Original Article

Findings from an Online Survey Assessing the Burden and Management of Seasonal Allergic Rhinoconjunctivitis in US Patients

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What is already known about this topic? Symptoms of seasonal allergic rhinoconjunctivitis (SARC) affect 16% or more of the US population annually with demonstrated negative impact on sleep, daily activities, productivity, concentration, and emotions.

What does this article add to our knowledge? The patient-perceived burden of SARC assessed by an online survey is discussed in relation to newer treatments, increased access to treatments, and changing management protocols.

How does this study impact current management guidelines? The data suggest that patient expectations for therapy are increasingly being met and patients are taking more responsibility for their (child’s) condition. Continuing to educate patients about SARC and its treatment remains a priority.

BACKGROUND: Seasonal allergic rhinoconjunctivitis (SARC) affects ≥16% of the US population annually. Telephone and in-office surveys have demonstrated negative effects of allergic rhinitis (AR) symptoms on sleep, daily activities, productivity, concentration, and emotions.

OBJECTIVE: The objective of this study was to assess the patient-perceived burden of SARC in relation to newer treatments, increased access to treatments, and changing management protocols.

METHODS: An online survey of symptom experience, impact on daily life, and management was conducted in US respondents who suffer (or whose child suffers) from SARC symptoms.

RESULTS: A total of 1001 surveys were completed: 500 adults (≥18 years old) and 501 children (12-17 years old, documented by their parents). Similar to earlier AR surveys, SARC symptoms negatively affected the patient’s (and family’s) quality of life, and were most severe in the spring. Before being treated, >50% of respondents reported daily symptoms during their season; 75% to 80% considered their symptoms moderate to severe. Patients saw a variety of health care professionals (including pharmacists) and used over-the-counter and prescription medications for symptoms. Those using prescription medications were generally more satisfied with treatment and less likely to switch or discontinue treatment. Nasal and/or ocular symptoms drove adherence, seeing a health care professional, and reviewing and/or changing treatment.

CONCLUSIONS: The majority of patients with SARC report moderate-to-severe symptoms that significantly impair their quality of life. However, patients appear to be taking more responsibility for their (child’s) condition, and patient expectations for therapy are increasingly being met. Continued efforts will be needed to examine the contribution of better information and/or increased access to and availability of medications to control the disease. © 2016 The Authors. Published by Elsevier Inc. on behalf of the American Academy of Allergy, Asthma & Immunology. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/). (J Allergy Clin Immunol Pract 2016;:https://doi.org/10.1016/j.jaip.2016.10.010)

Key words: Allergic rhinitis; Antiallergic treatment; Nasal/ocular allergy symptoms; Patient perception; Quality of life; Questionnaire; Seasonal allergic rhinoconjunctivitis; Survey

Seasonal nasal and ocular allergy, often referred to as seasonal allergic rhinoconjunctivitis (SARC) and sometimes as “hay
fever,” is a common chronic disease, estimated to affect upward of 16% of the population of the United States in any one year.\(^1\)\(^-\)\(^3\) Although estimates of the incidence and prevalence can vary widely depending on the specific population and analyses used,\(^5\)\(^-\)\(^4\) trends indicate that neither has diminished despite a better understanding of the condition, new pharmacological and immunological treatments, and increased access to care. Indeed, patient-reported and/or physician-diagnosed seasonal nasal and ocular symptoms seem to have become more common.\(^3\)\(^-\)\(^8\)

Patients commonly report bothersome symptoms affecting the nose (congestion, sneezing, itching, rhinorrhea) and eyes (itching, redness, watering, swelling) that can vary in frequency, intensity, and seasonality. The underlying mucosal inflammation also can exacerbate other conditions, and symptoms can impair patients’ quality of life (QoL).\(^4\)\(^,\)\(^6\) For children in particular, symptoms can negatively impact family and daily activities.\(^7\) Management requires a multifaceted approach for most individuals, and the patient (and/or parent/caregiver) needs to understand the disease, its variability, and how and when treatment works to optimize clinical outcomes.\(^3\)\(^,\)\(^7\)\(^,\)\(^8\)\(^,\)\(^10\) Standard approaches to manage SARC include environmental control methods, pharmacotherapy, and immunotherapy; patient education is critical for day-to-day care.\(^3\)\(^,\)\(^10\) Discussion of management is beyond the scope of this paper, and readers are directed to several excellent reviews as well as current guidelines.\(^3\)\(^,\)\(^7\)\(^,\)\(^8\)\(^,\)\(^10\)\(^-\)\(^12\) The goal of treatment is control of the disease, which translates to minimal symptoms and improved well-being and ability to function for the patient (and family).

Data reported over the past 15 years from surveys of individuals with nasal allergies in the United States and health care professionals (HCPs) who treat those patients in the United States\(^4\)\(^,\)\(^8\)\(^,\)\(^9\)\(^,\)\(^13\)\(^-\)\(^17\) have sought treatment from a medical professional for SARC\(^,\)\(^13\)\(^-\)\(^17\) Has sought treatment from a medical professional for SARC\(^,\)\(^13\)\(^-\)\(^17\) Personally suffers (or has a child, aged 12-17 years, who suffers) Nasal and ocular allergy symptoms negatively affected physical and emotional health, daily activities, cognitive ability, and productivity, and contributed to missed work and school days.

**METHODS**

**Survey**

The survey was conducted online in the United States between March 2 and March 9, 2015, by Nielsen Consumer Insights on behalf of the Asthma and Allergy Foundation of America. The inclusion criteria for survey respondents were as follows:

- Ages 18 years or older
- Personally suffers (or has a child, aged 12-17 years, who suffers) from nasal and/or ocular symptoms of seasonal allergies
- Confirmed by a physician based on the question “Have you been told by a doctor that you have (or your child has) any of the following conditions…” as shown in Appendix E1, available in this article’s Online Repository at www.jaci-inpractice.org
- Has sought treatment from a medical professional for SARC

The survey was designed to be approximately 15 minutes in length and to obtain information on patient and/or parent perspectives of the burden of nasal and ocular seasonal allergy symptoms occurring at a time when they (their child) typically experienced symptoms (as opposed specifically to the week of survey administration). Survey design was similar to earlier phone surveys\(^3\)\(^,\)\(^9\)\(^,\)\(^13\)\(^-\)\(^17\) but updated given the availability of newer prescription and OTC medications since those surveys were conducted. The survey is shown in Appendix E1, available in this article’s Online Repository at www.jaci-inpractice.org.

**Sample source**

The sample source was derived from a Harris Poll panel of respondents for online consumer research supplemented by similar online panels from various Nielsen research partners. The sample was pulled randomly to provide a national census representation of respondents who met the inclusion criteria. To efficiently screen for parents of children with SARC, individuals preidentified from known panel statistics as parents of children (<18 years) were targeted.

Email invitations were sent to a total of 79,839 potential respondents with a password protected link, so that each link could only be used once.

**TABLE I.** Key outcomes of phone and paper surveys of patients with allergic rhinitis and health care professionals (HCPs) who treat those patients in the United States\(^4\)\(^,\)\(^8\)\(^,\)\(^9\)\(^,\)\(^13\)\(^-\)\(^17\)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>The worst season for nasal and eye allergy symptoms was spring.</td>
<td></td>
</tr>
<tr>
<td>The most bothersome symptom was nasal congestion/stuffiness/blacked nose.</td>
<td></td>
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<td>Nasal and ocular allergy symptoms negatively affected physical and emotional health,</td>
<td></td>
</tr>
<tr>
<td>daily activities, cognitive ability, and productivity, and contributed to missed work and</td>
<td></td>
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<tr>
<td>school days.</td>
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<tr>
<td>Treatment dissatisfaction was high, and reflected incomplete relief, slow</td>
<td></td>
</tr>
<tr>
<td>onset of relief, duration of relief less than 24 h, and/or a sense of reduced efficacy</td>
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<tr>
<td>with use over time.</td>
<td></td>
</tr>
<tr>
<td>Inadequate efficacy was the primary reason for discontinuing or changing medications.</td>
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<tr>
<td>Nasal and ocular allergy exacerbated comorbid conditions, particularly asthma and</td>
<td></td>
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<tr>
<td>rhinosinusitis.</td>
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</table>

**Abbreviations used**

AR- Allergic rhinitis
HCP- Health care professional
INAH- Intranasal antihistamine
INCS- Intranasal corticosteroid
OTC- Over the counter
QoL- Quality of life
SARC- Seasonal allergic rhinoconjunctivitis
Data analysis

The total data were weighted to represent the general population of ≥18 year olds and parents of children (12-17 years old), and then were combined proportionally into a representative total. Weighting was based on the demographics of the adult respondent, and the weighting variables included age by gender, household income, education, race and/or ethnicity, region, and whether or not a parent. Propensity score weighting was used to adjust for respondents’ propensity to be online.

Because the sample is based on respondents who agreed to participate in market research surveys, estimates of theoretical sampling error could not be calculated.

RESULTS

A total of 1001 surveys were collected: 500 adults (≥18 years old) and 501 children (12-17 years old as documented by their parents). Table II presents the patients’ characteristics at the time of the survey. All patients suffered from SARC and had sought medical treatment for their symptoms. Approximately 74% of the adults and 84% of children had been tested for their seasonal allergies. Throughout this paper, the term “patients” refers to adult respondents (and/or to their children) who suffer from allergies. The term “patient” refers to respondents.

Patients’ condition

The majority of patients experienced nasal and/or ocular allergy symptoms in the spring (adults 95%, children 92%), though more than 60% of patients also reported symptoms in the summer and the fall (Figure 1). Approximately 20% of adults and 21% of children reported experiencing symptoms year round. The seasonal triggers listed by patients are shown in Table III.

Patients reported spring allergy symptoms as the worst, both when asked about the season with the worst symptoms (spring, 64%; summer, 16%; fall, 15%; winter, 6%) and when asked to classify the severity of their (or their child’s) symptoms by season (Figure 2).

Almost all patients experienced symptoms at least monthly (adults, 93%; children, 91%) during their reported allergy season(s). Approximately half had daily symptoms (adults, 57%; children, 46%). The single most bothersome symptoms for which patients sought treatment are shown in Figure 3. Before treatment, most patients rated their overall symptoms as moderate (adults, 43%; children, 50%) or severe (adults, 45%; children, 38%); the symptoms rated as most severe were nasal congestion (adults, 46%; children, 42%) and stuffy nose (adults, 33%; children, 36%). The severity ratings and the symptom terminology were evaluated according to the respondents’ interpretation of their symptom experience. No guidance was provided as to what mild, moderate, or severe might entail, nor for the different terms for nasal congestion.

Impact of seasonal allergy symptoms

SARC had substantial negative impact, physically, mentally, and emotionally (Figure 4). When asked about productivity, performance, concentration, and feelings, more than 50% of patients (adults and children) reported impairment of daily activities and/or increased levels of distraction, irritability, fatigue, and frustration when suffering from symptoms of SARC. Patients also reported feeling unhappy, upset, and angry, and expressed negative self-images in relation to their symptoms.

Approximately 9 of 10 patients experienced at least some disruption of sleep due to their allergy symptoms; for approximately 40%, symptoms affected sleep “a lot” (Table IV). Symptom-related interference with daily leisure and/or social activities and productivity at work or school was considerable, with approximately one-third experiencing “a lot” of interference. When subsequently asked to estimate days of lower productivity per month with allergy symptoms, 82% of adults and 91% of children reported being less productive at work and/or school for at least 1 day/month. Approximately 50% of patients (adults, 48%; children, 54%) experienced 6-20 days of diminished productivity. The mean estimates for days of lost productivity related to seasonal allergy symptoms were 9.3 for adults and 10.2 for children in a typical seasonal allergy month.

Management

Most patients saw an HCP due to their nasal and/or ocular allergy symptoms more than once a year, and children generally saw their HCP’s more frequently than adults (Table E1, available in this article’s Online Repository at www.jaci-inpractice.org).
Approximately 4% of patients (adults and children) saw a pharmacist for care. In most cases, the patient (or parent) initiated the discussion about different treatment options for their (child’s) allergy symptoms (adults, 69%; children, 61%). Of these, 5% or fewer initiated the discussion because of advertisements (TV, print, internet) or recommendations (family, friends) for specific medications. Patients used a wide range of products to manage their (child’s) symptoms (Figure 5). The specific classes of allergy medications being used by respondents or their children at the time of the survey are shown in Table V. Antihistamines (oral, intranasal) were the most commonly used medication, both OTC and prescription.

When asked about how they chose what to use to treat SARC symptoms, most respondents reported either only taking medications recommended by their physician or pharmacist (adults, 39%; children, 47%) or taking recommended medications but sometimes supplementing with other OTC medications for specific symptoms (adults, 27%; children, 30%). The remainder used OTC medications without the benefit of a health professional’s recommendation.

Symptoms and symptom onset were the primary signals to take allergy medication for 47% of adults and 46% of children. However, some respondents reported using allergy medication daily and year round (adults, 41%; children, 28%) either because of symptoms or “to ward off symptoms.” Only 12% of adults and 26% of children started their allergy medications before seasonal symptom onset.

Symptoms and symptom onset were also the key signals for re-evaluating care. Respondents most commonly reassessed care “when symptoms are no longer managed with current care” (adults, 57%; children, 47%, difference statistically significant at 95% confidence level) and “at the beginning of each allergy season” (adults, 22%; children, 43%, difference statistically significant at the 95% confidence level).

Respondents reported switching between brands, formulations, and type of medication (OTC, prescription) over time (Figure 6). Patients taking OTC medications were more likely to change brands and formulations compared with patients using only prescription medications (35% and 20%, respectively). Approximately 15% of respondents reported adding OTC medications to supplement what their (child’s) doctor prescribed. Switching between OTC and prescription medications also was cited—approximately 18% of patients switched from prescription medications to only using OTC medications; approximately 11% of patients switched from OTC medications to only using prescriptions.

### Satisfaction with treatment

Patients were asked about their satisfaction with the effectiveness of various types of treatments for SARC symptoms. Satisfaction was rated highest for allergy injection immunotherapy (shots) (adults, 94%; children, 95%), though only 10% of patients were treated this way (Figure 5). Prescription medications had the next highest satisfaction ratings, and nonprescription OTC medications the lowest. Nonetheless, the satisfaction ratings for all classes of medications were fairly high. For adults, the ratings were: allergy shots (94%) > prescription oral allergy medications (83%) > prescription seasonal nasal sprays, overall (78%) > OTC oral allergy medications (69%) > OTC seasonal sprays, overall (64%). For children, the ratings were slightly higher with less between-class differentiation: allergy shots (95%) > prescription oral allergy medication (87%) ≈ prescription seasonal nasal sprays (88%) > OTC seasonal sprays (81%) ≈ OTC oral allergy medication (79%). The various nasal sprays were not specified as to type.

Effectiveness, providing consistent relief from SARC symptoms, and few side effects were the three most important criteria in patient ratings of their allergy treatments (Figure 7). Quick relief, ease of use, and cost considerations while ranked lower were important considerations for most patients. Under a separate query, most patients agreed that their current medications met the criteria previously rated as important (Figure 8).

### Cost and compliance considerations

When asked about changes in the cost of medications for their SARC symptoms over the past year, about half of the patients reported that costs have remained the same, regardless of whether they were using OTC or prescription medications. The remainder was more likely to report their medications having increased in price—36% of patients using prescription medications and 40% of those using OTC medications.

Cost was an important criterion for treatment (Figure 7). Seventy-two percent of patients who preferred an OTC medication noted that it was important that the medication be within their budget. For those using prescription medications, 69% and 65%, respectively, cited “covered by my prescription plan” and

### TABLE III. Reported triggers of seasonal allergy nasal/ocular symptoms (% patients)

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Adults (n = 500)</th>
<th>Children (n = 501)</th>
<th>Total (N = 1001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree pollen</td>
<td>75%</td>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>Grass pollen</td>
<td>69%</td>
<td>77%</td>
<td>71%</td>
</tr>
<tr>
<td>Weed pollen</td>
<td>69%</td>
<td>70%</td>
<td>69%</td>
</tr>
<tr>
<td>Mold spores</td>
<td>52%</td>
<td>52%</td>
<td>52%</td>
</tr>
<tr>
<td>Other*</td>
<td>16%</td>
<td>4%</td>
<td>13%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>8%</td>
<td>7%</td>
<td>8%</td>
</tr>
</tbody>
</table>

*As specified by respondents, this included dust/dust mites, flower pollen, animal dander, blooming plants, insects, chemicals, humidity, perfumes, and/or unknown.
available at my lowest copay as important criteria. In response to a subsequent query, most patients agreed that their current SARC medications met these criteria: available OTC and within budget, 67%; covered by prescription plan, 89%; available at lowest copay, 83% (Figure 8).

About two-thirds of patients reported taking their medication exactly as prescribed or recommended. Another 20% reported only using their medication(s) when they (their child) had symptoms. The remainder indicated effort at keeping to directions, but sometimes not following them. Patients who perceived their symptoms as "severe" were more likely to take their medications exactly as prescribed/recommended (severe, 50%; moderate, 32%; mild, 31%). The reasons given for not taking medications as prescribed are shown in Figure 9.

Those who did not take their medications as prescribed were asked: "What would make it easier for you/your child to take your/his/her allergy medications exactly as prescribed?" Fewer side effects (42%), lower cost (36%), and more convenient dosing schedule (33%) were key (Figure 10).

DISCUSSION

This is the first reported online survey for AR. Despite differences in survey methodologies and subject characteristics, the outcomes of the current survey support the findings of earlier questionnaires regarding patient perceptions of the expression, impact, and management of AR nasal and ocular symptoms (see Table 1).4,5,9,13-17 Before treatment, more than 50% of the SARC respondents experienced symptoms daily during an allergy month; 75% to 80% considered symptoms to be moderate or severe. Symptoms were reported as most severe in the spring, and in more than 50% of adults and children, seasonal nasal and/or
ocular symptoms negatively impacted the patient’s (and family’s) QoL. More than 90% reported disrupted sleep (40%, “a lot”). Exacerbation of comorbid conditions (eg, asthma, rhinosinusitis) by seasonal allergy symptoms was reported in the earlier surveys, but was not included in the current questionnaire. However, the consequence of worsening any of the many comorbidities further underscores the overall morbidity of AR.

This survey updates and expands information on treatment satisfaction from the patient’s perspective. All treatments for SARC had relatively high satisfaction ratings, with immunotherapy the highest at 95% of respondents. Unfortunately, this was provided to only 10% of patients. Prescription medications, both oral and intranasal, had higher ratings than OTC medications. The satisfaction ratings for prescription oral and intranasal medications were very close: 83% and 77%, respectively, for adults, and 87% and 88% for children. The Allergies in America surveys also included questions on satisfaction with treatment, but focused on INCS. The responses were similar to those for prescription nasal sprays in the current study. Approximately 75% of adult patients with AR and 76% of pediatric respondents (parents and/or children) reported being somewhat or very satisfied with their INCS treatment. Two parallel structured telephone surveys of 1001 adult patients with AR in Canada conducted in 2006 reported that 87% were satisfied with their INCS treatment.18

The higher satisfaction numbers for children in the current survey compared with the Pediatric Allergies in America data could reflect changes in treatment options, access, or knowledge, or might be due to differences in the subjects and how the data were recorded. The current survey included only children between the ages of 12 and 17 years with seasonal nasal/ocular allergy symptoms; the earlier study included children between the ages of 4 and 17 years with a physician’s diagnosis of “nasal allergy.” Sixty percent were younger than 12 years, and 62% identified as seasonal allergy patients.9 In that study, patients between 12 and 17 years old completed the survey along with a parent; data presented for the current study are from only the parent respondent.

The by-proxy assessment of patient symptom severity and/or treatment effect can differ from direct patient assessment. For example, in the Allergies in America survey adult patients and their HCPs were asked how satisfied they (or their patients) were with INCS treatment. More than 90% of HCPs reported that their patients were very or somewhat satisfied with treatment compared with 75% of patients.15 Likewise, parents and/or caregivers may have a different perspective of their teenager’s morbidity and the impact of treatment. In a recently reported pediatric clinical trial of the intranasal combination of azelastine and fluticasone propionate, caregivers underestimated the effect of treatment on AR symptoms and QoL compared with independent evaluations completed by older children.19 This proxy confounder effect has been reported for other allergic diseases (eg, asthma, eczema), showing poor agreement between parent and child ratings of morbidity and therapeutic effect.20,21 The results of this survey

![Graph](image-url)
support these earlier studies suggesting that children older than 11 years should complete their own questionnaires.19,20

The reasons for potential dissatisfaction with treatment are the same as reported in earlier studies: incomplete symptom relief and/or perception of ineffectiveness, slow speed of onset, short duration of relief, and side effects remain key factors.9,15,18 Some product attributes (eg, bad taste or smell, drippiness related to the fluid volume sprayed in the nose)—real or perceived—also may contribute to dissatisfaction and subsequently to changing, even stopping, treatment. Thus, change and discontinuation rates can provide an indirect measure of satisfaction.

The current survey indicates that patients using prescription medications were not only generally more satisfied with treatment effectiveness than patients taking OTC medications (approximately 80% vs 65%), but also were less likely to switch or discontinue their treatment (approximately 20% and 35%, respectively), supporting observations of greater treatment satisfaction with prescription medications. In part this may reflect better instruction in the clinician’s office about how to use their medications, particularly nasal sprays—a factor that was not evaluated in the survey. Nonetheless, approximately 18% of respondents reported switching from prescription medications to solely using OTC medications, which may reflect changes in labeling and/or financial/insurance considerations. If so, the disparity between change rates for OTC and prescription medications may diminish over time as more prescription products become available OTC. Unfortunately, availability will not solve the problem of 20% to 35% of patients not perceiving the adequacy of their treatment. Approximately 70% of respondents in this survey reported that their prescription medications were covered by insurance (89%) and at the lowest copay (83%) as compared with medications available OTC and within budget (67%). Future surveys with similar queries will be needed to see if the treatment satisfaction difference between prescription and OTC medications lessens or remains the same with different access.

### Table V. Allergy medications used by patients at the time of the survey

<table>
<thead>
<tr>
<th>Medication class</th>
<th>Over the counter</th>
<th>Prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults (n=358)</td>
<td>Children (n=324)</td>
<td>Adults (n=298)</td>
</tr>
<tr>
<td>Oral antihistamine</td>
<td>60% 53%</td>
<td>26% 41%</td>
</tr>
<tr>
<td>Nasal antihistamine†</td>
<td>20% 28%</td>
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</tr>
<tr>
<td>NSAID</td>
<td>9% 11%</td>
<td>7% 12%</td>
</tr>
<tr>
<td>Other</td>
<td>6% 3%</td>
<td>5% 6%</td>
</tr>
<tr>
<td>None</td>
<td>1% 5%*</td>
<td>5% 6%</td>
</tr>
<tr>
<td>Not sure</td>
<td>11% 7%</td>
<td>13% 7%</td>
</tr>
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NSAID. Nonsteroidal anti-inflammatory drug. OTC, over the counter.

*Statistically significant compared with adult respondents at the 95% confidence level.

†Included despite no products currently on the OTC market in the United States. [Specific combination drug product, or drug products, was not specified. It could have been interpreted as a single medication that contains 2 agents (eg, oral antihistamine/decongestant) or a single intranasal product containing 2 agents (eg, intranasal antihistamine/corticosteroid). It also could have been interpreted as using multiple medications or immunotherapy plus and oral medication.

*FIGURE 5. How patients generally managed their/their child’s seasonal allergy (nasal/eye) symptoms. Base = all qualified respondents, N = 1001. Respondents were asked to select all that applied. OTC, Over the counter.

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<td>9% 22%</td>
</tr>
<tr>
<td>NSAID</td>
<td>9% 11%</td>
<td>7% 12%</td>
</tr>
<tr>
<td>Other</td>
<td>6% 3%</td>
<td>5% 6%</td>
</tr>
<tr>
<td>None</td>
<td>1% 5%*</td>
<td>5% 6%</td>
</tr>
<tr>
<td>Not sure</td>
<td>11% 7%</td>
<td>13% 7%</td>
</tr>
</tbody>
</table>

NSAID. Nonsteroidal anti-inflammatory drug. OTC, over the counter.

*Statistically significant compared with adult respondents at the 95% confidence level.

†Included despite no products currently on the OTC market in the United States. [Specific combination drug product, or drug products, was not specified. It could have been interpreted as a single medication that contains 2 agents (eg, oral antihistamine/decongestant) or a single intranasal product containing 2 agents (eg, intranasal antihistamine/corticosteroid). It also could have been interpreted as using multiple medications or immunotherapy plus and oral medication.
Compared with adult respondents, children were less likely to switch from prescription to OTC medications (19% and 13%, respectively) and more likely to switch from OTC medications to using only prescription medications (10% and 16%, respectively). Children also were slightly more likely to have their prescription brands changed, with no difference between ages for switches in formulations. Although changes between formulation and brand were not separated in the Allergies in America surveys, the data similarly suggested that children were more likely to have their prescription allergy medications changed than adults.\textsuperscript{9,15}

The majority of respondents in this survey reported initiating the discussion about treatment options and changing treatment 

**FIGURE 6.** How patients’ medications for seasonal eye/nose allergy symptoms changed in recent years. Base = all qualified respondents, N = 1001. Respondents were asked to select all that applied. OTC, Over the counter; Sx, symptoms.

**FIGURE 7.** Percentage of patient rating criteria for allergy medication as important. Base = all respondents, N = 1001. OTC, Over the counter; Sx, symptoms.
with their HCPs, a factor that could enhance treatment satisfaction by empowering the patient and/or parent to take the lead in managing their (child’s) allergic disease. Symptoms and the negative impact of symptoms on daily life were the primary reasons given to initiate the conversation. It has been suggested that advertisements (TV, print, internet) or recommendations (from family, friends) are the key drivers for patients to initiate that discussion, but the results of this survey suggest otherwise.

Adherence with treatment for this population also appears to be symptom driven. Most respondents reported that they (or their child) typically take medications as prescribed or recommended, but are more likely to do so when experiencing symptoms. Related to this, the more severe the patient’s symptoms, the better the adherence. Given the relatively low rates of discontinuation of treatment and switching medications, it is relevant that the majority of patients reported that their medications met their identified “important criteria” for treatment, namely, completeness of symptom relief, quick onset of relief, long duration of relief, and minimal side effects. The key reasons for lack of adherence were “forgetfulness or dislike of taking medications” and “use only when needed.”

The outcomes of this survey suggest that the patient-treatment paradigm may be improving. Compared with earlier surveys, it appears that patient expectations for treatment are being met to a
greater extent. Whether this reflects the availability of “better” medications or whether HCPs are doing a better job of fine-tuning and explaining treatment for the individual patient is unclear. An important outcome of earlier surveys was a recommendation for patient education.4,5,9,13-18,22 In this survey, 55% of the respondents agreed, when asked, that seasonal allergies are a disease of the immune system, a concept that requires information, though it is not known whether the information came through the HCP or from some other source. Nonetheless, when a patient understands his or her disease, adherence and satisfaction with treatment improve.23 A subanalysis of treatment satisfaction found that patients who identified seasonal allergies as a disease of the immune system were more likely to be satisfied with treatment compared with those who did not. Undeniably, there is a continuing need to educate patients and their families about SARC. It will be of interest to see if this trend in patient education continues and how it relates to patient adherence and satisfaction in future research.

Since the earlier surveys, pharmacists have taken on a larger role in patient care, and that is reflected here. Approximately 4% of the patients in this survey reported seeing a pharmacist at least once a year for treatment. This likely reflects the recent movement within the health care system from a primary care model to a retail clinic model as found in some other countries.24 This model encourages pharmacists to be part of the primary health care team so that physicians can focus on more complex cases.25 It is a topic that needs to be further explored as the implications for patient care are not clearly delineated.

This survey assessed the respondent’s (or child’s) symptom experience. It was entirely conducted by patient (or parent) perspective only, without physician oversight or guidance. Even diagnosis was based on respondent report without a requirement for current symptoms. Although lack of guidance may be considered a positive for some queries, the fact that the questionnaire was entirely based on subjective responses without use of validated scales is an inherent limitation as is the fact that the respondent’s interpretation of some treatments (ie, “combination products,” “sprays”) was not defined. Whether or not respondents truly understood their medications is not clear. Although 20% of adults and 28% of children were reported as using OTC INAH, there currently are no such products available in the US market. Also, as noted earlier, parent respondents may have a different perspective of their teen child’s morbidity.

Other limitations are those related to the conduct of surveys. The study sample may not represent a random sample of SARC sufferers in the United States; respondents were recruited from a mass mailing and then balanced and weighted to reflect all US patients with SARC. Those who responded might be more likely to do so if they had a recent bout of symptoms or were symptomatic. This was not evaluated. Related to this, the survey was conducted in early March—mid-spring hay fever season in some regions. Patients in those regions, likely to be symptomatic or to have more severe symptoms, might have been more likely to respond and to seek care. However, because this retrospective analysis had no requirement as to when patients were last symptomatic, differences in recall time between symptoms and survey completion might also have skewed the data. The study was conducted online, possibly excluding potential subjects without computer access.

The response rate for this survey was low: 1.2% (1,001 of 79,839 households contacted by email). This may also reflect the online nature of the survey, though response rates for telephone surveys have varied broadly, from 1.4% for the Pediatric Allergies in America survey9 to as high as 25.7% for the Burden of Rhinitis in America survey.13 Nonetheless, the findings of this study are similar to those of earlier surveys confirming the
severity of symptoms by season and that the impact of SARC symptoms on QoL and productivity for the affected individual is significant. Despite the continued unmet needs for a still substantial percentage of the population with SARC, there appear to be some points of encouragement with regard to satisfaction with treatment and increased patient responsibility for management. Continued efforts to better understand this disease and its consequences, to increase access to therapy and make available newer medications, and to deal with the challenges of management still have the potential to further improve control of the disease and positively modify its outcomes. Future surveys will be necessary to confirm these trends.

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REFERENCES
APPENDIX E1. SURVEY QUESTIONS FOR US RESPONDENTS

Background

Base: all respondents.

Q268 Are you...

1 Male
2 Female

Base: all respondents.

Q270 In what year were you born? Please enter your response as a 4-digit number (eg. 1977).

Base: all respondents age 18+

Q600 How many children between the ages of 12 and 17, for who you are the parent or guardian, live in your household?

Base: all respondents age 18+ who have children.

Q605 Next, we would like to find out the age and gender of each child between the ages of 12 and 17 in your household for who you are the parent or legal guardian. For each child below, please enter his or her age and gender.

Base: all respondents age 18+

Q610 Have you, or any of your children aged 12-17, been told by a doctor (diagnosed) that you have any of the following conditions?

1 Year round nasal allergies (perennial allergic rhinitis)
2 Seasonal nasal allergies (seasonal allergic rhinitis)
3 Asthma
4 Obesity/overweight
5 Depression
6 Attention deficit disorder
7 Anxiety disorders
8 Cancer
9 Diabetes
10 Sleep disorders
11 None of these

Main Survey—About Their Condition

Base: all qualified respondents.

Q105 When [(“do you”) OR (“does your child”)] experience seasonal allergy (nasal and/or eye) symptoms? Please select all that apply.

1 Spring
2 Summer
3 Fall
4 Winter

Base: all qualified respondents.

Q110 Now, we would like to get a clearer picture of the allergies that [(“you have”) OR (“your child has”)] and the severity. What kinds of things trigger the seasonal allergy symptoms [(“you have”) OR (“your child has”)? Please select all that apply.

1 Tree pollen
2 Grass pollen
3 Weed pollen
4 Mold spores
5 Other—specify
6 Do not know

Base: all qualified respondents.

Q115 When are [(“your”) OR (“your child’s”) seasonal allergy symptoms the worst? Please select one.

1 Spring
2 Summer
3 Fall
4 Winter

Base: all qualified respondents.

Q120 Generally, how would you classify [(“your”) OR (“your child’s”) allergy symptoms for each season? 1, Mild; 2, Moderate; 3, Severe

1 Spring
2 Summer
3 Fall
4 Winter

Base: all qualified respondents.

Q130 When experiencing seasonal allergy symptoms, how frequently [(“do you”) OR (“does your child”)] suffer from them?

1 Less than once a month
2 Monthly
3 Weekly
4 Daily
Base: all qualified respondents.

Q135 At what age [(“were you”) OR (“was your child”)] first diagnosed with seasonal allergies?

Base: all qualified respondents.

Q140 What is the most bothersome allergy symptom that [“(you seek”) OR (“your child seeks”) ] treatment for? Please select one.
1 Runny nose
2 Stuffy nose
3 Itching
4 Itchy eyes
5 Congestion
6 Sneezing
7 Headaches/sinus pain
8 None of these

Base: all qualified respondents.

Q145 Which of the following words, if any, describe how [“(you feel”) OR (“your child feels”) ] when suffering from seasonal allergy (nasal and/or eye) symptoms? Please select all that apply.
1 Angry
2 Unhappy
3 Distracted
4 Having poor concentration
5 Embarrassed
6 Frustrated
7 Irritable
8 Tired
9 Upset
10 Unattractive
11 Unproductive/having reduced productivity
12 Unable to perform at [“(my”) OR (“his or her”) ] best
13 Less confident
14 Indifferent/don’t care
15 None of these

Base: all qualified respondents.

Q150 At what age did [“(you”) OR (“your child”) ] first start taking medications to treat [“(your”) OR (“his or her”) ] seasonal allergy (nasal and/or eye) symptoms?

Base: all qualified respondents.

Q155 The next few questions are about [“(your”) OR (“your child’s”) ] allergies when [“(you don’t”) OR (“he or she doesn’t”) ] take [“(your”) OR (“his or her”) ] allergy medication. Please think back to those times when [“(you have not taken your”) OR (“your child has not taken his or her”)] seasonal allergy medications. How would you describe [“(your”) OR (“his or her”) ] symptoms?
1 Mild
2 Moderate
3 Severe

Base: all qualified respondents.

Q160 Using the scale below, how severe would you say each of the following allergy symptoms is when [“(you have”) OR (“your child has”) ] not taken medication to treat it? 1, Not at all severe; 2, Mildly severe; 3, Very severe
1 Nasal congestion
2 Runny nose
3 Stuffy Nose
4 Sneezing
5 Itching
6 Itchy eyes
7 Headaches/sinus pain

Base: all qualified respondents.

Q165 Using the scale below, how much do [“(your”) OR (“your child’s”) ] seasonal allergy symptoms (nasal and/or eye) interfere with each of the following? 1, Not at all; 2, A little; 3, A lot
1 Productivity at work or school
2 Leisure/social activities
3 Sleep

Base: allergies interfered with work or school.

Q170 Allergies can often make people feel that they are less productive at work or school. During a month when [“(you typically suffer”) OR (“your child typically suffers”) ] from seasonal allergies (nasal and/or eye), how many days of work or school would you say [“(you were”) OR (“your child was”) ] less productive than [“(you usually are”) OR (“your child usually is”) ] on account of [“(your”) OR (“their”) ] seasonal allergies?
1 None
2 1-5 days
3 6-10 days
4 11-20 days
5 21-30 days
6 Don’t know

Main Survey—Treatment Options, Awareness, and Usage

Base: all qualified respondents.

Q200 [“(Have you”) OR (“Has your child”) ] seen a doctor and been tested for seasonal allergies?
1 Yes
2 No

Base: all qualified respondents.

Q205 What took place before [“(you”) OR (“your child”) ] visiting the doctor to get tested for seasonal allergies (nasal and/or eye)? Please select all that apply.
1 [“(T)” OR (“My child”) ] suffered from some seasonal allergy symptoms such as itchy eyes, runny nose, and sneezing.
2 [“(T)” OR (“My child”) ] tried some over-the-counter products based on advertising I saw about seasonal allergy symptoms.
3 [“(T)” OR (“My child”) ] tried some over-the-counter products based on a friend’s recommendation.
4 [“(T)” OR (“My child”) ] tried some over-the-counter products based on a pharmacist’s recommendation.
5 [("I") OR ("My child")]] tried some over-the-counter products based on reading the labels of multiple products in the store.
6 [("I") OR ("My child")]] had to take time off of work/school because symptoms were so bad.
7 None of these.

Base: all qualified respondents.

Q210 Which, if any, of the following doctors or health care professionals have you seen about ["(your") OR ("your child’s")]] seasonal allergy symptoms (nasal and/or eye)? Please select all that apply.
1 Primary care physician
2 Allergy specialist
3 Ear, nose, and throat specialist
4 Pediatrician
5 Pharmacist
6 Nurse practitioner
7 Other health care professional
8 None

Base: all qualified respondents.

Q215 Which of the following doctors/health care professionals, if any, are currently treating ["(your") OR ("your child’s")]] seasonal allergy symptoms (nasal and/or eye)? Please select all that apply.
1 Primary care physician
2 Allergy specialist
3 Ear, nose, and throat specialist
4 Pediatrician
5 Pharmacist
6 Nurse practitioner
7 Other health care professional—specify
8 None

Base: all qualified respondents.

Q220 True or false; seasonal allergies are a disease of the immune system. Please select one.
1 True
2 False

Base: all qualified respondents who have seen a health care professional.

Q225 How often do ["(you go") OR ("you take your child")]] to each of the following health care professionals listed below due to ["(your") OR ("your child’s")]] seasonal allergy symptoms (nasal and/or eye)?
1 Once a year or less often
2 2-3 times a year
3 4-6 times a year
4 7-11 times a year
5 More than once a month
   1 Primary care physician
   2 Allergy specialist
   3 Ear, nose, and throat specialist
   4 Pediatrician
   5 Pharmacist
   6 Nurse practitioner
   7 [OTHER FROM SPECIFY AT Q215]

Base: all qualified respondents.

Q230 When talking to your doctor about prescription treatments for ["(your") OR ("your child’s")]] seasonal allergies (nasal and/or eye), who initiates the discussion about different treatment options/choices? Please select only one answer.
1 I initiate the discussion.
2 I initiate the discussion after seeing a TV ad for a specific prescription allergy medication.
3 I initiate the discussion after seeing a print ad for a specific prescription allergy medication.
4 I initiate the discussion after seeing an internet ad for a specific prescription allergy medication.
5 I initiate the discussion after a recommendation from a friend or family member.
6 My doctor initiates the discussion.

Base: all qualified respondents.

Q235 How ["(do you") OR ("does your child")]] generally manage ["(your") OR ("his or her")]] seasonal allergy symptoms (nasal and/or eye)? Please select all that apply.
1 Allergy shots
2 Prescription oral allergy medication
3 Prescription allergy nasal spray
4 Prescription allergy eye drops
5 Nonprescription/over-the-counter oral allergy medication
6 Nonprescription/over-the-counter allergy nasal spray
7 Nonprescription/over-the-counter allergy eye drops
8 Vitamins
9 Herbal supplements
10 [("I don’t take") OR ("My child does not take")]]/use anything

Base: all qualified respondents who use at least one medication to treat seasonal allergy symptoms.

Q240 How satisfied are you with the effectiveness of each of the following types of medication ["(you use") OR ("your child uses")]] to relieve ["(your") OR ("his or her")]] seasonal allergy symptoms? Scale: 1, Not at all satisfied; 2, Somewhat satisfied; 3, Satisfied; 4, Very satisfied; 5, Extremely satisfied
1 Allergy shots
2 Prescription oral allergy medication
3 Prescription seasonal nasal spray
4 Prescription allergy eye drops
5 Nonprescription/over-the-counter oral allergy medication
6 Nonprescription/over-the-counter seasonal spray
7 Nonprescription/over-the-counter allergy eye drops

Base: all qualified respondents.

Q245 Which of the following type(s) of allergy medication ["(are you") OR ("is your child")]] using? Please select all that apply. Indicative: 1, Over-the-counter; 2, Prescription
1 Oral antihistamine
2 Nasal antihistamine
3 Nasal corticosteroid
4 Oral decongestant
5 Nasal decongestant
6 Nonsteroidal anti-inflammatory
7 Combination medicines
8 Other
9 None
10 Not sure

Base: all qualified respondents.

Q250 How has the treatment of [("your") OR ("your child's")] seasonal allergy symptoms (nasal and/or eye) changed in recent years? Please select one.
1 [("I have") OR ("My child has") only ever taken medications prescribed by [("my") OR ("his or her")]
   doctor, but the brand of medication has changed over time.
2 [("I have") OR ("My child has") only ever taken medications prescribed by [("my") OR ("his or her")]
   doctor, but the form of medication has changed over time (eg, from oral medication to nasal sprays or vice versa).
3 [("I have") OR ("My child has")] begun taking over-the-counter medications to supplement the
   prescriptions [("my") OR ("his or her")]
   doctor has prescribed.
4 [("I have") OR ("My child has") [("I have") OR ("My child has") switched from taking prescription
   medications to using only over-the-counter medications.
5 [("I have") OR ("My child has") [("I have") OR ("My child has") switched brands of over-the-counter
   medication but [("am") OR ("is")] using the same type of medication (eg, nasal spray, oral medication, etc.).
6 [("I have") OR ("My child has") switched from taking only over-the-counter medications to using only those
   prescribed by a doctor.
7 [("I have") OR ("My child has") started taking different kinds of over-the-counter medication to treat
   [("my") OR ("their") various symptoms.

Base: all qualified respondents.

Q255 When do you typically re-evaluate the care [("you receive") OR ("your child receives") for seasonal allergies
   (nasal and/or eye)? Please select all that apply.
1 At the beginning of every allergy season
2 Only when changes are made to [("my") OR ("my child’s")]
   health insurance
3 When [("I change") OR ("my child changes") primary
   care physicians
4 When symptoms are no longer managed with current
   care
5 None of the above

Base: all qualified respondents.

Q260 When [("do you") OR ("does your child")]
   typically start taking [("your") OR ("his or her")]
   medication to treat [("your") OR ("their") seasonal allergy symptoms (nasal and/or eye)? Please select one.
1 Before allergy season starts
2 At the start of [("my") OR ("their")]
   allergy season before any symptoms start
3 Only when [("I have") OR ("my child has")] symptoms
4 When symptoms first arise and continue taking until
   they subside
5 Every day to ward off symptoms
6 Constantly, [("I always seem") OR ("my child always
   seems") to be on some type of seasonal allergy medication.

Base: all qualified respondents.

Q265 Which of the following is closer to [("your") OR ("your child’s")]
   situation? Please select one.
1 [("I only take") OR ("My child only takes")
   medications to treat [("my") OR ("their")]
   seasonal allergies [("my") OR ("their")]
   doctor prescribes or over-the-counter medication that [("my") OR ("their")]
   doctor or pharmacist recommends.
2 [("I take") OR ("My child takes")
   medications prescribed by [("my") OR ("their")]
   doctors recommend but sometimes add over-the-counter medications to treat
   specific symptoms.
3 [("I take") OR ("My child takes")
   over-the-counter medications that I choose without the benefit of
   [("my") OR ("their")]
   doctors’ recommendation.
4 None of these

Base: uses prescription medications.

Q270 Would you say the prescription medications [("you take")
   OR ("your child takes")]
   seasonal allergies (nasal and/or eye) have become more or less expensive over the last year?
1 More expensive
2 Less expensive
3 About the same

Base: uses over-the-counter medications.

Q275 Would you say the over-the-counter medications [("you take")
   OR ("your child takes")]
   seasonal allergies (nasal and/or eye) have become more or less expensive over the last year?
1 More expensive
2 Less expensive
3 About the same

Base: all qualified respondents.

Q280 How important is it to you that [("your") OR ("your child’s")]
   seasonal allergy medication (nasal and/or eye) meets each of the following criteria? Scale: 1, Not at all
   important; 2, Somewhat important; 3, Very important; 4, Extremely important
1 Is the newest on the market
2 Is the most effective allergy medication on the market
3 Is effective
4 Gives [("me") OR ("my child")]
   the freedom to do
   more of what [("I") OR ("they")]
   want to do
5 Is fast acting/ provides quick relief
6 Does not cause drowsiness
7 Relieves a broad range of allergy symptoms
8 Is easy to use
9 Has few side effects
10 Is a brand I know and trust
11 Provides consistent relief from ["my"] OR ("my child’s") indoor and outdoor allergy symptoms
12 Is covered by my prescription plan
13 Is available at my lowest copay
14 Is available over the counter and without a doctor’s prescription
15 Is available over the counter and is within my budget
16 Works with other medications to provide treatment
17 Comes in a form ["I like"] OR ("my child likes")

Base: Currently using seasonal allergy medications.

Q285 Thinking about the medications ["you take"] OR ("your child takes")], how strongly do you agree or disagree that your current prescription seasonal allergy medication meets each of the following criteria? Scale: 1, Strongly disagree; 2, Somewhat disagree; 3, Somewhat agree; 4, Strongly agree
1 Is the newest on the market
2 Is the most effective allergy medication on the market
3 Is effective
4 Gives ["me"] OR ("my child") the freedom to do more of what ["I"] OR ("they") want to do
5 Is fast acting/provides quick relief
6 Does not cause drowsiness
7 Relieves a broad range of allergy symptoms
8 Is easy to use
9 Has few side effects
10 Is a brand I know and trust
11 Provides consistent relief from ["my"] OR ("my child’s") indoor and outdoor allergy symptoms
12 Is covered by my prescription plan
13 Is available at my lowest copay
14 Is available over the counter without a doctor’s prescription
15 Is available over the counter and is within my budget
16 Comes in a form ["I like"] OR ("my child likes")

Main Survey—Compliance

Base: all qualified respondents.

Q300 Is the way ["you take"] OR ("your child takes") ["your"] OR ("his or her") allergy medications exactly as the doctor prescribed (eg, taken daily or 2 times per day as the doctor indicated)?
1 Yes, ["I always take"] OR ("my child always takes") ["my"] OR ("his or her") allergy medications exactly as the doctor prescribed.
2 No, ["I try"] OR ("my child tries") to take ["my"] OR ("his or her") antiallergy medications as prescribed, but sometimes ["I am"] OR ("he or she is") not able to.
3 No, ["I take"] OR ("he or she takes") ["my"] OR ("his or her") antiallergy medications only when ["I have"] OR ("my child has") symptoms.

Base: does not take medications as prescribed.

Q305 Why ["don’t you take"] OR ("doesn’t your child take") ["your"] OR ("his or her") allergy medication as prescribed?
[OPEN END TEXT BOX]
medications exactly as prescribed? Please select all that apply.
1 Cost
2 Easier to know when to refill
3 Taste
4 Ease of use
5 Convenient dosing schedule
6 Few side effects (eg, drowsiness)
7 Rapid onset of effect
8 Is covered by my health insurance