



| Generic/ TRADE | Pregnancy Category ¹⁹ | Side Effects (Common & Rare) | Contraindications CI Precautions | Systemic Bioavailability ² | Dose: For Perennial & seasonal allergic rhinitis USUAL & MAX | \$ per bottle  (~30-50cents/day) Scented vs Non | Comments  |
|---|-------------------------------------|--|--|--|--|--|--|
| Beclomethasone dipropionate <i>generic only</i> 50ug aqueous spray ⁱ (previously available as BECONASE AQ) | C | Common: Transient nasal irritation (burning/stinging ^{<10%}), epistaxis ^{<10%} , pharyngitis ^{<5%} , sneezing ^{<3%} in hyperactive nose, rhinitis ^{<3%} , & headache ^{<3%} , & taste/smell/voice changes. | Contraindications Hypersensitivity reaction to any component of the medication; in pts. With untreated fungal, bacterial, tuberculosis & viral infections Precautions: Excess Nasal Secretions: may ↓ effectiveness (blowing first +/- decongestants important) Steroid Withdrawal: can occur if pt. stops systemic steroid therapy too quickly, after starting INCS (pain, depression & adrenal suppression can occur; also can unmask existing asthma or eczema) ↓ Thyroid & Cirrhosis: ↑ corticosteroid effects Nasal Structure: so far, biopsies normal ³⁰ Growth retardation: Minimal effect, but a beclomethasone trial ^{1yr} found a small effect. ²⁰ Not seen in products that have low systemic bioavailability. | High: 44% 400ug/day did not affect HPA; however 800ug/day did ↓ urinary cortisol Growth retardation: small but sig. effect in 6-9yr olds over 1yr ²⁰ | 1-2 spray in EACH nostril BID ^{Max 3 spray EN BID} (Kids <6yr not rec.) Also indicated for: ↓ nasal polyps ^{if >5yr} | \$22 / 200 doses (metered pump & nasal applicator in amber glass bottle) ♦ Scented | i ♦ Storage: protect from light, discard after 3 months use; shake well ♦ effectiveness / safety established with >20yrs of experience |
| Budesonide RHINOCORT AQUA <i>generic</i> 64ug ⁱⁱ , 100ug aqueous suspension nasal spray RHINOCORT Turbuhaler (100ug dry powder ⁱⁱⁱ) | B | Rare: Ulceration of mucous membranes, Pharyngeal candidiasis, ↓ wound healing esp. in nasal area, & skin rash. | | Moderate: 31% (Turbuhaler 22% ²⁹) HPA: none ^{21,22,23,24; ?some effect 25} Growth retardation: none at 2yr ^{26, some in asthma 27,28} | 1-2 spray in EACH nostril OD ^{Max 1 spray EN BID} (Kids <6yr not rec.) Also indicated for: ↓ nasal polyps ^{if >5yr} | \$18 / 10ml / ~120 doses ^{64ug} \$23 / 10ml / ~165 doses ^{100ug} (1 spray EN OD → lowest price @ ~30¢/day) (metered dose, nasal adapter in amber glass bottle) \$34 Turbuhaler / 200 doses | ii (Rhinocort Aqua), iii (Turbuhaler) ♦ Turbuhaler has no additives, & less bioavailability vs spray ²⁹ ; may be favored if post nasal drip is bothersome ♦ effectiveness / safety established with >20yrs of experience ♦ DI: itraconazole ↑ Cushing's risk ³⁰ |
| Flunisolide RHINALAR, generic ~25ug (0.025%) nasal spray ^{iv} | C | | | High: 40-50% Growth retardation: none at 1yr ³¹ in asthma | 1-2 spray in EACH nostril BID ^{Max 3 spray EN BID} Kids 6-14yr ^{1spray EN TID} (Kids <6yr not rec.) | \$24 / 25ml / ~225 doses (metered pump & nasal applicator in a plastic bottle) | iv (Rhinalar) ♦ Contains polyethylene glycol which may keep nose moist |
| Fluticasone propionate FLONASE 50ug aqueous nasal spray ^v | C | Very rare: Nasal septal perforation, ? atrophic rhinitis, face/tongue edema & ↑ intraocular pressure. Systemic effects may be more of a concern if on other corticosteroids (e.g. for asthma) [†] | | Very Low: ~0.5% HPA: none ^{2, some effect 32} Growth retardation: none at 1yr ^{33, 34 (in asthma)} | 1-2 spray in EACH nostril OD ^{Max 2 spray EN BID} (Kids <4yr not rec.) Also: sinusitis ^{acute if ≥12yr} | \$35 / ~120 doses (metered pump & nasal applicator in amber glass bottle) ♦ Scented | v (Flonase) ♦ Storage: shake gently before use ♦ DI: ritonavir ↑ risk of Cushing's ³⁵ |
| Mometasone furoate monohydrate NASONEX ~50ug (0.05%) aqueous nasal spray ^{vi} | C | | | Very Low: ~0.5% HPA: no effect Growth retardation: none at 1yr ³⁶ | 1-2 spray in EACH nostril OD ^{Max 4 spray EN BID} (Kids <3yr not rec.) Also: sinusitis ^{acute if ≥12yr} | \$36 / ~140 sprays (metered pump & nasal applicator in a plastic bottle) ♦ Scented | vi (Nasonex) ♦ Storage: protect from light, shake before use |
| Triamcinolone acetonide NASACORT AQ ~55ug aqueous nasal spray ^{vii} | C | | | High: 46% HPA: no effect | 1-2 spray in EACH nostril OD (Kids <4yr not rec.) | \$33 ~120 sprays (metered pump & nasal applicator in a plastic bottle) | vii (Nasacort Aq) ♦ Storage: shake before use |
| Non Steroidal Nasal Anti-inflammatory: Cromoglycate sodium CROMOLYN | B | | 2% nasal solution OTC | Adults & ≥2yr : 1 spray TID-QID ^{14,15} –effective prophylaxis if before isolated allergy exposure ¹⁸ (eg. cats/cutting lawn); low potency but very safe (even for pregnancy & kids ≥2 yrs), but benefits for seasonal allergic rhinitis in ~1-2weeks. {Expert Opinion: Ophthalmic formulation often useful for eye symptoms whereas Intranasal formulation often <u>not</u> very helpful.} | | | |

=Exception Drug Status =non-form Sask. **BP**=blood pressure **EN**=each nostril **HPA**=hypothalamic pituitary adrenal axis **OTC**=Over the Counter **Pts**=patients **rec**=recommended **C**=Pregnancy: possible fetal risk (evident in animals)

Efficacy: potent & effective for **nasal** symptoms (blockage, rhinorrhoea, sneezing, itching) in mod-severe **allergic rhinitis**. Also for **nasal polyps** & **chronic sinusitis**. No evidence of one INCS more efficacious than another.¹³

Therapeutic Tips: ♦ **Ensure adequate dose & duration!** ♦ Optimal effects of INCS seen within ~3-14days (whereas decongestants work quickly) ♦ **Best given regularly & ~1week before allergen exposure**

♦ Seasons of heavy allergen challenge may necessitate **additional** therapy especially for eye symptoms ♦ Topical route: requires lower doses than with oral steroids & lowers side effect potential ♦ **BID dosing** of agents may ↑ efficacy (even if the same daily dose is used). ♦ With **chronic dosing** a dose reduction is often possible & desirable ♦ **Initial Priming:** a few actuations to create a uniform spray (re-prime if spray used infrequently).

Administration: Blow nose, then insert nozzle into the nostril; avoid placing nozzle tip in too far; compress the opposite nostril & actuate the spray while inspiring through the nose, with closed mouth.

Avoid blowing nose for ~15mins. **Medication is aimed away from the septum** towards the turbinates (outer part of the nose) to lessen nasal bleeding. Vaseline may be used to lubricate the anterior nasal septal area. {The **Contralateral Hand Nostril technique** has been recommended. It uses the alternate hand method – the **right hand to spray in the left nostril**; and vice versa.³⁷}

† Systemic Steroid Cautions: (unlikely with low → normal dose INCS): ↑ BP, diabetes, infections, thin skin, ↑ weight, cause cataracts & osteoporosis (treat: Calcium 1500mg/d, Vit. D 800iu/d, +/- bisphosphonates).

Drug Induced Rhinitis: α blockers (eg. prazosin), **ASA/NSAIDs** in susceptible individuals, cocaine abuse, eye drops, methyl dopa, & **topical decongestants** (rebound congestion with overuse).

Other Therapy: **Antihistamines:** for itching, sneezing & rhinorrhoea: combination with INCS may lack ↑ efficacy vs INCS alone ^{6,38} **Decongestants:** for congestion **Ophthalmics:** for eye symptoms **Atrovent nasal:** for rhinorrhoea

Not avail. in  **Azelastine ASTELIN** nasal & ocular antihistamine: 2 sprays each nostril BID (5-11yr: 1 spray each nostril BID ¹⁵) –has rapid onset, but sometimes leaves a bitter taste & rarely sedation; useful for patients with mucosal irritation/nose bleeds.

- ¹ Bousquet J, Van Cauwenberge P. Allergic Rhinitis and its Impact on Asthma (**ARIA**) In collaboration with the World Health Organization. Allergy 2002 Sept;57:841-855. <http://www.whiar.com> (access verified Dec 9/03)
- ² Salib RJ, Howarth PH. Safety and tolerability profiles of intranasal antihistamines and intranasal corticosteroids in the treatment of allergic rhinitis. **Drug Saf.** 2003;26(12):863-93.
- ³ Micromedex 2003
- ⁴ Yanez A, Rodrigo GJ. Intranasal corticosteroids versus topical H1 receptor antagonists for the treatment of allergic rhinitis: a systematic review with **meta-analysis**. Ann Allergy Asthma Immunol. 2002 Nov;89(5):479-84.
- ⁵ Trangsrud AJ, Whitaker AL, Small RE. Intranasal corticosteroids for allergic rhinitis. Pharmacotherapy. 2002 Nov;22(11):1458-67.
- ⁶ Nielsen LP, Mygind N, Dahl R. Intranasal corticosteroids for allergic rhinitis: superior relief? **Drugs.** 2001;61(11):1563-79.
- ⁷ Weiner JM, Abramson MJ, Puy RM. Intranasal corticosteroids versus oral H1 receptor antagonists in allergic rhinitis: systematic review of randomised controlled trials. **BMJ.** 1998 Dec 12;317(7173):1624-9.
- ⁸ Kaszuba SM, Baroody FM, deTineo M, et al. Superiority of an intranasal corticosteroid compared with an oral antihistamine in the **as-needed** treatment of seasonal allergic rhinitis. Arch Intern Med. 2001 Nov 26;161(21):2581-7.
- ⁹ Bachert C, El-Akkad T. Patient preferences and sensory comparisons of three intranasal corticosteroids for the treatment of allergic rhinitis. Ann Allergy Asthma Immunol. 2002 Sep;89(3):292-7.
- ¹⁰ Shah SR, Miller C, et al. Two multicenter, randomized, single-blind, single-dose, crossover studies of specific sensory attributes of budesonide aqueous & fluticasone nasal spray. Clin Ther. 2003 Aug;25(8):2198-214.
- ¹¹ Lumry W, Hampel F, et al. A comparison of od triamcinolone acet. aqueous & bid beclomethasone diprop. aqueous nasal sprays in the treatment of seasonal allergic rhinitis. Allergy Asthma Proc. 2003 May-Jun;24(3):203-10.
- ¹² Sheth KK. Patient preferences and sensory comparisons of three intranasal corticosteroids for the treatment of allergic rhinitis. Ann Allergy Asthma Immunol. 2003 May;90(5):576; author reply 577.
- ¹³ Waddell A.N.; Patel S.K.; Toma A.G.; Maw A.R. Intranasal steroid sprays in the treatment of rhinitis: is one better than another? Journal of Laryngology & Otology, 1 November 2003, vol. 117, no. 11, pp. 843-845(3)
- ¹⁴ Therapeutic Choices 4rd edition, Canadian Pharmaceutical Association 2003
- ¹⁵ **Treatment Guidelines:** Drugs for Allergic Disorders. The **Medical Letter:** November, 2003; pp. 93-100.
- ¹⁶ Compendium of Pharmaceuticals & Specialties –The Canadian Drug Reference for Health Professionals CPS 2003
- ¹⁷ Benninger MS, Ahmad N, Marple BF. The safety of intranasal steroids. Otolaryngol Head Neck Surg. 2003 Dec;129(6):739-750.
- ¹⁸ Lieberman P. Best Practice Report: Rhinitis. May 2001 (Update March 2002). Available at: http://merck.praxis.md/index.asp?page=bpm_brief&article_id=BPM01AL07 (access verified Dec 9/02).
- ¹⁹ Drugs in Pregnancy & Lactation 6th edition, 2002
- ²⁰ Skoner DP, Rachelefsky GS, Meltzer EO, et al. Detection of **growth** suppression in children during treatment with intranasal beclomethasone dipropionate. Pediatrics. 2000 Feb;105(2):E23.
- ²¹ Wilson AM, Sims EJ, McFarlane LC, Lipworth BJ. Effects of intranasal corticosteroids on adrenal, bone, and blood markers of systemic activity in allergic rhinitis. J Allergy Clin Immunol. 1998 Oct;102(4 Pt 1):598-604.
- ²² Pipkorn U, Pukander J, Suonpaa J, Makinen J, Lindqvist N. Long-term safety of budesonide nasal aerosol: a 5.5-year follow-up study. Clin Allergy. 1988 May;18(3):253-9.
- ²³ Lindqvist N, Balle VH, Karma P, Karja J, Lindstrom D, Makinen J, Pukander J, et al. Long-term safety and efficacy of budesonide nasal aerosol in perennial rhinitis. A 12-month multicentre study. Allergy. 1986 Apr;41(3):179-86.
- ²⁴ Bacharier LB, Raissy HH, Wilson L, et al. Long-term (3 yr) effect of **budesonide** on hypothalamic-pituitary-adrenal axis function in children with mild to moderate asthma. Pediatrics. 2004 Jun;113(6):1693-9.
- ²⁵ Wihl JA, Andersson KE, Johansson SA. Systemic effects of two nasally administered glucocorticosteroids. Allergy. 1997 Jun;52(6):620-6.
- ²⁶ Moller C, Ahlstrom H, Henricson KA, et al. Safety of nasal budesonide in the long-term (1-2 year **-growth**) treatment of children with perennial rhinitis. Clin Exp Allergy. 2003 Jun;33(6):816-22.
- ²⁷ Long-term effects of budesonide or nedocromil in children with asthma. The Childhood Asthma Management Program Research Group. N Engl J Med. 2000 Oct 12;343(15):1054-63.
- ²⁸ Agertoft L, Pedersen S. Effect of long-term treatment with inhaled budesonide on adult height in children with asthma. N Engl J Med. 2000 Oct 12;343(15):1064-9.
- ²⁹ Thorsson L, Borga O, et al. Systemic availability of budesonide after nasal administration of three different formulations: pressurized aerosol, aqueous pump spray, and powder. Br J Clin Pharmacol. 1999 Jun;47(6):619-24.
- ³⁰ Bolland MJ, Bagg W, Thomas MG, Lucas JA, Ticehurst R, Black PN. Cushing's syndrome due to interaction between inhaled corticosteroids and itraconazole. Ann Pharmacother. 2004 Jan;38(1):46-9.
- ³¹ Gillman SA, Anolik R, Schenkel E, Newman K. One-year trial on safety and normal linear growth with flunisolide HFA in children with asthma. Clin Pediatr (Phila). 2002 Jun;41(5):333-40.
- ³² Wilson AM, et al. Effects of repeated once daily dosing of three intranasal corticosteroids on basal & dynamic measures of hypothalamic-pituitary-adrenal-axis activity. J Allergy Clin Immunol. 1998 Apr;101(4 Pt 1):470-4.
- ³³ Allen DB, Meltzer EO, et al. No growth suppression in children treated with the maximum recommended dose of fluticasone propionate aqueous nasal spray for one year. Allergy Asthma Proc. 2002 Nov-Dec;23(6):407-13.
- ³⁴ Allen DB, Bronsky EA, LaForce CF, et al. Growth in asthmatic children treated with fluticasone propionate. Fluticasone Propionate Asthma Study Group. J Pediatr. 1998 Mar;132(3 Pt 1):472-7.
- ³⁵ Health Canada Endorsed Important Safety Information on FLUTICASONE PROPIONATE (FLONASE/ FLOVENT/ ADVAIR) and RITONAVIR (NORVIR/KALETRA) Jan 22, 2004
- ³⁶ Schenkel EJ, Skoner DP, Bronsky EA, et al. Absence of **growth** retardation in children with perennial allergic rhinitis after one year of treatment with mometasone furoate aqueous nasal spray. Pediatrics. 2000 Feb;105(2):E22.
- ³⁷ Nsouli Talal M. Nasal Steroids: Contralateral Hand-Nostril Technique Curbs Epistaxis American College of Allergy, Asthma, and Immunology meeting Nov 2003. <http://www.medscape.com/viewarticle/464241>
- ³⁸ Howarth PH. A comparison of the anti-inflammatory properties of intranasal corticosteroids and antihistamines in allergic rhinitis. Allergy. 2000;55 Suppl 62:6-11.