

Table 1. Classification of Nonallergic Rhinitis Based on Frequency of Occurrence

Common	Infrequent
Vasomotor (perennial nonallergic rhinitis)	Hypothyroidism
Chronic sinusitis	Atrophic
Structural (septum, turbinates, valve)	Systemic immunologic disorders
NARES*/BENARS†	Cerebral spinal fluid rhinorrhea
Drug induced	Other structural disorders
Nasal polyps	Foreign body
Physical/chemical/irritant	Ciliary dyskinesia
Aspirin sensitivity	Nasal mastocytosis

* NARES-nonallergic rhinitis with eosinophilia syndrome.

† BENARS - blood eosinophilia nonallergic rhinitis syndrome.

Table 2. Classification of Nonallergic Rhinitis Based on Immunologic and Nasal Cytologic Features

Perennial Nonallergic Rhinitis (Inflammatory)	Non-inflammatory, Nonallergic Rhinitis	Structurally-related Rhinitis
Eosinophilic nasal disease (NARES*, BENARS**)	Rhinitis medicamentosa	Septal deviation, turbinate deformation, nasal valve dysfunction
Basophilic/metachromatic nasal disease	Reflex-induced rhinitis (bright light or other physical modalities)	Neoplastic and non-neoplastic tumors
Infectious	Vasomotor rhinitis	Miscellaneous (choanal atresia/stenosis, trauma, foreign body, malformation, cleft palate, adenoid hypertrophy)
	Irritant rhinitis	
	Cold air rhinitis	
	Gustatory rhinitis	
Nasal polyps	Rhinitis sicca	
Atropic rhinitis	Metabolic (restrogen-related or hyperthyroid)	
Immunologic nasal disease (non-IgE mediated or secondary to systemic immunologic disorders)		

* NARES - nonallergic rhinitis with eosinophilia syndrome.

** BENARS - blood eosinophilia nonallergic rhinitis syndrome.

Table 3. Classification of Chronic Nonallergic Rhinitis Based on Etiology or Systemic Disease Association

Syndromes of Unknown Etiology

- Vasomotor rhinitis
- Nonallergic rhinitis with eosinophils (NARES*, BENARS†)
- Basophilic/metachromatic nasal disease

Syndromes of Suggested Etiology

Chronic Sinusitis

- Immunodeficiencies
- Ostiomeatal obstruction

Metabolic Conditions

- Estrogen related (oral contraceptive/hormone replacement therapy, pregnancy)
- Hypothyroidism
- Acromegaly

Vasculitides/Autoimmune & Granulomatous Diseases

- Sjögren's syndrome
- Systemic lupus erythematosus
- Relapsing polychondritis
- Churg-Strauss syndrome
- Sarcoidosis
- Wegener granulomatosis

Drug-Induced

- Topical decongestants
- Systemic medications

Rhinitis with Nasal Polyps

- Aspirin intolerance
- Chronic sinusitis
- Churg-Strauss syndrome
- Young's syndrome (sinopulmonary disease, azoospermia, nasal polyps)
- Cystic Fibrosis
- Kartagener syndrome (bronchiectasis, chronic sinusitis, nasal polyps)

Structurally Related Rhinitis

Septal deviation

Turbinate deformation

Nasal valve dysfunction

Obstructive adenoid hyperplasia

Trauma (e.g., cerebrospinal fluid rhinorrhea)

Congenital

Neoplastic

Atrophic Rhinitis

Resulting from surgery

Ozena

Physical/Chemical/Irritant-Induced

Dry air

Gustatory

Bright light

Air pollution

Occupational

Occupational Rhinitis

Annoyance

Irritant

Immunologic

Corrosive

* NARES-nonallergic rhinitis with eosinophilia syndrome.

† BENARS - blood eosinophilia nonallergic rhinitis syndrome.

Table 4. Frequency of Occurrence: Allergic vs Nonallergic Rhinitis

Investigator (year)	N	Rhinitis Type		
		Allergic	Mixed	Nonallergic
Mullarkey '80	142	48%	Not studied	52%
Enberg '89	152 (128)*	54%	16%† Undetermined	30%
Togias '90	362	83%	Not studied	17%
ECRHS '99‡	1,412	75%	Not studied	25%

* Diagnosis determined in only 128.

† "Mixed" counted by allergic for total analysis except Enberg's "undetermined group."

‡ European Community Respiratory Health Survey.

Table 5. National Rhinitis Classification Task Force Survey of Nonallergic Rhinitis 1999
(N = 975)

	Pure Allergic	Pure Nonallergic	Mixed
% of samples	43	23	34
Female (%)	53	71	62
Mean age (years)	40	43	39
Caucasian (%)	95	98	96

Table 6. National Rhinitis Classification
Task Force Survey of Nonallergic Rhinitis
1999 (N = 975)

Type of Rhinitis		
Pure Allergic	Mixed	Pure Nonallergic
43%	34%	23%
	57%	

Table 7. Relative Contribution of Individual Symptoms to Overall Response

Ratio of Azelastine Nasal Spray: Placebo for Vasomotor Rhinitis Symptoms			
Primary Efficacy Variable† <i>P</i> = 0.002	OVERALL	1.8:1*	
	Post Nasal Drip	1.7:1*	
	Rhinorrhea	1.6:1*	Study 374‡
	Sneezes	>2.0:1*	
	Congestion	2.0:1*	
Primary Efficacy Variable† <i>P</i> = 0.005	OVERALL	1.9:1*	
	Post Nasal Drip	1.9:1*	
	Rhinorrhea	1.9:1*	Study 375‡
	Sneezes	1.6:1*	
	Congestion	1.5:1*	
2.0 1.5 1.0 0.5 0 0.5 1.0 1.5 2.0			
Placebo superior treatment			
	Azelastine nasal spray		
	superior treatment		

* Clinically significant.

† Primary efficacy variable is the improvement in total vasomotor rhinitis symptom score from baseline versus placebo.

‡ Studies 374 and 375 shared an identical protocol.

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Table 8. Characteristics of Nonallergic Rhinitis Cases

Characteristics	Number	(%)
Women	45	(58)
Men	33	(42)
Average age (years)	42	
Range (years)	16 to 85	
Average duration of rhinitis (years)	8	
Range* (months to years)	3* to 30	
Elevated IgE	9	(12)
Negative allergy skin tests	78	(100)

*Six patients had symptoms for less than 6 months and 14 patients had symptoms for less than 1 year.

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Table 9. Diagnosis of 78 Patients with Nonallergic Rhinitis

Diagnosis	Patients (N)	Patients considered (N)	% of patients
VMR	44	72	61
NARES	25	75	33
Sinusitis (radiographs)*	11	68	16
Possible allergy†	9	76	12
BENARS	3	76	4
Hypothyroidism	1	68	2

BENARS - blood eosinophilia nonallergic rhinitis syndrome.

NARES - nonallergic rhinitis with eosinophils syndrome.

* Overlapping of diagnosis present.

† Elevated serum IgE levels.

Adapted from Settupane GA and Klein DE with permission.

Table 10. Conditions That May Underlie Chronic Sinusitis

Anatomical
Rhinitis
Nasal polyps
Ciliary dyskinesia: Kartagener syndrome
Cystic fibrosis
Granulomatous disease
Neoplasm
Immunodeficiency

Table 11. Antihypertensive Drugs Causing Rhinitis

Trade Name	Generic	Symptoms
Aldomet*	Methyldopate	Nasal stuffiness
Apresoline†	Hydralazine	Nasal congestion, dyspnea
Cardura‡	Doxazosin	Nasal congestion
Catapres§	Clonidine	Dryness of nasal mucosa
Corgard¶	Nadolol	Nasal stuffiness, bronchospasm, cough
Hytrin**	Terazosin	Nasal congestion
Ismelin†	Guanethidine	Dyspnea, asthma in susceptible individuals, nasal congestion
Minipress‡	Prazosin	Nasal congestion, dyspnea
Moduretic*	Amiloride and hydrochlorothiazide	1% nasal congestion, 1% dryness
Normodyne††	Labetalol	Nasal stuffiness, wheezing in 1
Trandate‡‡	Labetalol	Nasal stuffiness, dyspnea, bronchospasm
Wyntensin§§	Guanabenz	Nasal stuffiness, dyspnea
—	Reserpine	Nasal congestion, dyspnea

* Merck and Company, West Point, PA.

† Novartis Pharmaceuticals, East Hanover, NJ.

‡ Pfizer, Inc, New York, NY.

§ Boehringer Ingelheim Pharmaceuticals, Ridgefield, CT.

¶ Bristol-Myers Squibb, Princeton, NJ.

** Abbott Laboratories, Abbott Park, IL.

†† Schering Corporation, Kenilworth, NJ.

‡‡ Glaxo-Wellcome, Research Triangle Park, NC.

§§ Wyeth-Ayerst Laboratories, Philadelphia, PA.

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Table 12. Antihypertensive Drugs with Diuretics Causing Rhinitis

Trade Name	Generic	Symptoms
Aldoclor*	Combination of methyldopa and chlorothiazide	Nasal stuffiness
Aldoril*	Methyldopahydrochlorothiazide, MSD	Nasal stuffiness
Apresazide†	Hydralazine and hydrochlorothiazide	Conjunctivitis, eosinophilia, dyspnea, nasal congestion
Combipres‡	Clonidine and chlorthalidone	Dryness of nasal mucosa
Diupres*	Chlorothiazide and reserpine	Nasal congestion, dyspnea
Diutensin-R§	Methylclothiazide and reserpine	Frequent nasal congestion, dyspnea
Enduronyl tablets¶	Methylclothiazide and deserpidine	Asthma in asthmatic patients, nasal congestion, dyspnea
Hydropres*	Reserpine-hydrochlorothiazide	Nasal congestion, dyspnea
Rauzide tablets**	Rauwolfia serpentina with bendroflumethiazide	Nasal congestion, dyspnea
Ser-Ap-Es†	Reserpine, hydralazine hydrochlorothiazide	Dyspnea, nasal congestion
Minizide‡‡	Prazosin and polythiazide	Nasal congestion, dyspnea

* Merck and Company, West Point, PA.

† Novartis Pharmaceuticals, East Hanover, NJ.

‡ Boehringer Ingelheim Pharmaceuticals, Ridgefield, CT.

§ Wallace Laboratories, Cranbury, NJ.

¶ Abbott Laboratories, Abbott Park, IL.

** Bristol-Myers Squibb, Princeton, NJ.

‡‡ Pfizer, Inc. New York, NY.

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Table 13. Etiology of Nasal Polyps

Aspirin intolerance

Aspirin tetrad syndrome

Intrinsic asthma

Chronic sinusitis

Young syndrome

Cystic fibrosis

Kartagener syndrome

Churg-Strauss syndrome

Allergic fungal sinusitis

Table 14. Occupational Rhinitis: Causative Agents in the Workplace

Agent	Occupational environment
Annoyance rhinitis	
Perfumes	Beauty salons, department stores
Cooking odors	Restaurants, food manufacturers
Exhaust fumes	Garages, public transportation industry
Detergents	Supermarkets
Cleaning agents	Supermarkets
Room deodorizers	
Flower fragrances	Florist shops, gardening industry
Clothing fragrances	Clothing stores
Cosmetic odors (hair spray)	Cosmetic factories, stores, beauty salons
Tobacco smoke on clothing	
Irritation rhinitis	
Tobacco smoke	
Pollution	
Oxides of nitrogen	Chemical industry
Paint fumes	
Garden sprays	
Toluene, xylene	Petroleum, chemical, paint industries
Capsaicin	Food industry
Formaldehyde	Chemical industry
Sulfur dioxide	
Ozone	
Immunologic rhinitis	
Animal proteins	Animal laboratories, pet stores
Wheat	Food-processing plants
Green tea	
Pyrethrum	Insecticide, gardening industries
Cotton fibers	Cotton mills
Reactive dyes	
Toluene diisocyanate	Auto body spray painting
<i>Bacillus subtilis</i>	Detergent factories
Trypsin	
Papain	Meat-processing plants
Latex	Health care industry

Latex	Health care industry
Platinum salts	
Colophony	Metal, electronics industries
Acid anhydrides	Adhesive industry
Plicatic acid	Cedar sawmills
Corrosive rhinitis	
Ammonia	Tanneries; dye, bronzing industries
Chloride	Pulp, paper industry; swimming pool maintenance
	Bleach, battery manufacturing
Hydrochloric acid	
Vinyl chloride	
Organophosphide compounds	Pesticide industry
Acrylamide	Resins, plastics manufacturing
Cyanide, nitriles	Steel, plastics, herbicide industries

Organic sulfur-containing compounds.

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