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Substantial evidence exists to support the concept that the respiratory system functions as an integrated unit. Pathophysiological processes that involve the upper airway generally occur in conjunction with lower airway diseases, and diffuse inflammation often affects mucosal surfaces of the middle ear, nose, sinuses, and tracheobronchial tree simultaneously. Support for this relationship can be found in epidemiological studies, in shared pathophysiological mechanisms, and in observed interactive treatment effects. This model and its implications are discussed.

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Nadir Ahmad and Mark A. Zacharek	

A relationship between allergic rhinitis and acute and chronic rhinosinusitis has been postulated for many years. Epidemiologic evidence suggests that such a relationship is likely. In addition, evidence of a common pathophysiologic mechanism linking these diseases is compelling and continues to evolve. Although a clear and definitive causal relationship remains to be elucidated, an increasing number of studies support the plausibility of this link. The current paradigm of the “unified airway” and evidence to support this model further strengthen this link. This article reviews the literature relating allergic rhinitis and acute and chronic rhinosinusitis.

## **Asthma and Rhinitis: Comorbidities**

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Matthew W. Ryan

The connection between asthma and rhinitis is not a new discovery. Significant progress has been made in understanding the relationship of these two conditions, however, and the implications of the asthma–rhinitis link make it increasingly important. Patients who have asthma and rhinitis tend to have more severe disease with higher treatment costs. Treatment of rhinitis may improve asthma control, and early treatment of allergies may prevent the development of asthma. This article more fully explores the epidemiologic, pathophysiologic, and clinical relationships between asthma and rhinitis.

## **Chronic Rhinosinusitis and Asthma**

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Stephanie A. Joe and Kunal Thakkar

Based on considerations of the underlying epidemiology, pathophysiology, histopathology, clinical relationships and treatment outcomes, the links between rhinosinusitis and asthma become evident supporting the unified airway concept.

## **The Link Between Allergic Rhinitis and Chronic Otitis Media with Effusion in Atopic Patients**

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Amber Luong and Peter S. Roland

The significant incidence of atopy associated with otitis media with effusion (OME) has suggested a role of allergy in the pathogenesis of OME. Analysis of inflammatory mediators indicates that the mucosa of the middle ear can respond to antigen in the same way as does the mucosa of the lower respiratory tract. Recent characterization of the mucosa and effusion from atopic patients with OME reveals a Th2 cytokine and cellular profiles consistent with an allergic response, supporting the role of allergy in OME. In addition, animal studies demonstrate that inhibiting characteristic allergy cytokines can prevent the production of middle ear effusion. As the understanding of allergy and its role in the inflammation of OME continues to deepen, this will introduce focused treatments of OME in the atopic population.

## **Allergic Rhinitis—History and Presentation**

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Rose J. Eapen, Charles S. Ebert, Jr, and Harold C. Pillsbury, III

Allergic rhinitis is a common disorder that results from a complex interaction of environmental and genetic causes. This disorder has a tremendous impact on the quality of life and on health care expenditures, as evidenced by a large loss of worker productivity. Care must be taken to promptly diagnose patients with this condition, evaluate them for associated conditions, and begin appropriate management to reduce its impact on the individual and the health care system. Allergic rhinitis represents only a

component of the spectrum of inflammatory diseases involving the unified airway.

**Allergic Rhinitis—Current Approaches to Skin and In Vitro Testing**

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Richard C. Haydon

This article discusses the currently available techniques used for the diagnosis of IgE-mediated upper respiratory allergy. These methods are necessary to confirm the presence and the intensity of allergy in an effort to select patients for immunotherapy and to dose immunotherapy properly. Specific techniques discussed include epicutaneous and intradermal skin tests and in vitro tests designed to measure antigen-specific IgE antibody.

**Allergic Rhinitis—Current Pharmacotherapy**

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John H. Krouse

The use of pharmacotherapy for allergic rhinitis remains a central strategy in the integrated treatment of the patient. The most appropriate medical therapy depends upon the nature of specific rhinitis symptoms, patient tolerance to and preference for certain classes of medications, and response to treatment. Through an appreciation of these various physiological mechanisms, the physician can select the treatment option or options that will be most likely to effectively manage symptoms.

**Injection and Sublingual Immunotherapy in the Management of Allergies Affecting the Unified Airway**

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Bryan Leatherman

The spectrum of allergic disease involves both the upper and lower airways. Immunotherapy has been shown to produce immunologic changes that can result in the improvement of allergic diseases. Numerous clinical trials have demonstrated the effectiveness of injection and sublingual immunotherapy in the treatment of rhinitis and asthma. Recent data suggest that immunotherapy may have a role in preventing the development of new sensitizations or in decreasing the progression of allergic disease from rhinitis to asthma. Models of immunotherapy may therefore transition from symptom-relieving treatments to preventive methodologies for the management of allergic disease.

**Asthma History and Presentation**

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Bruce R. Gordon

Asthma is suspected from a history of key symptoms, including cough, wheezing, dyspnea, chest tightness, and increased mucus production. A positive family or personal history of atopic diseases and diseases that are comorbid with asthma, such as allergic

rhinitis and rhinosinusitis, is also important. The differential diagnosis of asthma is broad and includes potentially life-threatening diseases. Pediatric asthma and psychiatric mimics require special attention to prevent misdiagnosis. Differentiating asthma from these other disease states by history alone is not always possible. Because accurate diagnosis is critical to successful treatment, objective testing by spirometry and methacholine challenge should be employed.

## **Introduction to Pulmonary Function**

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Michael W. Chu and Joseph K. Han

Asthma is a dynamic and complex inflammatory disease. Recent research suggests that it is a manifestation of a systemic disorder of the entire respiratory system including both upper and lower airways. The diagnosis of asthma can be made based on clinical history, physical findings, and pulmonary function tests such as spirometry. In children, spirometry may be difficult; therefore, diurnal changes in peak expiratory flow rate can be used instead to assist in the diagnosis of asthma. Increasing the use of objective pulmonary measures will help better identify and monitor treatment of lower respiratory inflammatory disease.

## **Asthma: Guidelines-Based Control and Management**

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John H. Krouse and Helene J. Krouse

Guidelines-based management of the patient with asthma allows maximal levels of function with few adverse effects. A flexible approach to therapy that emphasizes an ongoing partnership between the patient and physician allows optimal communication, facilitating treatment adherence and maximal levels of control. Through assessment of the patient's initial severity of disease and an evaluation of the patient's ongoing level of control, appropriate medical therapy can be initiated and level of therapy can be modified based on the patient's response. Patient education, environmental control strategies, and proper use of medications are vital in achieving maximal benefit in asthma management. Excellent asthma control is possible and should be a goal of both physicians and patients.

## **Environmental Controls of Allergies**

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Berrylin J. Ferguson

Environmental controls of allergy remain a cornerstone in the management of patients who have allergic rhinitis. In the past, recommendations for environmental controls were based on common sense and the demonstration that certain methods of environmental control reduce antigen quantity. Reduction of antigen quantity is, however, only an indirect measure of whether an environmental control strategy actually reduces allergic symptoms. This article details current recommendations for

reducing antigen exposure based on specific antigen sensitivities. Strategies for reduction of indoor inhalant allergens—dust mites, cockroach, molds, and house pet danders—are presented, as well as techniques for reducing exposure to outdoor inhalant allergens.

### **Laryngitis: Types, Causes, and Treatments**

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James Paul Dworkin

Inflammatory processes that affect the unified airway can concurrently exert significant influence on the larynx and surrounding mucosal surfaces. Laryngeal inflammation can be present secondary to direct effects of irritants, toxins, and antigens, but can also involve mechanical and infectious effects as well as secondary inflammation from behavioral mechanisms. This review examines laryngeal inflammation in the context of the unified airway and discusses pathophysiologic mechanisms that are central to the development of acute and chronic laryngitis.

### **Laryngitis—Diagnosis and Management**

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Ozlem E. Tulunay

Laryngeal inflammation includes a broad spectrum of pathologies, from infectious processes that need to be managed as airway emergencies, to indolent diseases that mimic head and neck cancer. The importance of a thorough history cannot be emphasized enough as it is the most important step toward developing a differential diagnosis. Vocal pathologies often have a noticeable impact on a person's quality of life and daily activities; therefore, it is key to counsel patients on the course of the disease process. Treatment of specific pathologies depends on the causative pathogen or etiology, as well as the age, vocal demands, and clinical characteristics of the individual.

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