

# Nasal allergies in the Latin American population: Results from the Allergies in Latin America survey

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## ABSTRACT

*Allergies in Latin America is the first cross-national survey that describes the symptoms, impact, and treatment of nasal allergies (NAs) in individuals  $\geq 4$  years old in Latin America (LA). In total, 22,012 households across the Latin American countries of Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Venezuela were screened for children, adolescents, and adults with a diagnosis of NA and either symptoms or treatment in the past 12 months. A total of 1088 adults and 457 children and adolescents were included and the sample was probability based to ensure valid statistical inference to the population. Approximately 7% of the LA population was diagnosed with NAs with two of three respondents stating that their allergies were seasonal or intermittent in nature. A general practice physician or otolaryngologist diagnosed the majority of individuals surveyed. Nasal congestion was the most common and bothersome symptom of NAs. Sufferers indicated that their symptoms affected productivity and sleep and had a negative impact on quality of life. Two-thirds of patients reported taking some type of medication for their NAs, with a roughly equal percentage of patients reporting taking over-the-counter versus prescription medications. Changing medications was most commonly done in those reporting inadequate efficacy. The most common reasons cited for dissatisfaction with current medications were related to inadequate effectiveness, effectiveness wearing off with chronic use, failure to provide 24-hour relief, and bothersome side effects (e.g., unpleasant taste and retrograde drainage into the esophagus). Findings from this cross-national survey on NAs have confirmed a high prevalence of physician-diagnosed NAs and a considerable negative impact on daily quality of life and work productivity as well as substantial disease management challenges in LA. Through identification of disease impact on the LA population and further defining treatment gaps, clinicians in LA may better understand and treat NAs, thus leading to improvements in overall patient satisfaction and quality of life.*

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**A**llergic rhinitis (AR), a chronic inflammatory disease of the upper airways, is characterized by nasal itching, sneezing, rhinorrhea, and nasal obstruction.<sup>1</sup>

AR is considered to be one of the most prevalent chronic conditions affecting children and adults and its prevalence continues to increase worldwide. However, the prevalence appears to be increasing at a higher rate in Latin America (LA) compared with other regions according to the comparison between Phase I and Phase III of the International Study of Asthma and Allergies in Childhood (ISAAC) survey.<sup>2,3</sup>

AR, considered a nuisance by many, has been studied with great exuberance over the past years to ascertain the true burden of disease. Recent studies have shown that AR is associated with increases in school and work absenteeism and presenteeism (reduced productivity at work).<sup>4,5</sup> Additionally, it has been shown to impair health-related quality of life and impose a considerable economic burden on the health care system.<sup>6–9</sup> Furthermore, studies have shown that subjects with poorly controlled AR can also suffer from sleep disturbances, chronic fatigue, learning impairment, decreased energy, anxiety, and diminished social interaction.<sup>5,6,10,11</sup>

To effectively manage AR and associated quality of life sequelae, AR often requires the chronic use of medications

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For more information about the Allergies in Latin America survey please visit [www.allergiesinlatinamerica.com](http://www.allergiesinlatinamerica.com)

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that address the underlying cause of the disease and do not necessarily take into consideration palliative issues. Current therapeutic approaches for the treatment of AR include antihistamines, decongestants, leukotriene modifiers, and intranasal corticosteroids (INCS). Although oral antihistamines are an effective first-line pharmacologic treatment for intermittent or mild persistent AR, they do not adequately address the underlying component of the disease, *viz.*, inflammation. Moreover, sedating antihistamines can have deleterious side effects including sedation, impaired cognitive function, and cardiac arrhythmias.<sup>12-14</sup> INCS, by contrast, are regarded as the most effective first-line therapy for patients with moderate to severe AR because they reduce localized inflammation within the nasal mucosa, thereby eliminating the underlying inflammatory cause of the disease.<sup>9,15,16</sup> Interestingly, however, data suggest that patients may not be satisfied with these agents because of, in large part, perceived efficacy and safety concerns in addition to undesirable side effects that lead to poor medication adherence and compliance.<sup>17-21</sup> Concern about adverse events and limited knowledge regarding international guidelines for rhinitis management may, in part, explain why primary care physicians and pediatricians prescribe unusually low volumes of INCS agents in LA.<sup>22</sup> Although several large-scale studies and surveys (*e.g.*, Allergies in America survey), have attempted to ascertain the true prevalence of nasal allergies (NAs), its impact on quality of life and current treatment gaps within the United States and European Union,<sup>6,18,23,24</sup> no such studies or surveys have addressed the true burden of NAs in LA. Therefore, the Allergies in Latin America survey was undertaken in an attempt to further clarify the prevalence of physician-diagnosed NAs, its impact on quality of life, existing treatment paradigms and treatment gaps associated with NAs, and the medications currently used to treat this disease.

## METHODS

### Allergies in Latin America Survey

Persons targeted for this survey included children and adolescents between the ages of 4 and 18 years as well as adults aged  $\geq 18$  years old residing in one of eight Latin American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Venezuela) who were currently experiencing or being treated for NAs after having been diagnosed by a physician as having AR or NAs. A total of 457 interviews were completed with parents of NA sufferers 4–18 years of age and a total of 1088 interviews were completed with adults having current NAs across the eight countries.

Fieldwork was conducted between February and April of 2008 and during which both telephone and in-person interviews were conducted. Most of the interviews were completed in urban areas because of the low telephone

penetration and lack of interviewing infrastructure in the rural areas of LA. The average interview length was 41 minutes. The survey was developed and conducted by ABT SRBI, an international survey research organization. The survey sponsor was NYCOMED, a research-based pharmaceutical company.

The maximum expected sampling error for a simple random sample of 1088 cases (*e.g.*, the adult Latin American sample) would be +3.0 percentage points at the 95% confidence level. The maximum expected sampling error for a simple random sample of 457 cases (*e.g.*, the pediatric Latin American sample) would be +4.6 percentage points at the 95% confidence level. The maximum expected sampling error for a simple random sample for country-specific samples from the Latin American survey would be +5.7 percentage points for sample sizes of 300, +9.8 percentage points for sample sizes of 100, and +13.9 percentage points for sample sizes of 50, at the 95% confidence level. It should be noted that household sampling for face-to-face interviews is conducted in a more complex design using cluster sampling so design effects may increase actual sampling variance compared with simple random sampling.

A high-level overview of the study design and breakdown of the number of households screened and surveyed can be found in Table 1 for the adults and Table 2 for children and adolescents. It is important to note that the population surveyed and presented in these two tables was diagnosed with AR or NA by a physician.

### Development of Survey Questionnaires

Because validated and standardized questionnaires specific to ascertaining the prevalence, impact, and treatment gaps associated with NAs did not exist at the time of the survey, the research firm Schulman, Ronca, and Bucuvalas, Inc., along with expert physicians in the AR field from LA collaborated to develop patient and health care professional questionnaires that would accurately collect relevant information on NAs within the Latin American Countries surveyed. Survey questions were developed through analysis of relevant literature, identification of questions used to study similar diseases in accepted health surveys, and review of pertinent questions developed for two previous studies supported by NYCOMED.<sup>4,25</sup> The developed questionnaires focused on general health, NA triggers, NA symptoms, effects of allergies on quality of life, NA medications, their effectiveness, and side effects.

AR questionnaires were reviewed, edited, and approved by a panel of AR experts. Weights were developed to correct for sampling bias and differences between eligible patients screened and eligible patients actually interviewed. An age and gender correction ensured that the interviewed population was similar to

Table 1 **Adult survey population and study sampling frame**

Population	Sampling Frame	Interview Length
Adults diagnosed with nasal allergies or allergic rhinitis, symptomatic or being treated for nasal allergies in the past 12 mo	Telephone and in-person screening of national or major city sample of households	Range: 20–166 min Mean: 41.4 min Note: Interview length excludes Colombia and Ecuador
Country	Number of Households Screened	Completed Sample (Adults)
Argentina	6236	173
Brazil	4618	285
Mexico	6539	305
Chile	1017	74
Colombia	213	57
Ecuador	1570	56
Peru	943	69
Venezuela	875	69
TOTAL	21,011	1088

Table 2 **Child survey population and study sampling frame**

Population	Sampling Frame	Interview Length
Children and adolescents diagnosed with nasal allergies or allergic rhinitis, symptomatic or being treated for nasal allergies in the past 12 mo	Telephone and in-person screening of national or major city sample of households	Range: 20–166 min Mean: 41.4 min Note: Interview length excludes Colombia and Ecuador
Country	Number of Households Screened	Completed Sample (Children)
Argentina	6236	45
Brazil	4618	123
Mexico	6539	107
Chile	1017	26
Colombia	213	43
Ecuador	1570	42
Peru	943	40
Venezuela	875	31
TOTAL	21,011	457

the screened population of allergy sufferers. Cross-tabulation and frequency weighting was used in all analyses to determine critical survey outcomes.

### Survey Questions

Questions in the patient survey relevant to this publication are detailed, by domain, in the Appendix.

## RESULTS

### Demographics

The major demographic characteristics captured from survey participants are displayed in Table 3.

There was approximately a 2:1 ratio of females versus males surveyed. The majority of respondents had some schooling with the majority having education up through the secondary level. There were slightly more respondents who cited having only public insurance versus those who cited having private insurance.

### Prevalence of AR or NAs Diagnosed by Physicians in LA

The Allergies in Latin America survey found that 6.6% of respondents across the eight countries surveyed had a physician diagnosis of AR or NAs (used

Table 3 Demographics

Parameter	Percent
Sex	
Male	32.6
Female	67.4
School attendance	
No school	1.3
Primary education	11.5
Secondary education	29.3
University	16.4
Postgraduate	0.8
Do not know	0.3
Refused	1.4
Other	39.5
Insurance types	
Private	33
Public	41.3
Both	6.5
None	17.2
Do not know	1.1
Refused to answer	0.6

synonymously for purposes of this study). Among Latin American countries surveyed, Peru and Venezuela reported the highest prevalence of NAs and Argentina reported the lowest prevalence of diagnosed NAs. A complete breakdown of the prevalence of AR across the eight countries can be found in Fig. 1.

A large majority of adults with diagnosed NAs across all eight countries reported having seasonal or intermittent NAs rather than NAs occurring throughout the year. Adults with NAs in Peru reported the highest rate of seasonal allergies whereas Ecuador reported the lowest rate of seasonal allergies. The reason for the low rate to seasonal allergies in Ecuador is likely ascribed to the minimal seasonal variation in this region.

Equally, the majority of parents of children and adolescents with NAs across all eight countries reported that their children's and adolescents NAs were seasonal or intermittent rather than occurring throughout the year. Parents of children and adolescents with NAs in Mexico reported the highest rate of seasonal allergies whereas the parents of children and adolescent's with NAs in Argentina reported the lowest rate of seasonal allergies (Fig. 2, A and B). Interestingly, despite nearly two-thirds of respondents stating that their allergies were seasonal or intermittent in nature, the major allergy trigger reported by survey participants was dust, a typical perennial allergen due to the high level of mite-related antigens (73% of adults and 74% of children and adolescents surveyed).

With regard to diagnosis of disease, the majority of adult survey respondents reported having been diag-

nosed with NAs by their general practice physician (37%) or an otolaryngologist (29%). Other physicians making the first diagnosis of NAs included allergists (13%), pediatricians (6%), pulmonologists (4%), family practice physicians (2%), internists (1%), dermatologists (1%), and others (7%). A similar pattern was observed in the child respondents (20% diagnosed by their general practice physician and 20% having been diagnosed by their otolaryngologist). The majority of individuals who were surveyed reported that they had the diagnosis of NA confirmed by a skin-prick test, a blood test, or both (57% of adults and 61% of children and adolescents surveyed).

When survey participants were asked to rate their general health and other concomitant conditions, 31% adult participants and 33% of pediatric participants reported an overall health rating of poor to fair or poor. When asked about other concomitant medical conditions, essentially one-quarter of adults, adolescents, and children included in the survey reported having been diagnosed with asthma. Adult participants were also asked what concomitant conditions they experienced within the past 4 weeks after a NA exacerbation. Nearly 50% reported suffering from the cold or flu (47%) followed closely by migraine headaches (41%). Over one-third reported having sinusitis or gastroesophageal reflux disease (GERD)-related symptoms (33 and 30%, respectively). The most frequently occurring concomitant conditions in adolescents and children, like in the adults, were cold or flu (52%) followed by migraine headaches (31%). Sinusitis and GERD-related symptoms were reported less frequently in children and adolescents compared with adults (26% versus 33% and 30% versus 13%, respectively). A complete breakdown of the most frequently occurring health-related conditions during or after an NA exacerbation reported in adults, children, and adolescents with NAs are displayed in Fig. 3, A and B.

### Symptoms Associated with AR and NAs in Latin American Patients

Adults with NAs in LA were asked about the frequency with which they experienced specific symptoms. Overall, more than one-half of them reported that they experienced nasal congestion every day or most days when their NAs were most severe. Additionally, nearly one-half reported nasal itching (49%) and repeated sneezing (47%) on all or most days in their worst month. A similar pattern emerged in children and adolescents with NAs. A full descriptive breakdown of the most bothersome symptoms reported by children, adolescents, and adults diagnosed with NAs are displayed in Fig. 4, A and B.

Patients with NAs reported a significant amount of discomfort during NA attacks. The majority of adults



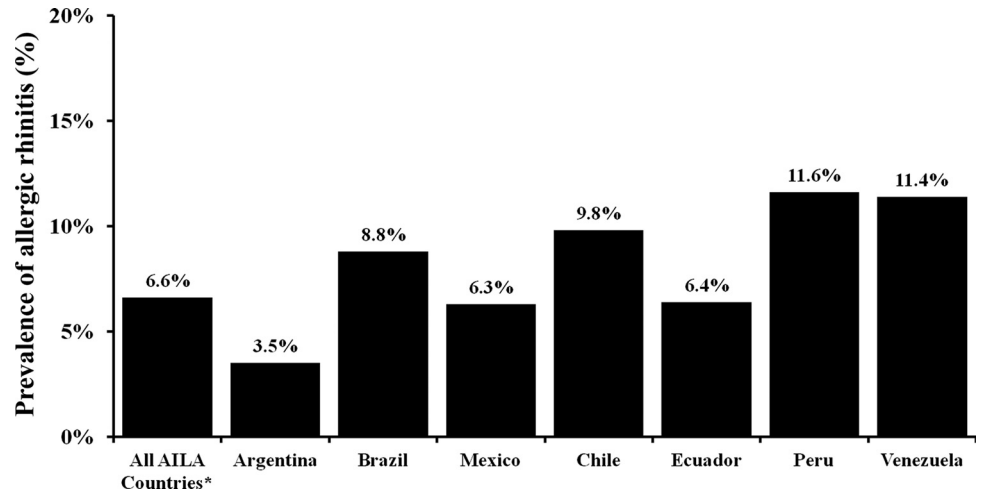


Figure 1. Prevalence of allergic rhinitis overall and by specific Latin American countries.

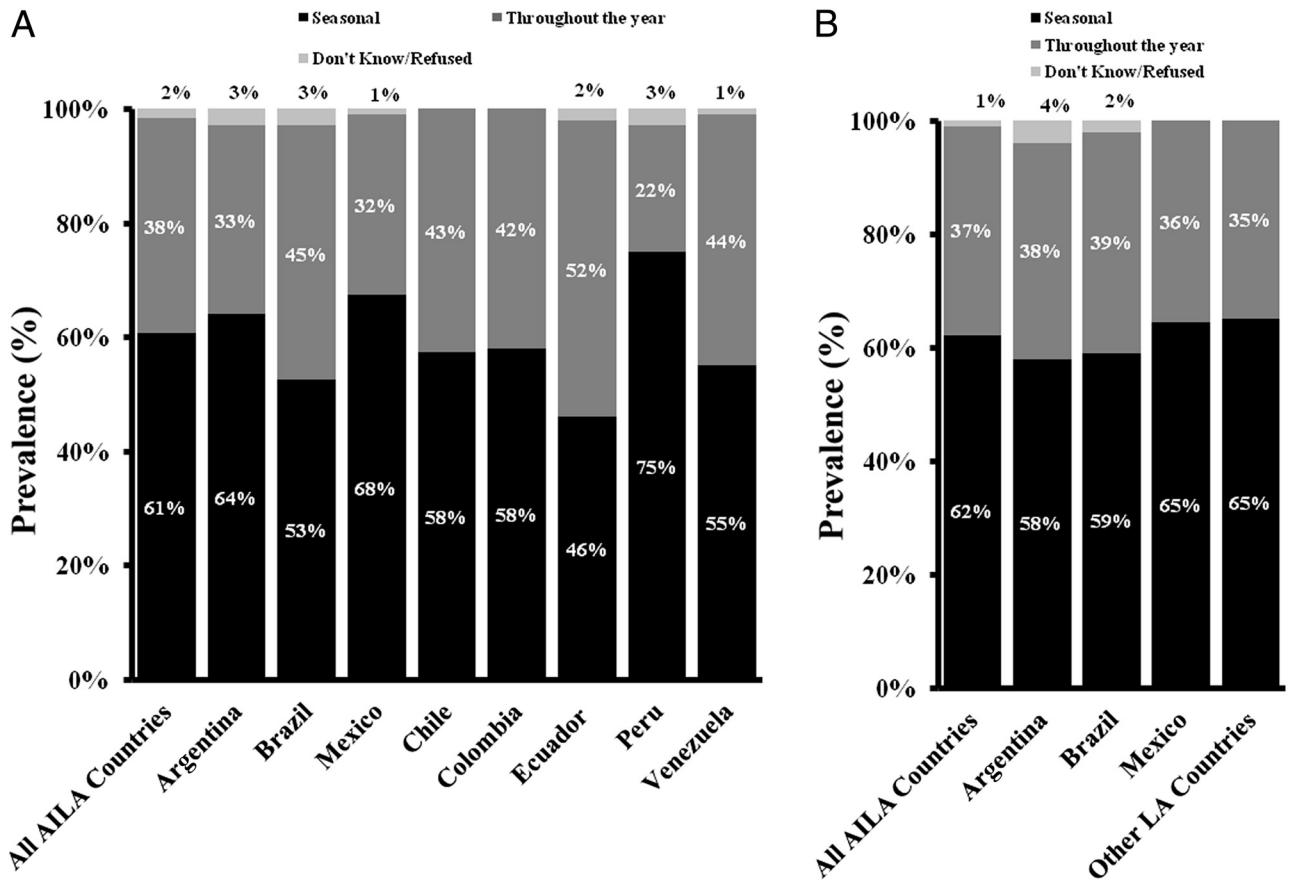


Figure 2. Breakdown of seasonal/intermittent versus persistent nasal allergies in (A) Latin American adults and (B) Latin American children and adolescents.

with NAs in LA (53%) stated that the discomfort they experience during an allergy attack is so severe that they can not tolerate it without relief. The greatest discomfort was found in Argentinians where 71% of adults surveyed reported that they could not tolerate their allergy symptoms without relief. With the exception of Brazil (39%), more than one-half of the adult NA sufferers surveyed in the other countries reported that they could not tolerate their NA symptoms with-

out relief. Similarly, the majority of parents of children and adolescents with NAs in LA (53%) said that the discomfort their children and adolescents experience during an allergy attack is so severe that they can not tolerate it without relief. Like in the adults with NAs, the greatest discomfort was found in Argentinian children and adolescents where 69% of those surveyed reporting that they could not tolerate their allergy symptoms without relief. The lowest rate was found in

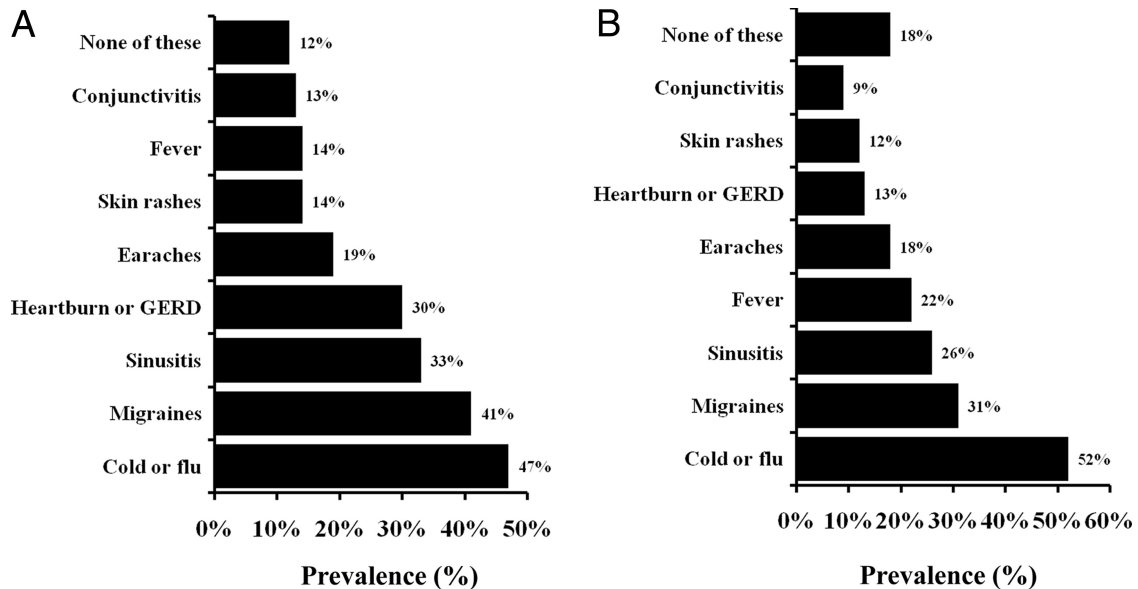


Figure 3. Concomitant diseases among (A) Latin American adults and (B) Latin American children and adolescents with nasal allergies in Latin America.

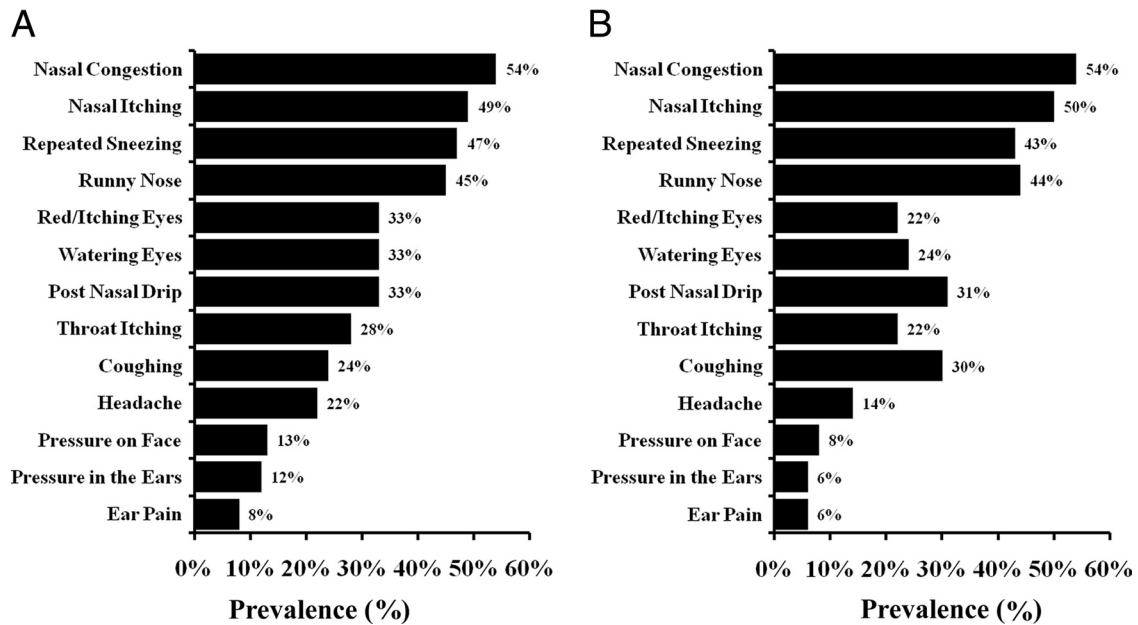


Figure 4. Most bothersome nasal allergy symptoms experienced by (A) Latin American adults and (B) Latin American children and adolescents when nasal allergies are at their worst.

Brazilian children and adolescents where 38% reported not being able to tolerate their symptoms without relief.

### Quality-of-Life Impact of AR and NAs in Latin American Patients

The Allergies in Latin America survey also assessed the impact of NA symptoms on quality of life. Almost all patients with NAs reported that the condition had an impact on their daily life when NA was at its worst. To this end, one-half of the adults surveyed reported that NAs affected their lives to at least a moderate

degree. Similarly, almost all parents of children and adolescents with NAs reported that the disease had some impact on their child's daily life when symptoms were most severe. Forty-one percent of children and adolescents reported having their daily life impacted to at least a moderate degree when their NAs were at their worst.

When adults were asked to identify specifically how NAs impacted their daily activities, they reported they were limited to some degree in having pets; exercising; and engaging in social, family, and outdoor activities.

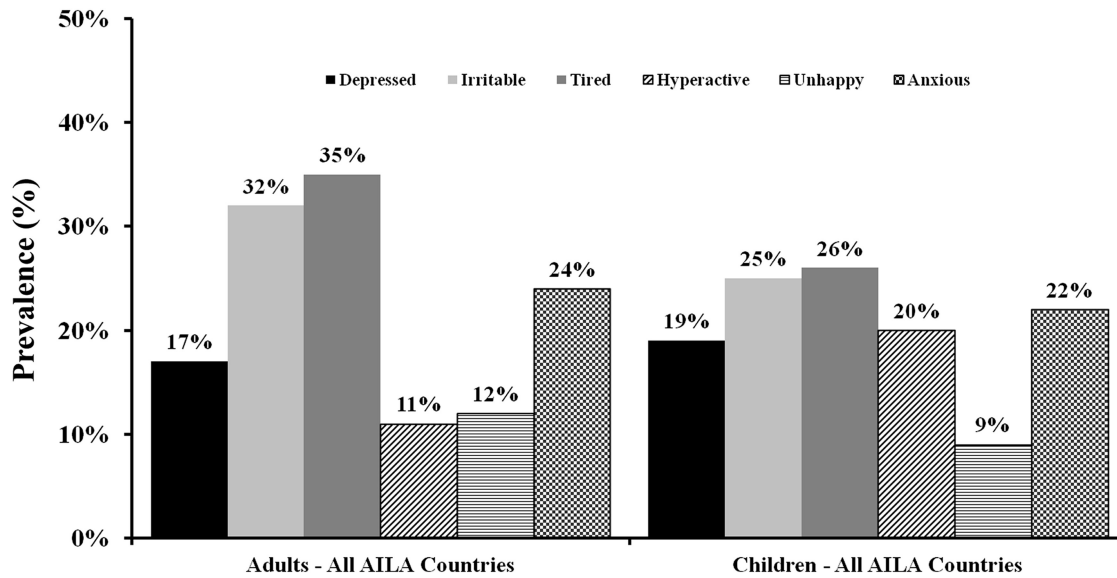


Figure 5. Description of Latin American adults, children, and adolescents' feelings when nasal allergy symptoms are most severe.

When adults of children and adolescents with NAs were asked about activity limitations resulting specifically from their child's NAs, they reported that their children and adolescents were limited in playing sports, outdoor activities, having pets, and going out with friends.

It is well recognized that NAs can affect a patient's sleep quality. As such, the Allergies in Latin America survey attempted to quantify sleep impact among NA patients. In the adult portion of the survey, 44% of sufferers reported being greatly troubled by at least one sleep indicator (e.g., falling asleep, awakening during the night, and perception of lack of restful night sleep). Similarly, 45% of children and adolescents suffering from NAs reported being greatly troubled by at least one of the aforementioned sleep indicators.

Aside from physical symptoms, NAs can affect the mood and feelings of those that suffer from them. Fatigue associated with NAs was reported as the most frequent mood disorder followed closely by irritability. Depression was the third most frequent mood disorder experienced by adult allergy sufferers in LA (Fig. 5). Likewise, in children and adolescents, fatigue due to NA was the most frequently experienced mood disorder, followed by frequent irritability and frequent depression (Fig. 5).

One important way in which NAs can impact an individual's daily life is the degree to which it can interfere with allergy sufferers' ability to work. Nearly two of five (37%) adults with NAs in LA reported having missed work or having their job performance affected by their NAs in the past 12 months (Fig. 6). When survey participants were asked to rate their work productivity with and without allergy symptoms, adults reported their mean work productivity

when experiencing severe NAs was reduced by one-third compared with when they experienced no symptoms (Fig. 6). Interestingly, these results were highly concordant across all countries surveyed in that respondents in the individual countries consistently reported at least a 30 percentage point difference in their work productivity when experiencing NAs at their worst compared with when they were symptom free. By contrast, over one-half of the parents of children and adolescents with NAs in LA reported that their adolescents and children had missed school or had their school performance affected by their NAs in the past 12 months (Fig. 6). Similar to the adults with NAs, parents of children and adolescents with NAs in LA cited a one-third loss in school productivity when their child's NAs were at their worst compared with when they were symptom free (Fig. 6).

### Need for Treatment of AR and NA Symptoms and Current Treatment Gaps

Most NA sufferers in LA are taking some kind of medication for their condition. Nearly one-half of adults with NAs reported using over-the-counter (OTC) medications for their allergies and a nearly identical number reported taking some type of prescription NA medication within the past 4 weeks. Only one in four reported using a prescription nasal spray to control their NA symptoms in the past 4 weeks (Fig. 7 A). Interestingly, although most children and adolescents with NAs in LA were taking some kind of medication for their condition, the difference between OTC use and prescription use varied considerably compared with the adult population. Specifically, 25% of children and adolescents with NAs were reported to be using

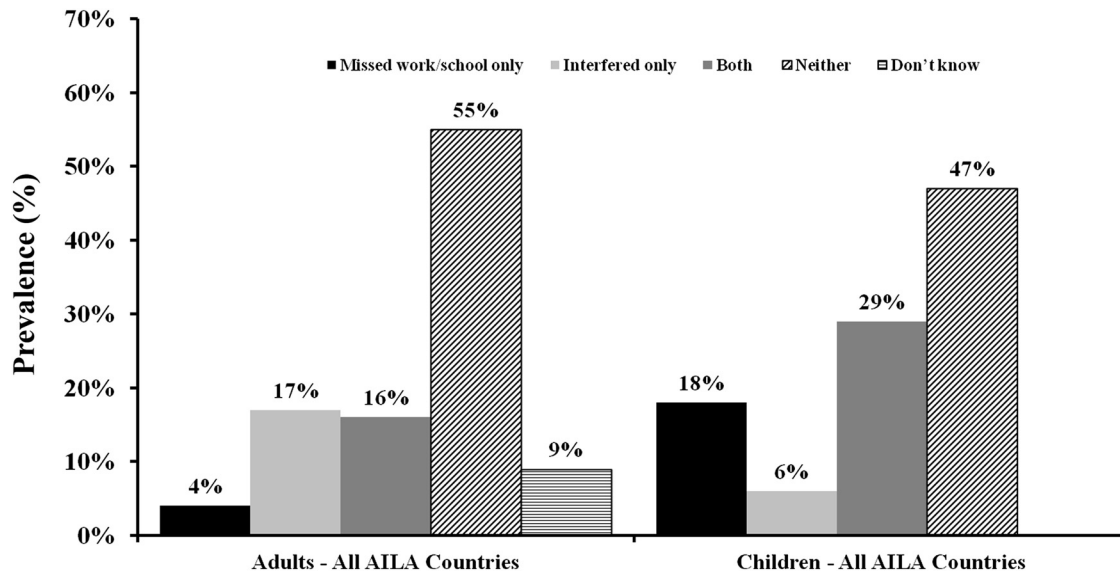


Figure 6. Interference and work/school productivity changes among Latin American adults, children, and adolescents with nasal allergies.

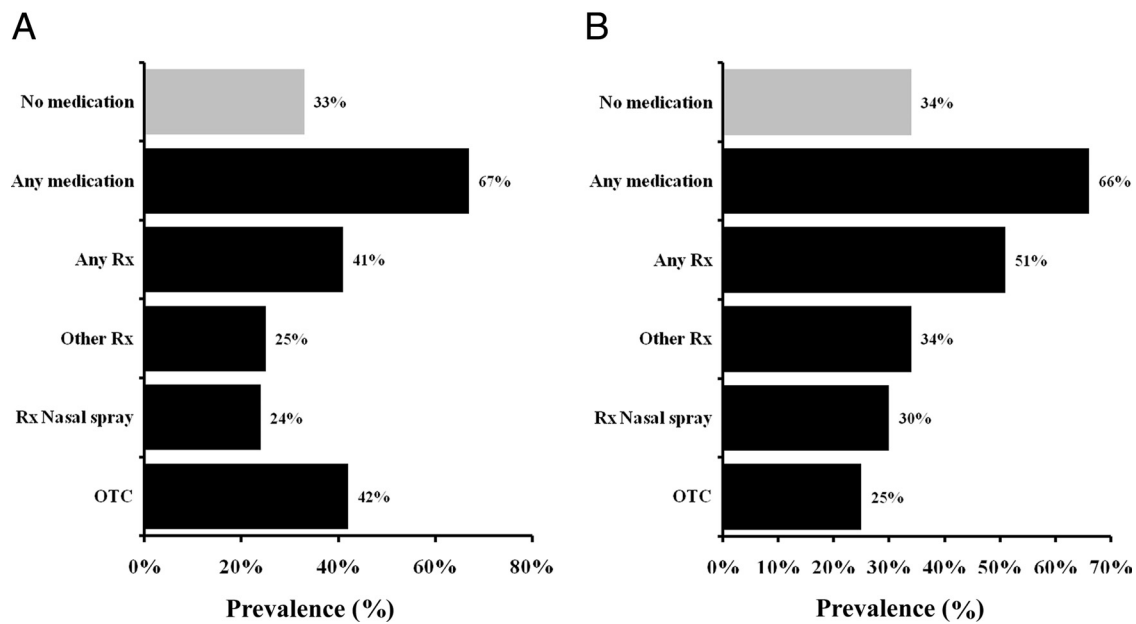


Figure 7. Types of medications used by (A) Latin American adults and (B) Latin American children and adolescents with allergic rhinitis to treat nasal allergies.

OTC medications whereas 51% reported using some type of prescription medication for their NAs in the past 4 weeks and 30% reported using a prescription nasal spray to control their NA symptoms in the past 4 weeks (Fig. 7 B).

Adults with NAs were also asked about the frequency with which they change their NA medication. The overwhelming majority stated that they rarely, if ever, change their NA medications once they started taking the medication (79%). A similar percentage of parents of children and adolescents with NAs reported rarely, if ever, changing their children's and adolescents' NA medications (76%). Interestingly, Ecuador

reported the highest percentage (21%) of adults who change their medicine several times a year. Those NA sufferers in LA who have changed their NA medication were asked to specify the reason for changing their medication. The most common reason for changing medications was that the medication was not adequately effective (39%). The second most common reason was because their doctor wanted to try something else (23%). A similar pattern emerged when parents of children and adolescents with NAs were surveyed. Interestingly, in both populations, cost and issues around cost were not a major reason for switching NA medications.



The issue of dissatisfaction with NA medications was also addressed in this survey. Adults reported lack of effectiveness (67%), effectiveness wearing off with chronic use (16%), lack of 24-hour relief (13%), and bothersome side effects (12%) as the most common reasons for dissatisfaction. A similar pattern emerged with children and adolescents in that 67% of parents cited poor effectiveness as a reason for dissatisfaction followed by lack of 24-hour relief (26%), effectiveness wearing off with chronic use (19%), and bothersome side effects (13%).

### Treatment Paradigms and Treatment Gaps with Prescription Nasal Sprays

Because prescription nasal sprays, especially corticosteroid sprays, are considered the most effective agents available to treat NAs, the survey focused on current treatment paradigms as well as treatment gaps with these agents. As previously discussed, 25% of adults and 30% of parents of children and adolescents with NAs reported taking some kind of prescription NA medication within the last 4 weeks. When adult survey participants were asked why they had not taken a prescription nasal spray for their NAs the majority responded that they did not take a prescription nasal spray because they did not have any symptoms (26%). Other responses in descending order of frequency were physician never prescribed this type of medication (22%), do not like nasal sprays (14%), and lack of severe enough symptoms (13%).

When asked about the relief experienced with prescription nasal sprays, two-thirds of adults with NA reported that their prescription nasal spray gave them relief from all or most of their NA symptoms. By contrast, only a small minority (3%) reported that they received no relief whatsoever after taking their prescription nasal spray. A similar pattern emerged with adults of children and adolescents with NA (data not shown).

Because efficacy appeared to be the main driver in patient dissatisfaction, the Allergies in Latin America survey attempted to elucidate the concerns related to efficacy as it specifically pertained to prescription nasal sprays. When adult prescription nasal spray users were asked whether their spray provided adequate 24-hour relief, over one-third (35%) of adult users reported that their current prescription nasal spray lost effectiveness over the course of the day and night. Interestingly, in Ecuador the region where prescription nasal spray was the lowest, 50% of nasal spray users reported that their prescription nasal spray lost effectiveness over the course of the day. A similar pattern emerged for surveyed parents of children and adolescents diagnosed NAs (data not shown).

In addition to prescription nasal sprays losing effectiveness over the course of the day, the reduction in

effectiveness with chronic use was also assessed. When adult users of prescription nasal sprays were asked whether they had ever found the continuing effectiveness of their prescription nasal spray wearing off with chronic use, nearly one in three (27%) reported having experienced diminished effectiveness of their prescription nasal spray when taken over a long period of time. A nearly identical pattern emerged in those adults surveyed with children and adolescents with NAs.

Another driver of dissatisfaction with NA medications was unpleasant side effects. When the specific types of side effects experienced by users of prescription nasal sprays were assessed, the majority of reported bad taste and retrograde drainage into the esophagus as being associated with their NA medication. Other side effects reported by adult NA sufferers are displayed in Fig. 8 A. Similar patterns of side effects emerged for children and adolescents and are displayed in Fig. 8 B.

### DISCUSSION

Nasal allergies are generally recognized as the most common chronic respiratory disorder worldwide. However, prevalence estimates for the adult population suffering from NAs in LA are currently lacking. Although one study, the ISAAC, attempted to estimate the prevalence of AR in LA, these estimates are limited to two age cohorts (6–7 years and 13–14 years) and are based on 12-month prevalence of symptoms responded by the patient that suggest allergies by the symptoms and not a physician diagnosis as was the case in the survey presented here.<sup>3</sup> By contrast *Allergies in Latin America* is based on a physician diagnosis of the nasal allergies. The Allergies in Latin America survey is the first study in the Latin American population conducted with the sole purpose of ascertaining the prevalence, symptoms, impact, and treatment of NAs in children, adolescents, and adults in LA. This study has uncovered a substantial negative impact of NAs on quality of life and has identified a number of treatment paradigms along with and, perhaps more importantly, the treatment gaps that currently exist in the treatment of this common chronic condition. In addition, it differed from the ISAAC survey in that ISAAC is based solely on questionnaires, responded to by the patient, that suggest allergies by their symptoms. By contrast *Allergies in Latin America* is based on a physician diagnosis of the nasal allergies.

Prevalence data in this survey has shown that NA is a common and chronic disease in LA as it is elsewhere in the world.<sup>26</sup> The overall prevalence of diagnosed NAs obtained from this survey was on average 6.6% across all eight Latin American countries surveyed. Interestingly and unexpectedly, this prevalence data was substantially lower than that published in the

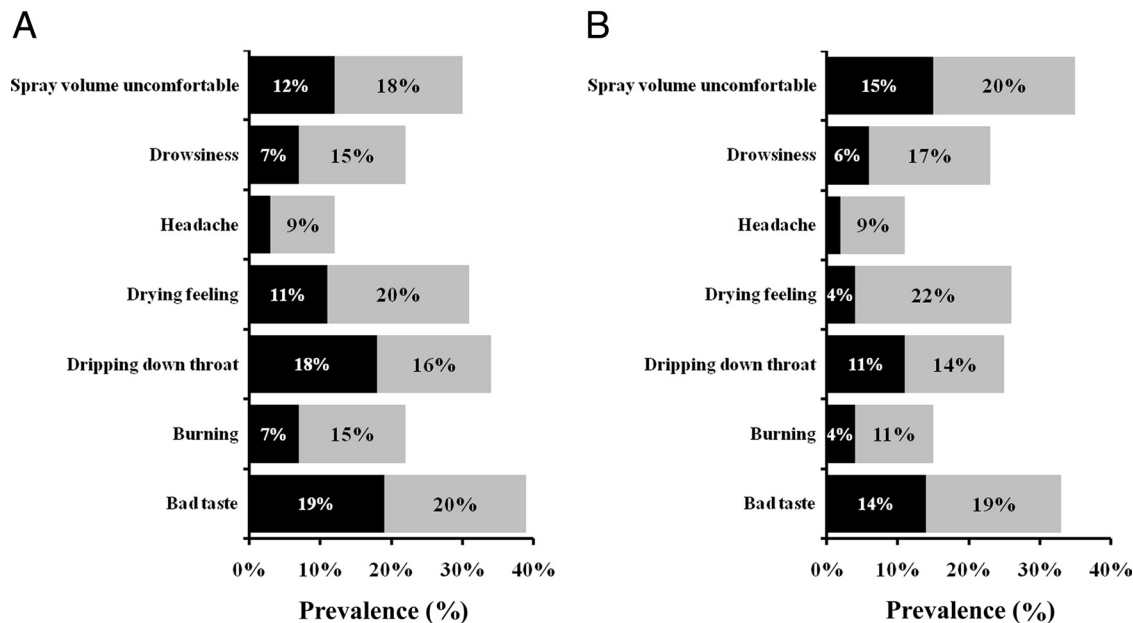


Figure 8. Types and frequency of side effects of prescription nasal spray in (A) Latin American adults and (B) Latin American children and adolescents.

ISAAC study in which the total prevalence was 27.9 and 37.6% for the 6- to 7-year-old group and the 13- to 14-year-old group, respectively, in the last 12 months. Additionally, these data also were substantially lower when compared with their prevalence in North America (14% in the United States and 20% in Canada, respectively), when using the same criteria of a physician diagnosis of AR or NAs as a clinical validation of the self-reported health condition.<sup>6,27</sup> By these criteria, those respondents who mentioned that they had NAs or AR but chose to self-treat rather than see a physician, because of the cost of a physician visit, were not included in the overall prevalence estimates. Hence, it is important to recognize that these apparent discordant prevalence estimates do not necessarily mean that NAs are less common in LA, but rather that the rates of physician diagnosis of the condition are likely different or that the level of subdiagnoses of AR is high in Latin American countries in comparison with the United States and Canada. It is important to mention that the social economics status, insurance types, and health care availability varies significantly across the different countries of LA. As such, it is not without reason to conclude that this could, in part, provide a rationale for the variations in NA prevalence among countries within LA. However, in the authors, opinions these differences are unlikely to be the major factor driving the varying prevalence estimates across the various Latin American countries surveyed. Rather, the socio-economic differences are likely a direct driver of the differences between OTC and prescription NA use across the different countries as outlined later in this Discussion.

Despite the comparatively low prevalence of physician-diagnosed NAs within LA compared with elsewhere in the world, reassuringly, the types of symptoms experienced by NA sufferers as well as the impact on their daily lives was highly concordant with other studies reporting the impact on quality of life and treatment gaps that currently exist in the treatment of NAs. For example, the most bothersome symptoms reported by NA sufferers within LA included nasal congestion, runny nose, postnasal drip, itching eyes, headaches, watering eyes, and repeated sneezing. These most bothersome symptoms, especially nasal congestion, were consistent with those reported by individuals in other studies.<sup>1,9,22,24</sup>

It is well established that NA has a profound impact on the sufferer's quality of life. Not only do people with NAs complain of rhinorrhea, nasal congestion, sneezing, itching, and associated eye problems, but they also have impaired emotional well-being and social functioning.<sup>6</sup> Additionally, data have shown that nasal congestion, the most prominent (and bothersome according to this survey) symptom in NAs, is associated with sleep-disordered breathing.<sup>28</sup> Sleep-disordered breathing secondary to NA has been shown to have a profound effect on mental health, including increased psychiatric disorders, depression, anxiety, and alcohol abuse.<sup>6,10,11,29,30</sup> Furthermore, sleep-disordered breathing in childhood and adolescence is associated with increased disorders of learning performance, behavior, and attention.<sup>31</sup> The data presented here are also concordant with data published by others. These data have shown that almost all patients with NAs reported that the condition had some impact on their daily lives. Additionally, the most common

mood disorder reported by adults as well as children and adolescents with NAs from LA was fatigue, irritability, and depression.

Sleep impairment is a significant problem for patients with inflammatory disorders of the upper respiratory tract, such as NA, rhinosinusitis, and nasal polyposis. Nasal congestion, one of the most common and bothersome symptoms of these disorders, is associated with sleep-disordered breathing and is thought to be a key cause of sleep impairment.<sup>32</sup> Although the literature is replete with data linking NA with impaired sleep, the negative impact on sleep quality and quantity and, consequently, on various aspects of the patient's life, remains an underrecognized and undertreated component of NA morbidity.<sup>1,32-40</sup> The data from the current survey show that nearly one-half of children, adolescents, and adults with NAs had reported either difficulty in falling asleep, awakening during the night, or the lack of a restful night's sleep.

The frequent and burdensome symptoms of NA as well as impaired sleep can significantly affect allergy sufferers' lives and work productivity. The two primary components of work productivity are absenteeism and presenteeism. Absenteeism represents the number of days/hours missed from work because of the illness, whereas presenteeism refers to illness-related reductions in performance while the person is at work. Although NA does not contribute to a large extent to absenteeism in the workplace or school, it does have a large impact on presenteeism.<sup>6,40,41</sup> According to data from the Allergies in Latin America survey presented here, employed patients with NA have their productivity falling by over 33% on average between days when they have no allergy symptoms and days when their allergy symptoms are at their worst. A similar pattern emerges when parents were asked to rate their children's and adolescent's productivity in school. Interestingly, these data were consistent with the data from the Allergies in America survey, which showed a 23% reduction in adult productivity, and a 30% decrease in productivity in children.<sup>6,25</sup> Additionally, these data underscore the significant degree to which NA can impact work performance as well as the large, but hitherto unmeasured, economic consequences of NAs in LA.

In addition to examining the prevalence, symptoms, and burden of NAs in LA, the current survey also addressed the role of NA medications in the treatment of NAs, including patient perspectives on both the effectiveness and the bothersome side effects associated with these medications. Almost all NA sufferers said that discomfort during an allergy attack could not be ignored, with 53% of patients stating that the discomfort is something that they can not tolerate without relief. Relief is sought through prescription and OTC medications. The majority of adult patients (67%) have used some medication for their NAs in the past 12 months, with nearly an

identical split between OTC and prescription agents. There was nearly a 2:1 ratio of children and adolescents receiving prescription versus OTC medications to treat their disease. Interestingly, only one in four adult patients and one in three children and adolescents used a prescription nasal spray within the past 12 months within LA. Surprisingly, despite the differences in health care system and insurance coverage between LA and the United States, the pattern of prescription versus OTC medication use was surprisingly similar with 50% of adults in the Allergy in America survey reporting that they had used some type of OTC medication and 45% reporting some type of prescription use within the past 12 months. It is important to note, however, that appreciably more patients in the United States reported taking a prescription nasal spray (36%) compared with survey respondents in LA (24%). The reasons for not taking a prescription NA sprays were in part related to their dissatisfaction with related sensory attributes as well as the fact that they only perceive the need for a prescription nasal spray in the most serious of cases and mild-to-moderate disease is not perceived to require such potent agents, as well as the fact that primary care physicians and pediatricians within LA typically use oral antihistamine with decongestants to manage the nasal blockage instead of using nasal INCS as the Allergic Rhinitis and its Impact on Asthma (ARIA) recommends.<sup>22</sup> One other reason that could explain the differences in OTC versus prescription NA use in LA could be related to the socioeconomic differences and insurance coverage among individuals across the various Latin American countries surveyed. It is worthy of mention that nasal antihistamine use was essentially not reported in this survey because of the fact that these agents are not readily available in LA. Therefore, it is not without reason to conclude that if these agents were readily available and accepted in LA, the prescription uses may well have increased.

Treatment gaps were also addressed with current NA therapies in LA. These data showed that patients rarely, if ever, changed allergy medications once they were prescribed them. However, among those that did change NA medications, the major reason cited for changing their medication was related to lack of efficacy. When we looked specifically at the prescription nasal spray segment, the lack of efficacy was specifically related to lack of 24-hour control of symptoms as well as diminution of effect with chronic use. These results were very similar to the results in the Allergies in America survey in which 37% of those participants reporting dissatisfaction with NA medications cited they were dissatisfied due to lack of adequate effectiveness.<sup>42</sup>

Another driver of dissatisfaction with NA medications, specifically prescription nasal sprays, was unpleasant side effects. When the types of side effects experienced with prescription nasal sprays were assessed, the majority of users reported bad taste and retrograde drainage

into the esophagus being associated with their NA medication and it was rated as unpleasant.<sup>21</sup> Some patients also reported the spray volume of their current INCS is too large and onset of action of these agents does not meet their expectations. These data were concordant with the data obtained in the Allergies in America survey as well as other studies that looked at sensory attributes that patients found unpleasant. In one study by Mahadevia and colleagues, sensory attributes of INCS sprays were evaluated to assess which attributes influence patients' willingness to adhere to therapy. They found that lack of aftertaste was the most important attribute, followed by aftertaste, throat rundown, and nose runout.<sup>20</sup> These data suggest that patient preference may be an important driver in increasing patient acceptance and adherence to NA medications.

In conclusion, a better understanding of the true burden of NAs and NAs by physicians and patients in addition to better education of patients about their condition and treatment options is an important step in any medical treatment regimen. Thus, the information obtained from the Allergies in Latin America survey pertaining to prevalence, impact on quality of life, and treatment gaps now enable physicians within LA to better describe the true burden of disease to patients, which should lead to better patient education and, ultimately, to better treatment outcomes for sufferers of NAs and AR.

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## APPENDIX: ALLERGIES IN LATIN AMERICA SURVEY QUESTIONNAIRE

### HOUSEHOLD SCREEN FOR PERSONS WITH NASAL ALLERGIES

- A. Including yourself, how many persons, adults and children, live in this household (even if not there right now)?
- B. Have any of these persons been diagnosed as having nasal allergies or allergic rhinitis?
- C. How many persons in this household have been diagnosed with nasal allergies or allergic rhinitis?
- D. (Has this person/Have any of these persons) had symptoms such as sneezing, itching, watery eyes, nasal congestion, or other nasal allergy symptoms in the past 12 months?
- E. (Does this person/Do any of these persons) take any medication for their hay fever, rhinitis or nasal allergies?
- H1. (What is the age/What are the ages) of the person(s) with nasal allergies or allergic rhinitis?
- H2. What is the gender of that person?

### IF MORE THAN ONE ELIGIBLE AGE IN H, THEN SELECT ONE DESIGNATED RESPONDENT FOR THE SURVEY

### IF DESIGNATED RESPONDENT IS LESS THAN 18 YEARS OLD, ASK TO SPEAK TO ADULT MOST KNOWLEDGEABLE ABOUT THE CHILD’S HEALTH

- S1a. Has a doctor ever diagnosed (you/your child) as having allergic rhinitis or nasal allergies?
- S1b. (Do you/Does our child) still suffer from allergic rhinitis or nasal allergies?
- S1c. When was the most recent time that (you/your child) experienced symptoms of nasal allergies for a month or longer?
- S2. In the past 12 months (have you/has your child), taken medication to treat nasal allergies?

### IF YES IN S1B OR S2, SKIP TO Q1, IF NOT ASK S3

- S3. Is there any other person in the household who suffers from nasal allergies? ( yes, no, refused)

### QUESTIONS

1. In general, would you say (your/your child’s) health is excellent, very good, good, fair, poor, very poor, not sure, refused?
2. During the past 4 weeks (have you/has your child) been limited in the kind of work or other activities (you/he/she) could do as a result of (your/his/her) nasal allergies? ( yes, no, not sure, refused)
3. During the past 4 weeks (have you/has your child) had difficulty in performing work or other activities as a result of (your/his/her) nasal allergies? ( yes, no, not sure, refused)
4. During the past 4 weeks (have you/has your child) had to cut down on the amount of time spent on (your/his/her) regular daily activities as a result of (your/his/her) nasal allergies? ( yes, no, not sure, refused)
5. During the past 4 weeks (have you/has your child) accomplished less than (you/he/she) would like to as a result of (your/his/her) nasal allergies? ( yes, no, not sure, refused)
- 6a. (Have you/Has your child) ever been diagnosed with asthma? ( yes, no, not sure, refused)



- 6b. (Have you/Has your child) had asthma symptoms or exacerbations in the past 12 months? ( yes, no, not sure, refused)
- 7a. (Do you/Does your child) have any other chronic or serious health conditions? ( yes, no, not sure, refused)
- 7b. What are those other chronic or serious health conditions? Anything else?
  8. (Have you/Has your child) had (your/his/her) tonsils or adenoids removed? ( yes, no, not sure, refused)
  9. (Do you/Does your child) have enlarged or swollen tonsils and/or adenoids? ( yes, no, not sure, refused)
  10. (Have you/Has your child) had tubes put in (your/his/ears)? ( yes, no, not sure, refused)
  11. (Have you/Has your child) ever had nasal or sinus surgery? ( yes, no, not sure, refused)
  12. During the past 4 weeks (have you/has he/she) had? ( migraines, sinusitis, earaches, skin rashes, cold or flu, fever, heartburn or GERD, conjunctivitis or pink eye, none of these, not sure, refused)
  13. At what age (were you/was your child) first diagnosed with nasal allergies or allergic rhinitis?
  14. What was the medical specialty of the doctor who FIRST diagnosed (you/him/her) with nasal allergies?
  15. (Were you/was he/she) given a skin test to see what (you were/he/she was) allergic to? ( yes, no, not sure, refused)
  16. (Were you/Was your child) given a blood test to see what (you were/he/she was) allergic to? ( yes, no, not sure, refused)
  17. Would you describe (your/his/her) nasal allergies as seasonal or intermittent or do they occur throughout the year (persistent)?
- 18a. In the past 12 months, have (your/his/her) nasal allergy symptoms been more frequent or worse during a particular season or time of year? ( yes, no, not sure, refused)

**IF SEASONAL IN Q17 OR YES IN Q18a, ASK Q18b, ELSE SKIP TO Q19**

- 18b. During what months of the year are (your/his/her) nasal allergies the worst?
19. Are (your/his/her) nasal allergy symptoms worse when (you are/he/she is) outdoors or inside, or is it about the same?
20. During the worst 1-month period in the past year, did (you/he/she) have repeated sneezing, watery or teary eyes, red or itching eyes, nasal congestion or stuffed-up nose, nasal itching, throat itching, headache, ear pain, ear blockage or pressure, facial pain or pressure, runny nose, postnasal drip, cough— every day, most days a week, a few days a week, a few days a month, or less than that, not sure, or refused?

**IF NO SYMPTOMS AT LEAST A FEW DAYS A MONTH, SKIP TO Q23**

21. When (you have/he/she has) nasal allergy attacks, how bothersome are the following symptoms usually: repeated sneezing, watery or teary eyes, red or itching eyes, nasal congestion or stuffed-up nose, nasal itching, throat itching, headache, ear pain, ear blockage or pressure, facial pain or pressure, runny nose, postnasal drip, cough? Was the (symptom) extremely bothersome, moderately bothersome, slightly bothersome, not bothersome, not sure, refused?
22. Which of these symptoms was the MOST bothersome to (you/him/her)? Was it repeated sneezing, watery or teary eyes, red or itching eyes, nasal congestion or stuffed-up nose, nasal itching, throat itching, headache, ear pain, ear blockage or pressure, facial pain or pressure, runny nose, postnasal drip, cough, not sure, refused?
23. In general, when (you have/he/she has) a nasal allergy attack would you say that (your/his/her) discomfort is usually such that (you/he/she) can tolerate it, can't tolerate it without relief, not sure, refused?
24. What things usually trigger or make (your/his/her) nasal allergy symptoms worse?
25. Are you currently employed full-time, employed part-time, unemployed and looking for work, retired, a student, a homemaker, disabled and unable to work, or something else?

**ASK Q26 IF CHILD SELECTED, ELSE SKIP TO 27a**

26. Is your child currently enrolled in a school or daycare facility? ( yes, no, not sure, refused)
- 27a. (Have you/Has your child) **missed (work/school)** in the past 12 months because of (your/his/her) nasal allergies? ( yes, no, not sure, refused)
- 27b. How many (work/school) days in the past year (have you/has he/she) missed?
- 28a. Aside from actually missing (work/school) (have your/has his/her) nasal allergy symptoms in the past 12 months interfered with (your/his/her) performance at (work/school)? ( yes, no, not sure, refused)

- 28b. On days when (you/he/she) had nasal allergy symptoms how much did the symptoms interfere with (your/his/her) ability to do (your/his/her) (work/school work). Did the symptoms interfere a lot, a moderate amount, some, only a little, not at all, not sure, refused?
29. Thinking about (your/your child's) ability to do the things (you/he/she) want(s) to on a scale from 0 to 100, where 100 means 100% able, where would you rank (your/his/her) ability on days when (you don't/he/she doesn't) have nasal allergy symptoms?
30. Where would you rank (your/his/her) ability to do the things (you/he/she) want(s) to on the same scale of 0 to 100, where 100 means 100% able, when (your/his/her) nasal allergies are at their worst?
31. How much do you feel that (your/your child's) allergies limit what (you/he/she) can do in the following areas? Do you feel (your/his/her) allergies restrict (you/him/her) a lot, some, only a little, or not at all in playing organized sports or exercising, doing well in work or school, social activities, doing things with the family, going out with friends, having or playing with pets, outdoor activities (e.g., biking or walking), indoor activities (e.g., reading or computer games), or anything else?

**IF CHILD AGED 0–5 YEARS, SKIP TO D**

32. During allergy season, how often (do you/does he/she) feel (depressed or sad, irritable, tired, hyperactive, unhappy, anxious) frequently, sometimes, rarely, or never?
33. During the worst 1-month period, would you say the condition impacted (your/his/her) daily life a lot, a moderate amount, some, a little, did not really impact daily life, not sure, or refused?
34. How troubled (have you/has he/she) been by each of these symptoms during the last week (as a result of your/his/her nasal symptoms)? On a scale of 1 to 7, where 1 means not at all troubled and 7 means extremely troubled, how much trouble have nasal allergies caused in difficulty getting to sleep, waking up during the night, lack of a good night's sleep?
35. How often (do you/does he/she) snore while sleeping? Would you say (you/he/she) snore(s) every night, most nights, some nights, rarely, never, not sure, or refused?
36. How would you describe (your/his/her) nasal allergy symptoms during the last 4 weeks? Would you say (you/he/she) had no symptoms, mild symptoms, moderate symptoms, severe symptoms, not sure, or refused?
37. Overall, how well would you say that (your/your child's) nasal allergies have been controlled in the last 4 weeks? Would you say it was completely controlled, somewhat controlled, poorly controlled, not controlled at all, not sure, or refused?
38. Is the place (you/your AGE) USUALLY (go/goes) for (your/his/her) overall health care, medical advice or treatment a doctor's office, private hospital, hospital emergency room, company or union clinic, public hospital, some other place, not sure, or refused?
39. What is the medical specialty of the doctor that (you see/he/she sees) MOST OFTEN for (your/his/her) nasal allergies?
- 40a. (Have you/Has he/she) seen a doctor about (your/his/her) health in the past 12 months? ( yes, no, not sure, refused)
- 40b. How many times (have you/has he/she) seen a doctor about (your/his/her) health in the past 12 months? ( yes, no, not sure, refused)
- 41a. (Have you/Has he/she) seen a doctor about (your/his/her) nasal allergies in the past 12 months? ( yes, no, not sure, refused)
- 41b. How many times (have you/ has he/she) seen a doctor primarily for (your/his/her) nasal allergies in the past 12 months? ( yes, no, not sure, refused)
- 42a. Has (your/your child's) doctor ever given (you/him/her) allergy shots? ( yes, no, not sure, refused)
- 42b. When was the most recent time (you/he/she) had allergy shots? ( within the past month, within the past year, more than a year ago, not sure, refused)
- 43a. Has (your/your child's) doctor ever given (you/him/her) allergy drops or extracts by mouth or under the tongue to treat (your/his/her) nasal allergies?
- 43b. When was the most recent time (you/he/she) had allergy drops or extracts by mouth or under the tongue? ( within the past month, within the past year, more than a year ago, not sure, refused)
- 44a. Has a doctor ever shown (you/your child) how to use a nasal spray for (your/his/her) nasal allergies? ( yes, no, not sure, refused)
- 44b. When was the most recent time a doctor showed (you/him/her) how to use a nasal spray for (your/his/her) nasal allergies? ( within the past month, within the past year, more than a year ago, not sure, refused)

45. Overall, how satisfied are you with (your/his/her) doctor's management and treatment of (your/your child's) nasal allergies? Would you say that you are very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied, very dissatisfied, not sure, or refused?
- 46a. Have you ever changed doctors because you were dissatisfied with their management of (your/your child's) nasal allergies? ( yes, no, not sure, refused)
- 46b. When was the most recent time that you changed doctors because you were dissatisfied with their management of (your/your child's) condition? ( within the past year, not sure, refused)
- 47a. (Have you/Has your child) seen an allergist, ENT, or pulmonologist about (your/his/her) nasal allergies in the past 12 months? ( yes, no, not sure, refused)
- 47b. How often (do you/does he/she) see a specialist about (your/his/her) nasal allergies? ( monthly or more often, several times a year, once a year, only if problems develop, never, not sure, refused)
- 47c. Overall, how satisfied are you with the specialist's management and treatment of (your/your child's) nasal allergies? Would you say that you are very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied, very dissatisfied, not sure, or refused?
- 48a. (Have you/Has he/she) seen a PHARMACIST about (your/his/her) nasal allergies in the past 12 months? ( yes, no, not sure, refused)
- 48b. How many times (have you/has he/she) seen a PHARMACIST primarily for (your/his/her) nasal allergies in the past 12 months?
- 49a. In the past 4 weeks (have you/has he/she) used any homeopathic, herbal, or nontraditional treatments for (your/his/her) nasal allergies? ( yes, no, not sure, refused)
- 49b. What kinds of homeopathic, herbal, or nontraditional treatments (do you/does he/she) use?
- 50a. In the past 4 weeks, (have you/has your child) used any over-the-counter, nonprescription medicine to give (you/him/her) relief from nasal allergy symptoms? ( yes, no, not sure, refused)
- 50b. When was the most recent time that (you/he/she) used an over-the-counter medicine, nonprescription medicine for relief from nasal allergy symptoms? ( within the past 4 weeks, within the past 6 months, within the past year, 1–2 years ago, 3 or more years ago, not sure, refused)
- 50c. What is the name of the over the counter medicine(s) (you/he/she) take(s)/took for nasal allergies?
- 50d. How often (do you/does he/she) take (NAME FROM Q50c)? ( several times a day, once a day, several times a week, once a week, less than once a week, not sure, refused)
- 50e. (Do you/Does he/she) take that medicine as a pill, liquid, or by nasal spray? ( pill/capsule, liquid, spray, not sure, refused)
- 50f. How satisfied are you with the over-the-counter medicine (you have/your child has) used for (your/his/her) nasal allergies in the past 4 weeks? Would you say very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied, very dissatisfied, not sure, or refused?
51. In the past 4 weeks, (have you/has he/she) used eye drops for itching eyes or red eyes from allergies? ( yes, no, not sure, refused)
- 52a. In the past 4 weeks, (have you/has your child) used any prescription nasal spray for (your/his/her) nasal allergies? ( yes, no, not sure, refused)
- 52b. When was the most recent time that (you/he/she) used a prescription nasal spray for (your/his/her) nasal allergies? ( within the past 4 weeks, within the past 6 months, within the past year, 1–2 years ago, 3 or more years ago, not sure, refused)
- 52c. What is the name of the prescription nasal spray (you/he/she) take(s)/took for nasal allergies?
- 52d. How often (do you/does he/she) take (NAME FROM Q52c)? ( several times a day, once a day, several times a week, once a week, less than once a week, not sure, refused)
- 52e. Does (your/his/her) current prescription nasal spray give (you/him/her) relief from all of (your/his/her) symptoms, most symptoms, some symptoms, or no symptoms? ( all symptoms, most symptoms, some symptoms, no symptoms, not sure, refused)
- 52f. How long does it take (your/his/her) current prescription nasal spray to begin giving (you/him/her) symptom relief? ( hours 0–23, days 1–6, weeks 1–4, don't know, refused)
- 52g. Does (your/your child's) current prescription nasal spray lose effectiveness over the course of the day or night, or does it remain as effective as when (you/he/she) first took it? ( yes, loses effectiveness; no, does not lose effectiveness; not sure; refused)
- 52h. How long after taking (your/his/her) current prescription nasal spray does it begin losing effectiveness? ( less than 4 hours, 4–7 hours, 8–11 hours, 12–15 hours, 16–23 hours, 24 hours or longer, not sure, refused)

- 52i. How satisfied are you with the prescription nasal spray (you have/your child has) used for (your/his/her) nasal allergies in the past 4 weeks? Would you say that you are very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied, not sure, or refused?
53. Why (haven't you/hasn't your child) used a prescription nasal spray for (your/his/her) nasal allergies in the past 4 weeks?
- 54a. (Have you/Has your child) taken any other prescription medications for (your/his/her) nasal allergies in the past 4 weeks? ( yes, no, not sure, refused)
- 54b. What is the name of the other prescription medicines (you take/he/she takes) for nasal allergies?
- 54c. How often (do you/ does he/she) take (NAME FROM Q54b)? ( several times a day, once a day, several times a week, once a week, less than once a week, not sure, refused)
- 54d. (Do you/Does he/she) take that medicine as a pill, liquid or by nasal spray? ( pill/capsule, liquid, spray, not sure, refused)
- 54e. Does (your/his/her) other prescription medicine give (you/him/her) relief from all of (your/his/her) symptoms, most symptoms, some symptoms, or no symptoms? ( all symptoms, most symptoms, some symptoms, no symptoms, not sure, refused)
- 54f. How long does it take (your/his/her) other prescription medicine to begin giving (you/him/her) symptom relief? ( hours 0–23, days 1–6, weeks 1–4, don't know, refused)
- 54g. Does (your/your child's) other prescription medicine lose effectiveness over the course of the day or night, or does it remain as effective as when (you/he/she) first took it? ( yes, loses effectiveness; no, does not lose effectiveness; not sure; refused)
- 54h. How long after taking (your/his/her) other prescription medicine does it begin losing effectiveness? ( less than 4 hours, 4–7 hours, 8–11 hours, 12–15 hours, 16–23 hours, 24 hours or longer, not sure, refused)
- 54i. How satisfied are you with the other prescription medicine (you have/your child has) used for (your/his/her) nasal allergies in the past 4 weeks? Would you say that you were very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied, not sure, refused?
- 55a. How often (do you/does your child) change nasal allergy medicines? ( several times each year, once a year, every few years, only rarely, never, not sure, refused)
- 55b. Why (have you/has your child) changed nasal allergy medicines?
- 56a. Have you ever asked the doctor to change (your/your child's) nasal allergy medication because (you were/he/she was) dissatisfied with it? ( yes, no, not sure, refused)
- 56b. When was the most recent time that you asked to have (your/his/her) nasal allergy prescription changed?
- 56c. Why (were you /was he/she) dissatisfied with that medicine?
57. How quickly are prescription nasal spray's supposed to begin providing symptom relief for nasal allergies? ( within 1 hour, 1–3 hours, 4–6 hours, 7–9 hours, 10–12 hours, 13–24 hours, 25 hours or longer, not sure, refused)
58. How long are prescription nasal spray's supposed to provide symptom relief for nasal allergies? ( less than 6 hours, 6–11 hours, 12–17 hours, 18–23 hours, 24 hours or longer, not sure, refused)
- 59a. Have you ever found that the effectiveness of a prescription nasal spray that promised 24 hour relief for nasal allergies began wearing off earlier? ( yes, no, not sure, refused)
- 59b. Has this happened to (you/your child) with more than one prescription nasal spray? ( yes, no, not sure, refused)
- 59c. About how long after (you/he/she) started taking it does a prescription nasal spray's allergy medicine's effectiveness begin wearing off?
- 60a. Have you ever found that a prescription nasal spray's effectiveness in treating (your/your child's) nasal allergy symptoms wears off over weeks or months even when (you are/ he/she is) taking the medicine as prescribed? ( yes, no, not sure, refused)
- 60b. Has this happened to (you/your child) with more than one prescription nasal allergy spray? ( yes, no, not sure, refused)
- 60c. About how long, in months, after (you have/he/she has) started taking it does a prescription nasal allergy spray's effectiveness begin wearing off even when taking the medicine as prescribed?
- 60d. (Have you/Has your child) ever stopped taking a prescription spray for (your/his/her) nasal allergies because its effectiveness had worn off? ( yes, no, not sure, refused)
- 61a. Have any of the prescription sprays that (you have/your child has) taken for nasal allergies ever caused nosebleeds? ( yes, no, not sure, refused)



- 61b. How bothersome were those nosebleeds? ( extremely bothersome, moderately bothersome, slightly bothersome, not bothersome, not sure, refused)
62. How many of the prescription sprays that (you have/your child has) taken for nasal allergies had the following types of side effects: bad taste, burning, dripping down throat, dry feeling, headaches, drowsiness, spray volume uncomfortable? ( all, some, or none)
- 63a. (Have you/Has he/she) experienced any other bothersome side effects from prescription nasal sprays for (your/his/her) nasal allergies? ( yes, no, not sure, refused)
- 63b. What other bothersome side effects have (you/has he/she) experienced from prescription nasal sprays?
64. Compared with prescription nasal sprays, would you say that other treatments for (your/his/her) nasal allergy symptoms have more side effects, fewer side effects, or about the same number of side effects, not sure, refused.
65. How bothersome are the following side effects of prescription sprays for nasal allergies: bad taste, burning, dripping down throat, drying feeling, headaches, drowsiness, spray volume, spray volume uncomfortable, or other? ( extremely, moderately, slightly, or not bothersome)
66. Compared with prescription nasal sprays, would you say that other treatments for (your/his/her) nasal allergy symptoms have more bothersome side effects, less bothersome side effects, or about the same? ( more bothersome, less bothersome, about the same, not sure, refused)
67. (Have you/Has your child) ever stopped taking a nasal allergy spray prescribed by (your/his/her) doctor because you didn't find it effective, it didn't provide relief through the day and night, it's effectiveness began wearing off over time, it had bothersome side effects, it was hard to administer, dosing schedule was difficult, it was not covered by your insurance, the co-pay was too high, too expensive, concerns about safety, any other reason, none of these, not sure, refused?
68. When (you have/your child has) stopped taking a nasal allergy spray for one of these reasons, do you always tell (your/his/her) doctor right away? ( yes, no, not sure, refused)
69. In choosing a prescription nasal spray (for yourself/for your child), which would be most important? ( fast symptom relief, long-lasting symptom relief, complete symptoms relief, easy to take, few side effects, low cost, I don't use, none of these, don't know/not sure, refused)
- 70a. Are there any prescription sprays for nasal allergies that you try to avoid using (for your child)? ( yes, try to avoid, no, not sure, refused)
- 70b. Why do you try to avoid that/those product(s)?
71. On a scale of 0–100%, what percent symptom relief would you expect from a prescription nasal spray for it to be considered a successful treatment?
72. How quickly after taking would a prescription nasal spray have to begin relieving symptoms for you to consider it a successful treatment?
73. How long after (you take/your child takes) a dose of prescription nasal spray should symptom relief last for you to consider it a successful treatment? ( less than 4 hours, 4–7 hours, 8–11 hours, 12–15 hours, 16–23 hours, 24 hours or longer, don't use, not sure, refused)
74. People with allergies sometimes fail to follow their physician's instructions about their medicines for their nasal allergies. (Have you/Has your child) ever failed to take a nasal allergy medicine as prescribed because of troublesome side effects, the cost of drugs, lack of symptoms, concern about long-term drug use, worry about the side effects, loss of effectiveness over time, lack of symptom relief, poor toleration, concerns about safety?
75. Now, I'm going to read you a series of statements. As I read each statement, please tell me whether you agree strongly, agree somewhat, disagree somewhat, or disagree strongly? (there are no truly effective treatments for nasal allergies, frequent nasal allergy symptoms can be prevented in most cases, prescription nasal sprays are safe)
- 76a. Do any members of your immediate family have allergies? ( yes, no, not sure, refused)
- 76b. Do they have nasal allergies or some other kind of allergy? ( nasal allergies, other allergies, both, not sure, refused)
- 77a. Do you have pets living in your house? ( yes, no, not sure, refused)
- 77b. What kind of pet or pets? ( dog, cat, bird, chickens, other, not sure, refused)
78. Does anyone in your household smoke? ( yes, no, not sure, refused)
79. Do you live within one-half kilometer of a highway? ( yes, no, not sure, refused)

## NOW, A FEW LAST QUESTIONS FOR STATISTICAL PURPOSES

D1. How old are you?

D2. What is the last year or grade of school you completed? (COUNTRY SPECIFIC)



- D3. Would you describe the place in which you live as being a large city, the suburb of a large city, a large town (population of 25,000–100,000), a small town, or a rural area?
- D4. Do you have coverage for your medical care costs through private health insurance or public health plans?  
( yes, private health insurance; yes, public health insurance; yes, both; no health insurance/public plan; not sure; refused)