40[12]
Ciclesonide – *Omnaris* (Covis)	Metered-dose pump spray (50 mcg/spray)	2 sprays per nostril once/day	≥6 yrs[13]: 2 sprays per nostril once/day	294.50
Flunisolide – generic	Metered-dose pump spray (25 mcg/spray)	2 sprays per nostril bid-tid	6-14 yrs: 1 spray per nostril tid or 2 sprays per nostril bid	53.10
Fluticasone furoate[5] – *Flonase Sensimist Allergy Relief, Children's Flonase Sensimist Allergy Relief* (GSK)	Metered-dose pump spray (27.5 mcg/spray)	2 sprays per nostril once/day x 7 days, then 1-2 sprays per nostril once/day[10]	2-11 yrs: 1 spray per nostril once/day[11]	17.50[12]

HFA = hydrofluoroalkane
1. Approximate WAC for 30 days' treatment at the lowest recommended adult dosage (using smallest size available). WAC = wholesaler acquisition cost or manufacturer's published price to wholesalers; WAC represents a published catalogue or list price and may not represent an actual transactional price. Source: AnalySource® Monthly. March 5, 2025. Reprinted with permission by First Databank, Inc. All rights reserved. ©2025. www.fdbhealth.com/policies/drug-pricing-policy.
2. FDA-approved for seasonal allergic rhinitis (≥5 years old) and vasomotor rhinitis (≥12 years old).
3. Dosage for seasonal allergic rhinitis. Dosage for vasomotor rhinitis is 2 sprays per nostril bid.
4. FDA-approved for seasonal and perennial allergic rhinitis (≥6 years old).
5. Available without a prescription.
6. Dosage for seasonal allergic rhinitis. Dosage for perennial allergic rhinitis is 2 sprays per nostril bid.
7. FDA-approved only for treatment of seasonal allergic rhinitis.
8. Individual retailers may have their own OTC generic products.
9. A dose of 2 sprays/nostril should only be used until symptoms improve; then the dose should be reduced to 1 spray/nostril.
10. OTC intranasal corticosteroids should not be used daily for >6 months without consulting a physician.
11. OTC intranasal corticosteroids should not be used daily for >2 months/year in children <12 years old without consulting a physician.
12. Approximate cost at walmart.com. Accessed March 13, 2025.
13. Not FDA-approved for treatment of perennial allergic rhinitis in children <12 years old.

INTRANASAL SALINE — Saline sprays and drops can relieve nasal dryness and congestion and reduce oral antihistamine use. Nasal irrigation administered by neti pot, squeeze bottle, or bulb syringe can help expel mucus and relieve congestion. Premade saline solutions and kits are available OTC. Patients should use sterile, distilled, or previously boiled water to prepare solutions for nasal irrigation.

BIOLOGICS — Biologic agents such as **omalizumab** *(Xolair; Omlyclo)* and **dupilumab** *(Dupixent)* can improve AR symptoms, but none are currently FDA-approved for such use. Omalizumab, an anti-IgE monoclonal antibody, has been studied the most. In patients with inadequately controlled AR, subcutaneous injection of omalizumab has significantly reduced rescue medication use and improved symptoms and quality of life.[17] Omalizumab is generally well tolerated, but it can rarely cause anaphylaxis.

ORAL CORTICOSTEROIDS — A short course (5-7 days) of an oral corticosteroid (e.g., prednisone 20 mg qAM) can be effective for treatment of AR or rhinitis medicamentosa in patients with significant nasal obstruction that prevents adequate penetration of intranasal drugs.[1]

PREGNANCY — In a systematic review and meta-analysis of 37 studies that included >50,000 pregnant women, use of **H_1-antihistamines** during the first trimester was not associated with an increased risk of major malformations, spontaneous abortions, prematurity, or low birth weight.[18] The oral second-generation H_1-antihistamines loratadine and cetirizine have the most data supporting their safety; the results of large cohort studies suggest that fexofenadine and desloratadine are also safe for use in pregnant women.[19,20]

Table 3. Some Nasal Sprays for Allergic Rhinitis (continued)

Drug	Some Available Formulations	Usual Adult Dosage	Usual Pediatric Dosage	Cost[1]
Corticosteroids (continued)				
Fluticasone propionate[5,8] – *Flonase Allergy Relief, Children's Flonase Allergy Relief* (GSK)	Metered-dose pump spray (50 mcg/spray)	2 sprays per nostril once/day x 7 days, then 1-2 sprays per nostril once/day[10]	4-11 yrs: 1 spray per nostril once/day[11]	$15.00[12]
Mometasone furoate[5,14] – *Nasonex 24 Hr Allergy, Children's Nasonex 24 Hr Allergy* (Perrigo)	Metered-dose pump spray (50 mcg/spray)	2 sprays per nostril once/day	2-11 yrs: 1 spray per nostril once/day	20.40[12]
Triamcinolone acetonide[5,8] – *Nasacort Allergy 24 hour, Children's Nasacort Allergy 24 hour* (Chattem)	Metered-dose pump spray (55 mcg/spray)	2 sprays per nostril once/day[8,11]	2-5 yrs: 1 spray per nostril once/day[11] 6-11 yrs: 1-2 sprays per nostril once/day[9,11]	20.00[12]
H_1-Antihistamine/Corticosteroid Combinations				
Azelastine/fluticasone propionate[7] – generic *Dymista* (Meda)	Metered-dose pump spray (137 mcg/50 mcg per spray)	1 spray per nostril bid	≥6 yrs: 1 spray per nostril bid	93.60 220.10
Olopatadine/mometasone[6] – *Ryaltris* (Hikma)	Metered-dose pump spray (665 mcg/25 mcg/spray)	2 sprays per nostril bid	≥12 yrs: 2 sprays per nostril bid	249.00
Mast Cell Stabilizer				
Cromolyn sodium[5,8] – *Nasalcrom* (Prestige)	Metered-dose pump spray (5.2 mg/spray)	1 spray per nostril tid-qid	≥2 yrs: 1 spray per nostril tid-qid	21.30[12]
Anticholinergic				
Ipratropium bromide – generic	Metered-dose pump spray (21 or 42 mcg/spray)	2 sprays per nostril bid-qid[15]	≥5 yrs: 2 sprays per nostril bid-qid[15]	34.20

14. Also FDA-approved for prophylaxis of seasonal allergic rhinitis in patients ≥12 years old and treatment of nasal polyps in patients ≥18 years old.
15. Dosage of 0.03% formulation is 2 sprays (42 mcg) per nostril bid-tid in patients ≥6 years old with allergic or nonallergic perennial rhinitis; dosage of 0.06% formulation is 2 sprays (84 mcg) per nostril qid in patients ≥5 years old with seasonal allergic rhinitis.

Intranasal saline, **intranasal cromolyn**, and **INCSs** are generally considered safe for use in pregnant women. Among INCSs, budesonide is preferred because it is the best studied.[21] In one prospective cohort study, maternal exposure to intranasal triamcinolone during the first trimester of pregnancy was associated with an increased risk of congenital respiratory defects.[22]

Oral decongestants are generally not recommended for treatment of AR in pregnant women. First-trimester use has been associated with an increased risk of birth defects; one meta-analysis of 10 studies found that pseudoephedrine increased the risk of gastroschisis.[23] **Intranasal decongestants** have been associated with pyloric stenosis and tracheo-esophageal fistula when used during the first trimester and with renal collecting system anomalies when used during the second trimester.[24]

ALLERGIC CONJUNCTIVITIS

Allergic conjunctivitis occurs in most patients with AR. Ocular symptoms such as itching, redness, tearing, and photophobia are frequently seasonal. Nonpharmacologic management includes allergen identification and avoidance, use of refrigerated artificial tears, eyelid cleansers and cold compresses, and refraining from eye rubbing. Wearing sunglasses as a barrier to allergens can also be helpful. Management of AR with an oral second-generation H_1-antihistamine or an INCS can benefit concomitant allergic conjunctivitis as well, but oral antihistamines (even second-generation agents) may reduce tear volume and induce or worsen dry eye syndrome.[25]

OPHTHALMIC DRUGS — Ophthalmic **H_1-antihistamines** are at least as effective as oral second-generation H_1-antihistamines for treatment of ocular itching due to allergic conjunctivitis, and they take effect within a few minutes. They are generally not effective in relieving erythema. Alcaftadine *(Lastacaft)*, azelastine, bepotastine *(Bepreve)*, epinastine, ketotifen *(Zaditor, Alaway)*, and olopatadine *(Pataday)* also have mast cell-stabilizing effects. Starting treatment before the pollen season may improve symptom control. Alcaftadine,[26] ketotifen, and olopatadine are available without a prescription (see Table 4).

The ophthalmic **mast cell stabilizers** cromolyn, lodoxamide *(Alomide)*, and nedocromil *(Alocril)* can alleviate ocular symptoms, but they have a slower onset of action than ophthalmic H_1-antihistamines and are mostly used for prevention of symptoms.

The ophthalmic **nonsteroidal anti-inflammatory drug** (NSAID) ketorolac (*Acular*, and generics) is

Table 4. Some Ophthalmic Drugs for Allergic Conjunctivitis

Drug	Some Available Formulations	Available Sizes	Usual Dosage	Minimum Age	Cost[1]
H_1-Antihistamines					
Alcaftadine[2] – *Lastacaft* (AbbVie)	0.25% soln*	5 mL	1 drop once/day	2 yrs	$20.00[3]
Azelastine – generic	0.05% soln*	6 mL	1 drop bid	3 yrs	40.00
Bepotastine – generic, *Bepreve* (Bausch + Lomb)	1.5% soln*	5, 10 mL	1 drop bid	2 yrs	187.70 292.10
Cetirizine – *Zerviate* (Harrow)	0.24% soln*	30 single-use 0.2 mL containers	1 drop bid (q8h)	2 yrs	229.10
Epinastine – generic	0.05% soln*	5 mL	1 drop bid	3 yrs	85.50
Ketotifen fumarate[2,4] – *Zaditor* (Alcon) *Alaway* (Bausch + Lomb)	0.025% soln*	5 mL 10 mL	1 drop bid (q8-12h)	3 yrs	14.00[3] 11.80[3]
Olopatadine[2,4] – *Pataday Twice Daily* (Alcon) *Pataday Once Daily* *Pataday Once Daily Extra Strength*	0.1% soln* 0.2% soln* 0.7% soln*	5 mL 2.5 mL 2.5 mL	1 drop bid (q6-8h) 1 drop once/day 1 drop once/day	2 yrs 2 yrs 2 yrs	17.50[3] 22.00[3] 22.00[3]
Mast Cell Stabilizers					
Cromolyn sodium[5] – generic	4% soln*	10 mL	1 drop q4-6h	4 yrs	22.50
Lodoxamide tromethamine – *Alomide*[4] (Novartis)	0.1% soln*	10 mL	1 drop qid	2 yrs	203.30
Nedocromil – *Alocril* (Allergan)	2% soln*	5 mL	1 drop bid	3 yrs	224.50
Decongestants					
Naphazoline[2] – *Clear Eyes Maximum Itchy Eye Relief* (Prestige)[6]	0.012% soln*	15 mL	1-2 drops up to qid	6 yrs	5.60[3]
Tetrahydrozoline[2] – *Visine A.C.*[6] (Johnson & Johnson)	0.05% soln*	15 mL	1-2 drops up to qid	6 yrs	10.50[3]
H_1-Antihistamine/Decongestant Combinations					
Pheniramine/naphazoline[2,4] – *Naphcon-A* (Alcon) *Opcon-A* (Bausch + Lomb) *Visine Allergy Multi-Action* (Johnson & Johnson)	0.3%/0.025% soln* 0.3%/0.027% soln* 0.3%/0.025% soln*	15 mL 15 mL 15 mL	1-2 drops up to qid	6 yrs	11.00[3] 16.20[3] 7.50[3]
Nonsteroidal Anti-Inflammatory Drug (NSAID)					
Ketorolac tromethamine – generic *Acular* (Allergan)	0.5% soln*	3, 5, 10 mL 5 mL	1 drop qid	3 yrs	14.70 275.40
Corticosteroids					
Loteprednol etabonate – *Lotemax* (Bausch + Lomb) generic *Alrex* (Bausch + Lomb) generic	0.5% susp* 0.2% susp*	5, 10, 15 mL 5, 10 mL	1-2 drops qid[7] 1 drop qid[6]	See footnote 8 See footnote 8	322.90 213.70 303.60 254.20
Prednisone acetate – *Pred Mild* (Allergan)	0.12% susp*	5, 10 mL	1-2 drops bid-qid[6]	See footnote 8	160.40

soln = solution; susp = suspension
*Contains the preservative benzalkonium chloride.
1. Approximate WAC for one bottle of the smallest available size. WAC = wholesaler acquisition cost or manufacturer's published price to wholesalers; WAC represents a published catalogue or list price and may not represent an actual transactional price. Source: AnalySource® Monthly. March 5, 2025. Reprinted with permission by First Databank, Inc. All rights reserved. ©2025. www.fdbhealth.com/policies/drug-pricing-policy.
2. Available without a prescription.
3. Approximate cost at walmart.com. Accessed March 13, 2025.
4. Individual retailers may have their own OTC generic products.
5. FDA-approved for treatment of vernal keratoconjunctivitis, vernal conjunctivitis, and vernal keratitis.
6. Also contains zinc sulfate 0.25%, which is an astringent.
7. Ophthalmic corticosteroids should not be used for >2 weeks.
8. Safety and effectiveness in pediatric patients have not been established.

less effective in relieving ocular symptoms than an ophthalmic H_1-antihistamine.

Ophthalmic **vasoconstrictors** such as naphazoline and tetrahydrozoline, which are available OTC, reduce erythema, congestion, itching, and eyelid edema, but they have a short duration of action and can cause burning and stinging. They should only be used short-term (<2 weeks) or intermittently to avoid rebound hyperemia. Pheniramine/naphazoline, an OTC ophthalmic **H_1-antihistamine/vasoconstrictor combination**, has similar adverse effects.

Ophthalmic **corticosteroids** can be considered for short-term use (1-2 weeks) in allergic conjunctivitis that does not respond to other drugs. Loteprednol (*Lotemax*, and others) is rapidly inactivated in the anterior chamber of the eye and has been associated with significantly lower rates of intraocular pressure elevation than ophthalmic prednisolone or

dexamethasone.[27] *Dextenza,* an ophthalmic insert that releases dexamethasone for up to 30 days, has been approved by the FDA for treatment of ocular itching associated with allergic conjunctivitis.[28] Patients treated with ophthalmic corticosteroids should be monitored for exacerbations of conjunctival or corneal viral infections and for increased intraocular pressure. With longer treatment, cataract formation is a concern.

Adverse Effects – Most ophthalmic products available for treatment of allergic conjunctivitis contain the preservative benzalkonium chloride, which can cause burning and stinging, and may be absorbed by contact lenses. Refrigerating topical ophthalmic preparations before use is helpful. Compounding pharmacies can prepare preservative-free formulations of ophthalmic drugs.

ALLERGEN IMMUNOTHERAPY

Immunotherapy can alter the natural history of allergic respiratory disease, including rhinitis, and induce long-term remission. It should be considered for patients with moderate to severe AR who have specific IgE antibodies to clinically relevant allergens.

Subcutaneous immunotherapy (SCIT) can be formulated to contain all relevant allergens for an individual patient. Sublingual immunotherapy (SLIT) tablets are FDA-approved for treatment of AR, with or without conjunctivitis, induced by grass pollen, ragweed pollen, and dust mites.[29] Aqueous formulations of SLIT have been used off-label; adequate data on their efficacy and safety are lacking.[1] Both SCIT and SLIT can, in appropriately selected patients, reduce symptoms and medication use in patients with AR or allergic rhinoconjunctivitis. A systematic review of controlled trials found that SCIT and SLIT appear to be similarly effective in adults with AR, but more direct comparisons are needed.[30] In indirect comparisons of randomized controlled trials, SCIT and SLIT appeared to be at least as effective as an INCS or oral antihistamine for treatment of AR.[1,31]

Intralymphatic immunotherapy (ILIT), an investigational route of allergen immunotherapy with a shorter treatment duration, has shown short-term benefits for treatment of seasonal allergic rhinoconjunctivitis; its long-term effects are unknown.[32]

Adverse Effects – Local adverse effects of **SCIT** include pain, redness, and swelling at the injection sites. Anaphylaxis and, very rarely, death can occur, especially in patients with uncontrolled asthma.[33] SCIT should only be administered under medical supervision. After gradual dose buildup over a few months, maintenance injections are typically continued at 2- to 4-week intervals for 3-5 years.

SLIT is less likely to cause severe systemic reactions than SCIT and maintenance treatment can be self-administered at home. It can cause local adverse effects such as mouth and ear pruritus, mouth edema, and throat irritation, including eosinophilic esophagitis. Systemic adverse effects include nausea and mild abdominal pain. Anaphylaxis is rare and fatalities have not been reported.[33]

Pregnancy – Immunotherapy should generally not be started during pregnancy, but it can be continued at a stable dose. A large cohort study found no evidence of congenital malformations or other adverse pregnancy outcomes in women treated with SCIT or SLIT during pregnancy.[34] ■

Key Points: Treatment of Allergic Rhinitis and Allergic Conjunctivitis

- An oral second-generation or intranasal H_1-antihistamine is preferred for initial treatment of intermittent allergic rhinitis (AR).
- Intranasal corticosteroids are the most effective monotherapy for AR symptoms. They can be used in combination with an intranasal H_1-antihistamine for treatment of moderate to severe symptoms.
- Use of an oral second-generation H_1-antihistamine or an intranasal corticosteroid for AR also improves symptoms of allergic conjunctivitis.
- The anti-IgE monoclonal antibody omalizumab can improve symptoms in patients with poorly controlled AR (off-label use).
- Ophthalmic H_1-antihistamines are at least as effective as oral second-generation H_1-antihistamines for treatment of allergic conjunctivitis.
- Short-term use of an ophthalmic corticosteroid such as loteprednol can be considered for allergic conjunctivitis that fails to respond to other medications.
- Allergen immunotherapy can alter the natural history of AR, induce long-term remission, and reduce medication use.

Additional Content Available Online

Comparison Table: Some Oral Drugs for Allergic Rhinitis
http://medicalletter.org/TML-article-1725b

Comparison Table: Some Nasal Sprays for Seasonal Allergic Rhinitis
http://medicalletter.org/TML-article-1725c

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Correction

In our recent article on the combination of vanzacaftor, tezacaftor, and deutivacaftor *(Alyftrek)* for cystic fibrosis (Med Lett Drugs Ther 2025; 67:41), Table 3 misstated the formulations and dosage of the combination of elexacaftor, tezacaftor, and ivacaftor *(Trikafta)*. A corrected version of the article appears online: http://medicalletter.org/TML-article-1724a

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Mark Abramowicz, M.D., President has disclosed no relevant financial relationships
Jean-Marie Pflomm, Pharm.D., Editor in Chief has disclosed no relevant financial relationships

In addition to the Principal Faculty above, the following have also contributed to this activity:
Amy Faucard, MLS, Associate Editor has disclosed no relevant financial relationships.

LEARNING OBJECTIVES FOR THIS ACTIVITY:

Activity participants will read and assimilate unbiased reviews of FDA-approved and off-label uses of drugs and other treatment modalities. Activity participants will be able to select and prescribe, or confirm the appropriateness of the prescribed usage of, the drugs and other therapeutic modalities discussed in *The Medical Letter* with specific attention to clinical trials, pathophysiology, dosage and administration, drug metabolism and interactions, and patient management. Activity participants will make independent and informed therapeutic choices in their practice.

Upon completion of this activity, the participant will be able to:

1. Explain the current approach to the management of allergic rhinitis and allergic conjunctivitis.
2. Discuss the pharmacologic options available for treatment of allergic rhinitis and allergic conjunctivitis and compare them based on their mechanisms of action, efficacy, and potential adverse effects.
3. Determine the most appropriate therapy given the clinical presentation of a particular patient with allergic rhinitis and/or allergic conjunctivitis.

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Issue 1725 Post-Activity Questions

(Correspond to questions #61-70 in Comprehensive Activity #92, available June 2025)

Treatment of Allergic Rhinitis and Allergic Conjunctivitis

1. Oral second-generation H_1-antihistamines are effective for treatment of:
   a. sneezing
   b. rhinorrhea
   c. ocular itching
   d. all of the above

2. Which of the following oral second-generation H_1-antihistamines is nonsedating at higher-than-recommended doses?
   a. cetirizine
   b. fexofenadine
   c. loratadine
   d. desloratadine

3. The most effective monotherapy for prevention and relief of the nasal symptoms of allergic rhinitis is:
   a. an oral antihistamine
   b. an intranasal corticosteroid
   c. oral montelukast
   d. intranasal cromolyn

4. For use in allergic rhinitis, intranasal cromolyn is:
   a. more effective than intranasal corticosteroids
   b. more effective than intranasal H_1-antihistamines
   c. particularly useful before episodic allergen exposure
   d. all of the above

5. Omalizumab:
   a. can reduce rescue medication use for allergic rhinitis
   b. is not currently FDA-approved for treatment of allergic rhinitis
   c. can rarely cause anaphylaxis
   d. all of the above

6. Which of the following are generally considered safe for treatment of allergic rhinitis in pregnant women?
   a. intranasal corticosteroids
   b. oral decongestants
   c. intranasal decongestants
   d. all of the above

7. Use of an oral second-generation H_1-antihistamine for treatment of allergic conjunctivitis can:
   a. increase the risk of ocular infection
   b. reduce tear volume and worsen dry eye syndrome
   c. increase intraocular pressure
   d. all of the above

8. Compared to oral second-generation H_1-antihistamines for treatment of allergic conjunctivitis, ophthalmic H_1-antihistamines are:
   a. less effective for treatment of ocular itching
   b. faster acting
   c. more effective in relieving erythema
   d. all of the above

9. Which of the following ophthalmic corticosteroids is associated with the lowest rate of intraocular pressure elevation?
   a. prednisolone
   b. dexamethasone
   c. loteprednol
   d. the rates are the same with all of the above

10. For treatment of allergic rhinitis, subcutaneous immunotherapy (SCIT) and sublingual immunotherapy (SLIT) appear to be:
    a. similarly effective
    b. at least as effective as an intranasal corticosteroid
    c. at least as effective as an oral antihistamine
    d. all of the above

ACPE UPN: Per Issue Exam: 0379-0000-25-725-H01-P; Release: March 20, 2025, Expire: March 19, 2026
Comprehensive Exam 92: 0379-0000-25-092-H01-P; Release: July 2025, Expire: July 2026

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