



Year in review: upper respiratory diseases

Anne K. Ellis, MD, MSc^{*,†}; and Mena Soliman, MBChB^{*}

^{*} Departments of Medicine and Biomedical and Molecular Science, Queen's University, Kingston, Ontario, Canada

[†] Allergy Research Unit, Kingston General Hospital, Kingston, Ontario, Canada

ARTICLE INFO

Article history:

Received for publication November 26, 2014.

Received in revised form December 11, 2014.

Accepted for publication December 12, 2014.

Throughout 2014, notable publications in the *Annals* covered unique and important aspects of the upper respiratory tract.

The International Study of Asthma and Allergies in Childhood group recently evaluated the prevalence of intermittent and persistent allergic rhinitis (AR) in children as it related to country of residence, climate, and vegetation.¹ The group was established in 1991 with the aim of establishing standardized methodology and international collaboration in studying AR and asthma global prevalence, predicting future trends, and helping etiologic studies.

In this particular study, 222 centers in 94 countries surveyed 642,315 13- to 14-year-old children and another 135 centers in 59 countries surveyed 360,302 6- to 7-year-olds (manual count of children extracted from tables provided in the publication).¹ Parents of 6- to 7-year-old children completed standardized International Study of Asthma and Allergies in Childhood questionnaires, and 13- to 14-year-old children completed it themselves. Participants indicated whether they had AR symptoms in the past 12 months (without cold or flu), specified the months in which symptoms were experienced, and whether the symptoms included itchy eyes during that period. Identifiable was persistent AR (where ≥ 1 symptom was reported for >2 consecutive months) vs intermittent AR (symptoms lasted <2 months).

Extensive data collected from multiple sources included monthly mean daily temperature, precipitation, vapor pressure, and vegetation index and land cover for each site; data were categorized into 1 of 5 climate types. Growth national index per capita and population density also were collected.

Analysis of “between-country associations” for the 13- to 14-year-old children showed that intermittent symptoms positively correlated with mean monthly temperature, precipitation,

and vapor pressure. Persistent symptoms were not associated with any climate variables. For the 37 countries with multiple centers, further analysis of data within the country was performed. A positive association was noted between intermittent and persistent symptom prevalence and mean monthly temperature and vapor pressure.¹ The within-country analysis for children 6 to 7 years of age showed a positive association only between persistent symptoms and mean vapor pressure and maximal monthly vegetation cover. The investigators acknowledge that other factors might not have been otherwise accounted for.

That persistent symptomatology was associated only with climatic factors at the “center level” and intermittent symptoms were associated with factors at the “country level” might be due to the fact that lifestyle factors (such as pet ownership) are more likely to affect persistent symptoms, whereas allergens that are affected by the climate are more likely to have an impact on intermittent symptoms. One limitation of the study is that different plant species with different types of allergenicity might be present in the surveyed areas but were not identified in the study.¹ Overall, the study was unique in its global prospective, suggesting that climate does affect rhinitis symptoms and might provide insight into the effect of climate change on symptom prevalence.

Also in 2014, Everhart et al² focused on the effect of AR and asthma control on AR quality of life (QOL) in urban children (7 to 9 years of age) who had the 2 diseases over a 4-week period. They hypothesized that children with well-controlled asthma and AR have better AR QOL, that AR control is a better predictor of AR QOL than asthma, and that non-Latino white children could have better AR QOL than children of other ethnicities.² Children from 4 different urban centers with similar environmental and ethnic diversity were enrolled, engaging schools, school-based community events, caregivers and hospital-based pediatric clinics. Inclusion criteria were physician-diagnosed asthma, parent report of child's breathing problems, and asthma medication prescription.

Children's symptoms were evaluated by study physicians. AR severity was graded according to Allergic Rhinitis and its Impact on Asthma guidelines and asthma severity was graded according to

Reprints: Anne K. Ellis, MD, MSc, Departments of Medicine and Biomedical and Molecular Science, Queen's University, Kingston, ON K7L 2V7, Canada; E-mail: ellisa@queensu.ca.

Disclosure: Dr. Ellis has received institutional grants from Circassia Ltd and Sun-Pharma to conduct CACF trials in the past 2 years. The other authors have nothing to disclose.

<http://dx.doi.org/10.1016/j.anai.2014.12.011>

1081-1206/© 2015 American College of Allergy, Asthma & Immunology. Published by Elsevier Inc. All rights reserved.

Expert Panel Report 3 from the National Heart, Lung, and Blood Institute. Children and parents completed the Rhinitis Control Assessment Test and Asthma Control Test at study onset, and children completed daily diary questions assessing asthma and AR symptoms and the Pediatric Rhinoconjunctivitis Quality of Life questionnaire over the 4-week period.

Decrease in AR QOL was associated with severity of AR symptoms, ethnicity, and income-to-needs ratio but was not related to age, sex, or asthma severity. Non-Latino white children experienced less impairment from their AR symptoms, consistent with previous studies indicating underdiagnosis and undertreatment of AR in urban minority children.³

Better AR control translated to better AR QOL on all subscales; however, better asthma control was associated only with assuaged nasal symptoms and fewer activity limitations. Everhart et al² concluded that AR control is more important than asthma control in evaluating AR QOL and suggested that physicians could use the Rhinitis Control Assessment Test in practice. Treating AR is known to improve asthma outcome in patients with comorbid disease; therefore, physicians should make families aware of the importance of this association.

To study AR pathophysiology and test the efficacy of novel medications for the treatment of AR, several human models have been developed. The Nasal Allergen Challenge model is one such model and was reviewed in a CME article aimed at practicing physicians.⁴ Nasal Allergen Challenge protocols in general vary, but all involve the direct application of the allergen under investigation onto the nasal mucosa of study participants.⁴ A major advantage of the model is the ability of applying a common protocol at multiple centers without dedicated specialized equipment that might be required for other models.⁵ The details of the various methodologies and pros and cons of using a Nasal Allergen Challenge model to study allergic rhinitis were well described in this CME review, and the reader is encouraged to consult this article and its key reference for further details.^{4,6–8}

Of penultimate importance with respect to the most important updates from 2014, the Joint Taskforce Practice Parameters commissioned a workshop of experts to systemically review the literature and consult expert opinion to develop the “Diagnosis and Management of Rhinosinusitis: A Practice Parameter Update.”⁹ This workshop defined rhinosinusitis as “inflammation of 1 or more paranasal sinuses and is categorized into acute or chronic depending on the duration of inflammation, whether it lasts less or more than 12 weeks.” In contrast, acute bacterial rhinosinusitis is a clinical diagnosis in patients with characteristic symptoms for 10 to 14 days and is described as recurrent if there are at least 3 episodes per year, with no need for radiologic confirmation except for complicated cases. A 10- to 14-day course of an appropriate antibiotic is adequate, although sinus secretions might be obtained for

culture in recurrent cases. There also is evidence to suggest that AR might predispose to acute bacterial rhinosinusitis, particularly in young adults.

Chronic rhinosinusitis is further subdivided based on the presence or absence of nasal polyps.⁹ Imaging techniques such as computed tomography might be necessary if symptoms and physical examination are inconclusive. Although the use of antibiotics in chronic sinusitis is controversial, it is warranted with concurrent bacterial infection in which a longer course of treatment might be needed. Patients with nasal polyps also benefit from oral steroids. The workshop also highlighted the association of rhinosinusitis with comorbidities such as AR and non-AR, viral upper respiratory tract infections, immunodeficiency, cystic fibrosis, and asthma.⁹

In conclusion, upper respiratory tract diseases affect an increasing proportion of the global population in different ways, affecting their health, QOL, and economy. In 2014, several noteworthy publications evaluated different aspects of these diseases with the aim of advancing our understanding of how AR and asthma affect QOL,² the global prevalence of AR in relation to climate factors,¹ and the experimental models used to study this condition.⁴ Furthermore, an updated practice parameter for the diagnosis and treatment of rhinosinusitis helped deliver important messages on how to address these diseases using clear and easy-to-follow algorithms.⁹

References

- [1] Fuertes E, Butland BK, Ross Anderson H, Carlsten C, Strachan DP, Brauer M. Childhood intermittent and persistent rhinitis prevalence and climate and vegetation: a global ecologic analysis. *Ann Allergy Asthma Immunol*. 2014;113:386–392.e9.
- [2] Everhart RS, Kopel SJ, Esteban CA, et al. Allergic rhinitis quality of life in urban children with asthma. *Ann Allergy Asthma Immunol*. 2014;112:365–370.e1.
- [3] Esteban CA, Klein RB, Kopel SJ, et al. Underdiagnosed and undertreated allergic rhinitis in urban school-aged children with asthma. *Pediatr Allergy Immunol Pulmonol*. 2014;27:75–81.
- [4] Soliman M, North ML, Steacy LM, Thiele J, Adams DE, Ellis AK. Nasal allergen challenge studies of allergic rhinitis: a guide for the practicing clinician. *Ann Allergy Asthma Immunol*. 2014;113:250–256.
- [5] Ellis AK, North ML, Walker T, Steacy LM. Environmental exposure unit: a sensitive, specific, and reproducible methodology for allergen challenge. *Ann Allergy Asthma Immunol*. 2013;111:323–328.
- [6] Bonay M, Neukirch C, Grandsaigne M, et al. Changes in airway inflammation following nasal allergic challenge in patients with seasonal rhinitis. *Allergy*. 2006;61:111–118.
- [7] Scadding GW, Calderon MA, Bellido V, et al. Optimisation of grass pollen nasal allergen challenge for assessment of clinical and immunological outcomes. *J Immunol Methods*. 2012;384:25–32.
- [8] Rousseau M, Boulay M, Goronfolah L, Denburg J, Keith P, Boulet L. Comparative responses to nasal allergen challenge in allergic rhinitic subjects with or without asthma. *Ann Allergy Clin Immunol*. 2011;7:8.
- [9] Peters AT, Spector S, Hsu J, et al. Diagnosis and management of rhinosinusitis: a practice parameter update. *Ann Allergy Asthma Immunol*. 2014;113:347–385.