Excipients to consider in development of intranasal pediatric products

Useful lists of excipients compiled from multiple sources

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Introduction

Intranasal products present a convenient, user-friendly way of administering medications. Pharmacologically, intranasal delivery offers rapid onset of action, access to the highly vascularized mucosa, avoidance of the first-pass hepatic metabolism, potential for direct uptake into the central nervous system through the olfactory bulb bypassing the blood-brain barrier and other advantages [1-6]. These benefits apply to all populations but are especially attractive for pediatric subjects who may not be as patient or skilled as adults when faced with other dosage forms, such as drugs administered by swallowing or injection.

As intranasal drugs are gaining in popularity [7], this sector of industry is growing. The global market for intranasal products is predicted to almost double in the next six years [8], fueled in large part by the pediatric indications [9].

Several classes of intranasal products have been studied and approved for pediatric populations, including corticosteroids [10], antihistamines, decongestants, anticholinergics [11] and anxiolytics [12]. More types are in development, such as a recently announced nasal spray to treat acute pain in pediatric patients brought to emergency departments [13].

Alongside active pharmaceutical ingredients (APIs), excipients (also called "inactive ingredients") play a critical role in formulation performance [14]. Excipients serve not only as vehicles or carriers for the active drug, but also as solubility or permeation enhancers, pH buffers, preservatives, surfactants, viscosity modulators, surface tension modifiers, tonicity agents, taste maskers, etc. [15]. As such, excipients may help improve drug adsorption and retention in the nasal cavity, increase bioavailability, prolong shelf life, ensure efficacy, reduce risk of side effects and facilitate patient adherence.

Excipients are generally chosen based on their physico-chemical properties, functionality, compatibility with the formulation and device, dose, taste, fragrance (or lack thereof), color and/or ease of administration. When formulating a new product, one of the important pragmatic considerations is the availability of a "safety record" for a given excipient, e.g., its use in a previously approved product for the same route of administration and target population, or at least its use in a somewhat similar approved product. Usually, the less that is known about an excipient, the riskier and costlier the development program for the product sponsor.

From the regulatory perspective, marketing approval (in the US) or marketing authorization (in Europe) is granted to a complete product rather than to individual ingredients. Therefore, excipients are not, strictly speaking, "approved" by themselves. Nevertheless, choosing excipients that appear in previously approved products might make it easier for new product formulators to justify their use. The closer a new product is to a previously approved product,

Table 1

Excipients listed in the FDA Inactive Ingredient Database (IID) used in approved nasal drug products for adults and pediatrics, along with their stated potency and maximum daily exposure (MDE), where available (Source: FDA Inactive Ingredients Database, March 2024; https://www.accessdata.fda.gov/scripts/cder/iig/index.cfm)

Inactive Ingredient Name	Excipient Potency or Amount	Maximum Daily Exposure
Acetic Acid	1.2 mg/1 ml	
Alcohol	198.8 mg/1 ml	
Anhydrous Citric Acid	26.03 mg/1 ml	
Anhydrous Dextrose		200 mg
Anhydrous Trisodium Citrate		8 mg
Benzalkonium Chloride	40.46 mg/100 ml	
Benzyl Alcohol		5 mg
Butylated Hydroxyanisole	20 mg/100 ml	
Butylated Hydroxytoluene	0.1 mg/1 ml	
Caffeine	10 mg/1 ml	
Camphor (Synthetic)	65 mg	
Carrageenan		
Castor Oil		429 mg
Cellulose Microcrystalline/ Carboxymethylcellulose Sodium		60 mg
Chlorobutanol	500 mg	
Citric Acid Monohydrate		9 mg
Cottonseed Oil	1.33 mg/0.1 ml	
Dextrose	50 mg	
Dichlorodifluoromethane		
Edetate Disodium	100 mg/100 ml	
Eucalyptol	68.5 mg	
Gelatin	50 mg/1 ml	
Glycerin	22.3 mg/1 ml	
Hydrochloric Acid	247 mg/100 ml	
Hydroxyethyl Cellulose (2000 Mpa.S at 1%)	0.1 mg/0.2 ml	
Hypromellose		1 mg
Hypromellose 2910 (4000 Mpa.S)		1 mg
Hypromellose 2910 (5 Mpa.S)	1 mg/1 ml	
Ink Black Sw-9008		
Lanolin		
Lavender Oil		
Mannitol	41.5 mg	
Menthol	40.32 mg	
Methylcellulose		
Methylparaben	250 mg	
Monobasic Potassium Phosphate	680 mg	
N,N-Dimethylacetamide	0.01 ml	
N-Dodecyl.Beta.-D-Maltoside		1 mg
Norflurane		217 mg
Pectin	10 mg	
Phenylethyl Alcohol		10 mg
Phenylmercuric Acetate	20 mg	
Polyethylene Glycol 3350	40,000 mg/100 ml	
Polyethylene Glycol 400	200 mg/1 ml	

Inactive Ingredient Name	Excipient Potency or Amount	Maximum Daily Exposure
Polysorbate 20	25 mg/1 ml	
Polysorbate 80	0.01 mg	
Potassium Chloride		
Potassium Sorbate	1.2 mg/1 ml	
Propylene Glycol	12,000 mg/100 ml	
Propylparaben	140 mg	
Saccharin Sodium Anhydrous	0.5 mg/1 ml	
Silicon Dioxide		20 mg
Sodium Chloride	330 mg	
Sodium Hydroxide	20 mg	
Sodium Phosphate	1.89 mg/1 ml	
Sodium Phosphate, Dibasic	3 mg/1 ml	
Sodium Phosphate, Dibasic, Anhydrous		7 mg
Sodium Phosphate, Dibasic, Dihydrate		12 mg
Sodium Phosphate, Dibasic, Dodecahydrate		7 mg
Sodium Phosphate, Dibasic, Heptahydrate		5 mg
Sorbitan Monolaurate		1 mg
Sorbitol		49 mg
Sorbitol Solution		70 mg
Sucralose		2 mg
Sulfuric Acid		8 mg
Thimerosal	0.01 mg/1 ml	
Trisodium Citrate Dihydrate		9 mg
Trolamine		

the fewer additional studies might be needed to demonstrate safety and efficacy of the new product (including excipients). For example, when formulating a nasal pediatric product, an excipient that had previously been approved only in a parenteral or oral product would likely have to undergo a more thorough qualification study than an excipient previously used in an approved nasal product for adults. The hardest excipients to qualify are those that have never been used in any pharmaceutical product.

Additional studies would still be required for a new nasal pediatric product, even when the nasal formulation uses the same excipients as in an adult nasal product. Excipients in products for pediatric populations require additional scrutiny for a number of reasons [16]. In contrast to adults, children's organs and tissues are less mature and at the same time more metabolically active. As a result, the still-developing nasal mucosa may exhibit higher permeability and hypersensitivity [17], potentially leading to unwanted systemic absorption and consequent side effects [18] or adverse allergic reactions. The skin near the nostrils might be more delicate, which may translate to an increased risk of skin irritation or reduced local tolerability. A bitter after-taste that might be only mildly unpleasant for adults could be unacceptable in children, requiring the addition of sweeteners to the formulation.

To obtain approval in pediatric populations, the sponsor must conduct clinical studies in the intended patient population, in this case in children of the target age. The age of patients for whom the product has been demonstrated to be safe and effective will then be stated on the product's label, along with any age-specific instructions for use.

For economic reasons, companies often seek approval in adult populations first and conduct additional studies in pediatric patients sometime later. For some products, pediatric studies are never conducted, so not all nasal products for adults have corresponding pediatric products.

In practice, all these factors restrict the list of excipients that a pediatric product developer may want to consider utilizing.

This article assembles available information on excipients in intranasal drug products, particularly for pediatric age groups compared to adults. This review of the current landscape underscores the need for more detailed and pediatric-specific data because existing resources, such as the United States Food and Drug Administration (FDA) Inactive Ingredient Database (IID) [19], primarily cover adult formulations. As was highlighted in a 2024 FDA presentation [20], IID "*does not currently provide information regarding the different exposure models, including safety*

in pediatric populations." Similarly, recent review articles about excipients for specialized delivery routes, such as pulmonary products [21] and ophthalmic products [22], as well as a workshop organized by the FDA-funded Center for Research on Complex Generics that discussed excipients in "injectable, insertable and ophthalmic products" [23], are focusing on products for adults. Conversely, a comprehensive two-part review of excipients in pediatric products [24, 25] does not discuss the nasal route of administration, and a 2024 FDA presentation [26] about excipients in pediatric products did not include nasal products.

This review provides a collation of the publicly available information on excipients used in approved pediatric nasal products.

Approach and findings

The FDA Inactive Ingredient Database is a common resource for information about the maximum daily dose of excipients in FDA-approved drug products. These maximum levels do not necessarily represent the maximum tolerated levels but reflect the levels supported by safety data for approved drug products. The levels listed in the IID are typically qualified for adult use, with relatively few pediatric product entries. Adult-product limits in the IID cannot be assumed to be safe for pediatrics applications. The IID helpfully specifies the route of administration. In Table 1, we have assembled IID information on *inactive ingredients* found in approved nasal drug products, as of March 2024. Each excipient may have multiple entries in the IID and full details about the approved drug products are not listed in the IID. Product developers may therefore need to conduct additional research to verify the maximum daily exposure and the patient population exposed to a particular excipient.

In this review, we also included some newer excipients from recently approved pediatric products, which are not yet listed in the IID, such as betadex (or beta-cyclodextrin) and dodecylphosphocholine used in some nasal powders [27] delivered by an active nasal powder delivery device [28, 29].

Outside the US, additional excipients may be used in nasal pediatric products [16]. For example, "pediatric xylometazoline nasal spray formulation," used in some countries, contains sodium colatum (105 mg/10 mL) among other excipients.

When available, the FDA IID provides some indication of the amount of excipient in a formulation, as well as the maximum daily exposure based on the maximum daily dose. However, this information is not available for all entries, so further investigation into product labels referencing these excipients is required to establish the approved maximum daily exposure for the specified dose. Labels also typically indicate if any studies have been conducted to establish the product's safety and effectiveness in pediatric populations.

Since most entries in the FDA IID are deemed safe for adults, we have conducted a separate review of product labels for approved nasal pediatric products, as well as those approved for both pediatric and adult use, via the FDA Approved Drugs database "Drugs @ FDA" [30]. Several older approved drugs have been discontinued (marked "DCTN"); however, a pertinent Federal Register [31] notice, if available, would indicate whether the discontinuation was due to safety or efficacy reasons, and could be searched for additional insights. If a product was not removed for safety or efficacy reasons, the drug product label remains relevant for determining the excipient dose levels that could be safely used. Some discontinued products have no available information and are therefore not included in this summary.

The *active* ingredients associated with nasal drug products approved for pediatric use are listed in Table 2. Several of these active ingredients are present in multiple approved nasal drug products, each with different excipients. The list also includes over-the-counter (OTC) products. In some product labels, the excipient quantities have been defined, although most do not specify the quantities of excipients used.

Finally, Table 3 provides a summary of excipients with stated potency based on the nasal product labels with pediatric indications listed in Table 2. This list is rather short compared to the number of excipients being used in non-nasal pediatric products, underscoring the need for further research and information sharing.

Conclusions

In summary, excipients are crucial to the performance of intranasal drug products for both adult and pediatric patients, influencing factors such as bioavailability, tolerability, stability and performance. The FDA IID provides valuable information on excipient amounts and maximum daily exposures, although most data are geared toward adult formulations. This article provides a summary of excipient information as a resource for nasal pediatric product developers. As this review shows, the list of excipients with specified potencies in pediatric nasal products is rather short, which underscores the necessity for additional research and thorough review of product labels and safety studies to fill existing data gaps. Ensuring the safety and efficacy of excipients in pediatric formulations requires continued data collection and research efforts to address these challenges effectively.

Table 2

Active and inactive ingredients in intranasal drug products indicated for pediatric age groups in the US (based on product labels)

Active Ingredient(s)	Strength/ Dosage Form	Pediatric Age (Years)	RLD's NDA Number*	Inactive Ingredients [32]
Azelastine Hydrochloride[a]	0.137 mg/spray; Metered	≥ 5	020114[a]	Benzalkonium chloride 125 ug/spray [33]
Azelastine Hydrochloride[b]	0.1% and 0.15% spray; Metered	≥ 6	022371[b]	In 0.1% spray: benzalkonium chloride (125 mcg/mL), edetate disodium, hypromellose, citric acid, dibasic sodium phosphate, sodium chloride, purified water [34] In 0.15% spray: benzalkonium chloride (125 mcg/mL), edetate disodium, hypromellose, purified water, sodium citrate, sorbitol solution and sucralose. Hydrochloric acid or sodium hydroxide may be added for adjustment of pH (pH 6.4) [35]
Azelastine Hydrochloride; Fluticasone Propionate	0.137 mg/spray; 0.05 mg/spray; Metered	≥ 6	202236	Glycerin, microcrystalline cellulose, carboxymethylcellulose sodium, phenylethyl alcohol (2.5 mg/g), edetate disodium, benzalkonium chloride (0.1 mg/g), polysorbate 80 and purified water, pH 6. [36]
Azelastine Hydrochloride Over the Counter (OTC)	0.2055 mg/ spray; Metered	≥ 6	213872-OTC	Benzalkonium chloride, edetate disodium, hypromellose, purified water, sodium citrate, sorbitol, sucralose [37]
Beclomethasone Dipropionate	0.040 mg/spray; Aerosol, Metered	≥ 4	202813	Norflurane (HFA-134a), alcohol (ethanol) [38]
Beclomethasone Dipropionate Monohydrate[c]	0.100 mg/spray; Metered	≥ 6	019389[c]	Microcrystalline cellulose, carboxymethylcellulose sodium, dextrose, benzalkonium chloride, polysorbate 80, phenethyl alcohol [39]
Budesonide	0.032 mg/spray and 0.064 mg/ spray; Metered	≥ 6	020746	Carboxylmethyl cellulose sodium, dextrose anhydrous, disodium edetate, hydrochloric acid (for pH adjustment), microcrystalline cellulose, polysorbate 80, potassium sorbate, purified water [40]
Ciclesonide (Zetonna®)	0.037 mg/spray; Aerosol, Metered,	≥ 12	202129	Norflurane (1,1,1,2-Tetrafluoroethane) and ethanol [41]
Ciclesonide (Omnaris®)	0.100 mg/spray;	≥ 6 (seasonal), ≥ 12 (perennial) allergic rhinitis	022004 022124	Microcrystalline cellulose, carboxymethylcellulose sodium, hypromellose, potassium sorbate, edetate sodium adjusted to a target pH of 4.5 with hydrochloric acid, water [42]
Cromolyn Sodium[a]	5.2 mg/spray	≥ 2	020363[a]	Benzalkonium chloride, edetate disodium, purified water [43]
Cyanocobalamin[c]	0.5 mg/dose; Gel; Metered	No age range specifiedd	019722[c]	Benzalkonium chloride in purified water, citric acid, glycerin and sodium citrate. The spray solution has a pH between 4.5 and 5.5 [44]
Desmopressin Acetate[a]	0.1 mg/mL; Metered	≥ 4	017922[a]	Per mL: Chlorobutanol 5 mg, Sodium chloride 9 mg, Hydrochloric acid to adjust pH to approximately 4 (marketed 1978-2021, for children older than 3 months) [45] Per mL: Sodium chloride 7.5 mg; Citric acid monohydrate 1.7 mg; Disodium phosphate dihydrate 3 mg; Benzalkonium chloride solution (50%) 0.2 mg [46, 47]

Active Ingredient(s)	Strength/ Dosage Form	Pediatric Age (Years)	RLD's NDA Number*	Inactive Ingredients [32]
Desmopressin Acetate[c]	1.5mg/mL	11 months -12 years	020355[c]	Sodium chloride 7.5 mg,Citric acid monohydrate 1.7 mg, Disodium phosphate dihydrate 3 mg, Benzalkonium chloride 0.1 mg, Purified water to 1 mL [48]
Diazepam	5 mg/spray, 7.5 mg/spray, 10 mg/spray	≥ 6	211635	Benzyl alcohol (10.5 mg per 0.1 mL), dehydrated alcohol, n-dodecyl beta-D-maltoside and vitamin E [49]
Epinephrine	1 mg/0.1mL spray; 2 ml/0.1mL spray	≥ 4 who weigh 15 kg or more	214697	Benzalkonium chloride, disodium edetate, n-dodecyl beta-D-maltoside, sodium chloride, sodium metabisulfite, and hydrochloric acid or sodium hydroxide to adjust pH, in water for injection. The pH range is approximately 3 to 5.5. [50]
Fluticasone Furoate	0.0275 mg/ spray; Metered	≥ 2	022051	Benzalkonium chloride solution, carboxymethylcellulose sodium, dextrose anhydrous, edetate disodium, microcrystalline cellulose, polysorbate 80, purified water [51]
Fluticasone Propionate	0.050 mg/spray; Metered	≥ 4	020121[a] 205438-OTC	Benzalkonium chloride, dextrose, microcrystalline cellulose, phenylethylalcohol, polysorbate 80, purified water, sodium carboxymethylcellulose [52]
Glucagon	3 mg/spray; Powder	≥ 4	210134	Betadex and dodecylphosphocholine [53]
Ipratropium Bromide	0.021, 0.042 mg/ spray; Metered	≥ 6	020393[a] 020394[a]	Benzalkonium chloride, edetate disodium, sodium chloride, sodium hydroxide, hydrochloric acid, water [54]
Midazolam	5 mg/spray	≥ 12	211321	Ethanol, PEG-6 methyl ether, polyethylene glycol 400, propylene glycol and purified water [55]
Mometasone Furoate	0.05 mg/spray; Metered	≥ 2	020762[a] 215712-OTC	Glycerin, microcrystalline cellulose and carboxymethycellulose sodium, sodium citrate, citric acid, benzalkonium chloride, and polysorbate 80. [56] Benzalkonium chloride, citric acid, glycerin, microcrystalline cellulose and carboxymethylcellulose sodium, polysorbate 80, purified water, and sodium citrate (for ANDA based on this RLD). [57]
Muprirocin Calcium[c]	Eq 2% base; Intranasal Ointment	≥ 12	050703[c]	Paraffin and a mixture of glycerin esters (Softisan® 649) [58]
Nafarelin Acetate	Eq 0.2 mg base/ spray; Metered	≥ 8	019886	Benzalkonium chloride, glacial acetic acid, sodium hydroxide or hydrochloric acid (to adjust pH), sorbitol and purified water [59]
Nalmefene Hydrochloride	Eq 2.7 mg base/spray;	≥ 12	217470	Benzalkonium chloride, disodium ethylenediaminetetraacetate, dodecylmaltoside, sodium chloride and purified water. The pH range is 4.1 to 4.9 [60]
Naloxone Hydrochloride	10 mg/spray; Metered	Pediatric	215487	Glycerin, trisodium citrate dihydrate, hydrochloric acid and sodium hydroxide to adjust pH and purified water. The pH range is 3.9 to 4.5. [61]
Naloxone Hydrochloride	8 mg/spray; Metered	Pediatric	212045	Dehydrated alcohol (20% (w/w)), edetate disodium dihydrate, propylene glycol, purified water and sodium hydroxide and hydrochloric acid to adjust pH. The pH range is 4.0 to 5.5. [62]
Naloxone Hydrochloride	4 mg/spray, 2 mg/spray[a]; Metered	Pediatric	208411-OTC	Benzalkonium chloride, edetate disodium, hydrochloric acid, sodium chloride, water [63]
Naloxone Hydrochloride	3 mg/spray; Metered	Pediatric	217722-OTC	Hydrochloric acid, purified water, sodium chloride, sodium hydroxide, trisodium citrate dihydrate [64]

Active Ingredient(s)	Strength/ Dosage Form	Pediatric Age (Years)	RLD's NDA Number*	Inactive Ingredients [32]
Olopatadine HCl	0.665 mg/spray; Metered	6-11	021861[c]	Anhydrous dibasic sodium phosphate, benzalkonium chloride (0.01%), edetate disodium dihydrate, sodium chloride, hydrochloric acid and/or sodium hydroxide and purified water. [65]
Olopatidine HCl and Mometasone Furoate	0.665 mg/spray; 0.05 mg/spray; Metered	≥ 12	211746	Benzalkonium chloride, carboxymethyl cellulose sodium, dibasic sodium phosphate heptahydrate, edetate disodium, hydrochloric acid, microcrystalline cellulose, polysorbate 80, sodium chloride, sodium hydroxide and water. [66]
Oxymetazoline HCl; Tetracaine HCl	0.1 mg/spray; 0.6 mg/spray; Metered	Children weighing 40 kg or more	208032	Benzyl alcohol, sodium hydroxide, hydroxyethyl cellulose (2000 mpa.s at 1%), sodium citrate, hydrochloric acid, anhydrous citric acid, water. [67]
Triamcinolone acetonide	0.55 mg/spray; Nasal Spray	≥ 2	020468	Benzalkonium chloride, carboxymethylcellulose sodium, dextrose, edetate disodium, hydrochloric acid or sodium hydroxide (for pH adjustment), microcrystalline cellulose, polysorbate 80, purified water [68]

[a] Discontinued but not for safety or efficacy reasons, per the Federal Register determination

[b] NDA 022203 discontinued 0.137 mg/spray and 0.2055 mg/spray; Label available in FDA Approved Drugs Database [30]

[c] Discontinued but without Federal Register determination

[d] Pediatric dose based on recommendation by the Food and Nutrition Board, National Academy of Science and National Research Council

*RLD's NDA Number = Reference listed drug's new drug application number

Table 3

Potency and maximum daily exposure (MDE) of excipients found in pediatric labels (where information is available)

Ingredient Name	Potency of Excipient	Units	Calculated maximum daily exposure for 4 years and older	Units	NDA Referenced
Benzalkonium chloride	0.125	mg/mL			20114, 22371
Benzalkonium chloride	0.1	mg/g			202236
Benzalkonium chloride	0.02	% w/w	0.06	mg	20121, 205355
Benzalkonium chloride (50% solution)	0.2	mg/mL			17922, 020355
Benzyl alcohol	105	mg/mL			211635
Citric acid monohydrate	1.7	mg/mL	0.51	mg	17922, 020355
Disodium phosphate monohydrate	3	mg/mL	0.9	mg	17922, 020355
Phenylethyl alcohol	0.0025	mg/g			202236
Phenylethyl alcohol	0.25	% v/w			19389, 20121, 205438
Sodium chloride	7.5	mg/mL	2.25	mg	17922 ,020355

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36. Drug Label Information at DailyMed - DYMISTA- azelastine hydrochloride and fluticasone propionate spray, metered (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=4c557ec4-c4cf-11df-851a-0800200c9a66&version=20#:~:text=age%20and%20older.-,DYMISTA%20is%20indicated%20for%20the%20relief%20of%20symptoms%20of%20seasonal,in%20each%20nostril%20twice%20daily)

37. Drug Label Information at DailyMed - ASTEPRO ALLERGY- azelastine hcl spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=e0640846-19a6-7f79-e053-2995a90a8176)

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41. Drug Label Information at DailyMed - ZETONNA- ciclesonide aerosol, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f0316d1b-9ba8-4ef3-9802-4cfed5d91d55)

42. Drug Label Information at DailyMed - OMNARIS- ciclesonide spray (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=15fefd46-ac7e-40d0-b635-e6c3d653c666)

43. Drug Label Information at DailyMed - NASALCROM- cromolyn sodium spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b34d36ca-4df4-458c-af0f-c0d0c9a025d9)

44. Drug Label Information at DailyMed - NASCOBAL- cyanocobalamin spray (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=697e0e52-c01b-4b53-9994-f79c46eb6b4f)

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49. Drug Label Information at DailyMed - VALTOCO- diazepam spray (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=1a8bcc90-68fa-474d-832c-0df01e825f39)

50. Drug Label Information at DailyMed - NEFFY- epinephrine spray (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=a1758142-a905-401d-8961-05829f51023a)

51. Drug Label Information at DailyMed - FLONASE SENSIMIST ALLERGY RELIEF- fluticasone furoate spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a008dc12-c21b-456e-9824-fcc5ce64d4ba)

52. Drug Label Information at DailyMed - CHILDRENS FLONASE ALLERGY RELIEF- fluticasone propionate spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=3adff80f-fca7-4cc5-b106-0f68f71c85b0)

53. Drug Label Information at DailyMed - BAQSIMI- glucagon powder (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=3fdb4e92-2e19-487d-9f14-99871e9fd15a)

54. Drug Label Information at DailyMed - ATROVENT- ipratropium bromide spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=fa419d1b-092a-429f-850d-ad49c55b632f)

55. Drug Label Information at DailyMed - NAYZILAM- midazolam spray (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=2b29422e-54d5-4a49-8522-e9cf752368c3)

56. Drug Label Information at DailyMed - NASONEX- mometasone furoate spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a06f66a9-ca36-48c6-a00d-4f614b539cdf)

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58. Drug Label Information at DailyMed - BACTROBAN- mupirocin calcium ointment (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b5777cde-7cd5-4fc8-a5a1-0ef4ddf6b5b1)

59. Drug Label Information at DailyMed - SYNAREL- nafarelin acetate spray, metered (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=d0aa57cb-d2f4-46d7-af43-7c8b06aa81a6)

60. Drug Label Information at DailyMed - OPVEE- nalmefenehydrochloridespray (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=999a4269-9e54-4801-b2ac-2a7276f0b94f)

61. Drug Label Information at DailyMed - REZENOPY- naloxonehydrochloridespray (https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=3c3e1795-eea4-4b88-bcca-88658194a0b3&version=1)

62. Drug Label Information at DailyMed - KLOXXADO- naloxone hcl spray (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ebf0f833-c1c0-487c-8f29-01fa8c61b6cb)

63. Drug Label Information at DailyMed - NARCAN- naloxone hydrochloride nasal spray (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a0ebc83d-2892-40de-bc0a-775ce90b30db)

64. Drug Label Information at DailyMed - RIVIVE- naloxone hydrochloride spray (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=1c4f1b9d-1c70-4666-a90e-2f5d2c670d4d)

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66. Drug Label Information at DailyMed - RYALTRIS- olopatadine hydrochloride and mometasone furoate spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=382eac74-a7ce-4f42-ac0a-b253308f335f)

67. Drug Label Information at DailyMed - KOVANAZE- tetracaine hydrochloride and oxymetazoline hydrochloride spray (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=d2af5404-3cfe-445d-8328-19e667ecdc43)

68. Drug Label Information at DailyMed - NASACORT- triamcinolone acetonide spray, metered (https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=37f290c9-576d-463f-b7d4-a146f53855b0)

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