



GEORGE MASON UNIVERSITY  
CENTER *for* CLIMATE CHANGE  
COMMUNICATION



## VIEWS OF ALLERGY SPECIALISTS ON THE HEALTH EFFECTS OF CLIMATE CHANGE

KEY FINDINGS: MEMBERSHIP SURVEY OF THE  
AMERICAN ACADEMY OF ALLERGY, ASTHMA, AND IMMUNOLOGY

Mona Sarfaty, M.D., MPH  
Jennifer Kreslake, Ph.D., MPH  
Brittany Bloodhart, Ph.D.  
Katherine Price, MPH  
Thomas Canale, M.D.  
Steve Folstein, M.Ed.  
Edward Maibach, Ph.D.  
December 2015

# A SURVEY OF MEMBERS OF THE AMERICAN ACADEMY OF ALLERGY, ASTHMA, AND IMMUNOLOGY

## Overview

The following report contains the findings of a survey of the members of the American Academy of Allergy, Asthma, and Immunology (AAAAI) regarding their perspectives on and their experience with the health effects of climate change. The entire membership of over 5,600 (5615) members were contacted via email to participate in the survey in February 2015; 141 had invalid email addresses, leaving a total of 5472 individuals contacted. There were 1184 responders. The responders were from 46 of the United States and the District of Columbia; the response rate was 22%.

## Table of Contents

	Pages
Key Findings.....	3-6
Detailed Survey Responses .....	5
Methods .....	27
Appendix.....	30
Physician Quotes:	
Patient Anecdotes from Physician Respondents.....	3
Barriers to Greater Physician Involvement.....	13
Helpful Resources.....	17

## Key Findings

### A large majority of AAAAI members believe climate change is happening, and that it is relevant to direct patient care.

Over 80% of respondents indicated that climate change is happening, and 76% indicated that it is caused by human activity to a significant degree. Sixty-three percent think climate change is relevant to direct patient care (“a great deal” or “a moderate amount”), and 74% indicate it is affecting the health of their own patients “a great deal,” (10%) “a moderate amount,” (38%) or “only a little” (26%).

### A large majority of AAAAI members report that their patients are experiencing a wide range of health effects from climate change.

The most common health effects that participants noted among their own patients were air pollution-related increases in severity of chronic disease (73%), increased allergic symptoms (63%), and injuries due to severe weather (49%). Other conditions identified as climate related health problems affecting their own patients were heat related effects (34%), vector borne infections (36%) and diarrhea from food/waterborne infections (23%). Across all the categories of health effects, more physicians thought their patients would experience harms in the next 10-20 years than physicians who are observing current harms. A request for anecdotes about patient experiences produced over 120 comments. Sixteen appear below. The remainder may be found in the Appendix.

Allergies
<i>Many elderly report the seasons lack consistency over the past 25 years coinciding with unseasonal symptoms of their allergy.</i>
<i>I have been in practice in the same location in the Pacific Northwest for over 25 years. I have watched a generation grow up in my practice. Suddenly, I am seeing 21-25 year olds coming in for significant hay fever symptoms much earlier than when I started in 1989.</i>
<i>Tree pollen season is starting three weeks earlier and seasonal allergy symptoms are more severe and last longer</i>
<i>The onset of symptoms due to ash tree pollination in Southern California used to be early February; now patients are becoming symptomatic in early January. Another major trigger of morbidity is Santa Ana Winds due to arid air. When I began practice they were occasionally present primarily in the fall. Now they are frequently occurring in the fall through winter months.</i>

*Because of the late spring and rain, the pollen counts have been higher and our allergic patients not doing well. Also, we have seen many new patients having Allergic Rhinitis that in a normal pollen year would not need to be seen.*

*Many patients are experiencing more prolonged and severe seasonal allergy symptoms due to changes in weather and pollination patterns*

*Tree pollen count elevations and seasonal rhinitis have been occurring earlier than "usual" and lasting longer for 4-5 years now compared to averages from the previous 20 years*

*A patient who previously had seasonal allergy symptoms to grass now has year round symptoms because of the warmer climate overall and the extension of grass season.*

*A lot of my patients have allergic rhinitis symptoms earlier and earlier in the year - pollen patterns don't seem to follow the known patterns.*

*A combination of high automobile pollution in Washington, D.C. metro area with heat, humidity, and high pollen produced not only nasal allergy and wheeze, but very severe redness, itch and eye irritation in August*

*Too many patients that I have seen moving to Houston with its humidity and pollution becoming much worse correlated with pollution levels more than airborne allergen levels. The cloud over Houston is impressive in the summer fall.*

**Asthma**

*I have several asthmatic patients with limitation of outdoor activities on smoggy days.*

*Work related symptoms in regards to rhinitis and asthma are increasing. Air pollution does affect our patients especially those who walk on major streets.*

*Recent rainfall and flooding increased patient in-home exposure to mold and humidity, and resulted in asthma emergency visits and hospitalizations.*

*Patients living in Hurricane Sandy-damaged homes have issues with mold and worse asthma control than those not affected by Sandy.*

**Vector-borne illness**

*Increase in fire ant sensitivity and tick borne illnesses moving North with warmer temperatures.*

## Key Findings, continued

### Allergists include discussions of air quality and lengthening of pollen season in their management of asthma

The majority responded “always”, “almost always”, or “at times” to questions about discussing the effect of outdoor air quality on symptoms (86%), providing instruction on how to use outdoor air quality data (60%), providing information about where to find a regular source of air quality data (53%). Allergy specific education included providing information about the increased length of Ragweed pollen season (60%), and mentioning climate change when providing information about lengthening pollen seasons (51%).

### Most AAAAI members perceive that certain groups are more vulnerable to the health effects of climate change than others.

A large majority of respondents reported that *certain specific groups* of people will be disproportionately affected by climate change, including people with chronic diseases (73%), young children ages 0-4 (57%), adults over age 60 (53%), and the poor and working poor (50%).

### Most AAAAI members want more information about climate change and health for themselves and others, and feel that medical societies and physicians should advocate for action to prevent climate change impacts on health.

A significant majority would find it useful to have more continuing medical education (CME) about the health effects of climate change (71%), and indicated that integrating teaching about climate change and its associated health impacts should be integrated into medical education (67%). A majority of respondents indicated that medical societies (61%) and physicians (65%) should have a significant advocacy role on climate and health, and that physicians have a responsibility to bring the health effects of climate change to the attention of their patients (56%) and the public (56%).

### Half or more of AAAAI members feel that their actions can make a difference in responding to climate change.

Most respondents (70%) believe that physicians should have a leadership role in encouraging offices, clinics, and hospitals to be as environmentally sustainable as possible. Half of survey participants (50%) believe that actions they can take in their personal and professional lives can contribute to effective action on climate change.

## Key Findings, continued

**Among AAAAI members, the most trusted source of information about climate and health is AAAAI itself, but a strong majority trust a range of other sources as well.**

Respondents “trust” or “strongly trust” information they receive about the health effects of climate change from several sources: the American Academy of Allergy, Asthma, & Immunology (79%), the American College of Asthma & Immunology (76%), the Centers for Disease Control and Prevention (75%), the Institute of Medicine (National Academy of Sciences) (65%), and the American Thoracic Society (67%). Fewer “trust/strongly trust” information from other prominent sources: the United Nations Intergovernmental Panel on Climate Change (IPCC) (43%) and the US National Climate Assessment (US Climate Change Research Group) (46%). A significant percentage responded “Don’t Know” to the latter two sources.

**Most AAAAI members feel that the U.S. should take significant steps to reduce the impacts of climate change and protect people from its harmful health effects.**

Three quarters of respondents feel the U.S. should make a significant effort to *protect people* from current effects of climate change: either a large scale effort even if it has large economic costs (44%) or a medium scale effort even if it has medium economic costs (31%). Over three quarters believe the U.S. should make a significant effort to *prevent future impacts* of climate change, either a large scale effort at large cost (41%) or a medium scale effort at medium scale economic costs (36%).

## Detailed Survey Responses

Climate change refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate is changing as a result. What do you think: Do you think that climate change is happening?

<i>(95% CI: +/- 2%)</i>	N	%
Yes	851	81
No	118	11
Don't Know	85	8
<b>Total</b>	<b>1,054</b>	<b>100</b>

How sure are you that climate change is happening?

<i>(95% CI: +/- 3% or less)</i>	N	%
Not at all sure	29	3
Somewhat sure	219	26
Very sure	304	36
Extremely sure	289	34
<b>Total</b>	<b>841</b>	<b>100</b>

How sure are you that climate change is not happening?

<i>(95% CI: +/- 9% or less)</i>	N	%
Not at all sure	7	6
Somewhat sure	40	36
Very sure	49	44
Extremely sure	15	14
<b>Total</b>	<b>111</b>	<b>100</b>

Do you think climate change over the past 150 years was...

<i>(95% CI: +/- 3% or less)</i>	N	%
Caused entirely by human activities	69	7
Caused mostly by human activities	490	47
Caused about equally by human activities and natural changes in the environment	232	22
Caused mostly by natural changes in the environment	151	15
Caused entirely by natural changes in the environment	47	5
None of the above because climate change isn't happening	47	5
<b>Total</b>	<b>1,036</b>	<b>100</b>

How knowledgeable do you feel about the association between climate change and health impacts?

<i>(95% CI: +/- 3% or less)</i>	N	%
Not at all knowledgeable	142	14
Modestly knowledgeable	444	43
Moderately knowledgeable	342	33
Very knowledgeable	100	10
<b>Total</b>	<b>1,028</b>	<b>100</b>

How much, if at all, do you think climate change is relevant to direct patient care?

<i>(95% CI: +/- 3% or less)</i>	N	%
Not at all	114	11
Only a little	200	20
A moderate amount	419	41
A great deal	228	22
Don't know	60	6
<b>Total</b>	<b>1,021</b>	<b>100</b>

How much, if at all, do you think climate change is affecting the health of your patients?

<i>(95% CI: +/- 3% or less)</i>	N	%
Not at all	132	13
Only a little	268	26
A moderate amount	385	38
A great deal	103	10
Don't know	76	7
I don't currently see patients	62	6
<b>Total</b>	<b>1,026</b>	<b>100</b>

How much, if at all, do you think climate change is affecting the health of your patients?

Currently being affected

<i>(95% CI: +/- 3% or less)</i>	Yes N (row %)	No N (row %)	Don't know N (row %)	Total Responses
1. Heat-related effects (e.g., heatstroke, heat exhaustion, cardio-respiratory illness)	301 (34%)	348 (39%)	246 (27%)	<b>895</b>
2. Vectorborne infection (e.g. Lyme, West Nile, Dengue Fever, Malaria)	321 (36%)	318 (36%)	253 (28%)	<b>892</b>
3. Diarrhea from food/waterborne illnesses ( e.g. Salmonella, Giardia, Cryptosporidia) following downpours or floods	207 (23%)	412 (46%)	271 (30%)	<b>890</b>
4. Injuries due to severe storms, floods, droughts, fires	439 (49%)	309 (34%)	152 (17%)	<b>900</b>
5. Air pollution related increases in severity of illness (e.g., asthma, COPD, pneumonia, cardiovascular disease)	658 (73%)	156 (17%)	92 (10%)	<b>906</b>
6. Increased care for allergic sensitization and symptoms of exposure to plants or mold (visits to office/ER for asthma/allergic symptoms)	567 (63%)	183 (20%)	149 (17%)	<b>899</b>

How much, if at all, do you think climate change is affecting the health of your patients?

Affected in the next 10-20 years

<i>(95% CI: +/- 3% or less)</i>	Yes N (row %)	No N (row %)	Don't know N (row %)	<b>Total Responses</b>
1. Heat-related effects (e.g., heatstroke, heat exhaustion, cardio-respiratory illness)	411 (47%)	157 (18%)	303 (35%)	<b>871</b>
2. Vectorborne infection (e.g. Lyme, West Nile, Dengue Fever, Malaria)	446 (51%)	123 (14%)	302 (35%)	<b>871</b>
3. Diarrhea from food/waterborne illnesses ( e.g. Salmonella, Giardia, Cryptosporidia) following downpours or floods	333 (38%)	189 (22%)	351 (40%)	<b>873</b>
4. Injuries due to severe storms, floods, droughts, fires	493 (57%)	132 (15%)	235 (27%)	<b>860</b>
5. Air pollution related increases in severity of illness (e.g., asthma, COPD, pneumonia, cardiovascular disease)	625 (72%)	85 (10%)	155 (18%)	<b>865</b>
6. Increased care for allergic sensitization and symptoms of exposure to plants or mold (visits to office/ER for asthma/allergic symptoms)	588 (67%)	99 (11%)	186 (21%)	<b>873</b>

Do you include the following as part of your management of Asthma?

<i>(95% CI: +/- 3% or less)</i>	Always	Almost Always	At Times	Rarely	Never	Total Responses
	N (row %)	N (row %)	N (row %)	N (row %)	N (row %)	
(A) Discussion of the effect of outdoor air quality on symptoms?	167 (18%)	269 (29%)	365 (39%)	112 (12%)	27 (3%)	<b>940</b>
(B) Instructions on how to use outdoor air quality data?	70 (7%)	137 (15%)	357 (38%)	244 (26%)	131 (14%)	<b>939</b>
(C) Information about where to find a regular source of air quality data.	50 (5%)	121 (13%)	327 (35%)	254 (27%)	182 (19%)	<b>934</b>
(D) Information about the increase in length of the Ragweed pollen season?	84 (9%)	166 (18%)	312 (33%)	177 (19%)	195 (21%)	<b>934</b>
(E) If you include information about the lengthening pollen season, do you mention climate change?	78 (8%)	168 (19%)	216 (24%)	183 (20%)	273 (30%)	<b>918</b>

See appendix for respondent comments.

Which of the following, if any, are barriers that prevent you from addressing climate change-related health issues with patients?

<i>(95% CI: +/- 8% or less)</i>	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total Responses
	N (row %)	N (row %)	N (row %)	N (row %)	N (row %)	
My patients would not be interested or knowledgeable enough about climate impacts to discuss this issue	31 (3%)	152 (17%)	352 (40%)	295 (33%)	59 (7%)	<b>889</b>
Lack of knowledge regarding how to approach the issue with my patients	46 (5%)	259 (29%)	254 (29%)	238 (27%)	92 (10%)	<b>889</b>
Addressing these issues with my patient will not make much difference in their overall health	84 (10%)	211 (24%)	275 (31%)	262 (30%)	43 (5%)	<b>875</b>
Others (please specify)	55 (40%)	27 (20%)	42 (30%)	10 (7%)	4 (3%)	<b>138</b>

Which of the following, if any, are barriers that prevent you from addressing climate change-related health issues with patients? [open-ended question; responses were organized into general themes by the researchers]:

<b><i>Selection of representative responses (n=19). See appendix for all responses (n=89).</i></b>
<b>Time</b>
<i>We barely have time to deal with disease, quality, costs, and other pressures.</i>
<i>Not enough time during a clinic visit to address these issues.</i>
<i>Current clinical practice precludes discussion about climate change because of time constraints. This issue has political overtones and could evoke a prolonged and possibly charged discussion.</i>
<i>Lack of time/interest in argument with a climate change denier.</i>

**Political Concerns**

*Many patients' politics do not admit possible climate change.*

*Concern that my patient will feel I'm pushing a political agenda, because climate change may affect them, but it does not really change my management, as they can't avoid climate change.*

*Active resistance to the existence of climate change, impeding the physician-patient relationship. This is a very political issue.*

*Don't want to alienate patients.*

**Lack of Knowledge / Resources**

*We need better resources for patients.*

*Lack of actionable recommendations.*

*Too much misinformation in the lay press.*

*Teaching module about climate change.*

*I lack the knowledge about climate change related health issues.*

**Low Priority**

*Variability of weather trumps long term effects of climate change. Patients have short memories.*

*You can't treat the climate to affect near-term symptom improvement.*

*No radical changes in our area.*

*Not an individually modifiable risk factor.*

*Climate change, if happening, is not important now.*

How much do you agree or disagree with the following statements?

<i>(95% CI: +/- 3% or less)</i>	Strongly Agree N (row %)	Agree N (row %)	Neutral N (row %)	Disagree N (row %)	Strongly Disagree N (row %)	Total Response
Teaching about environment (e.g., climate change) and its association with health impacts should be integrated into medical education	180 (19%)	446 (48%)	154 (17%)	83 (9%)	62 (7%)	<b>925</b>
Physicians should have a significant advocacy role in relation to climate change and health	184 (20%)	411 (45%)	186 (20%)	71 (8%)	70 (8%)	<b>922</b>
My medical societies should have a significant advocacy role in relation to climate change and health	187 (20%)	382 (41%)	183 (20%)	82 (9%)	87 (9%)	<b>921</b>
I feel that actions I take in my personal and/or professional life can contribute to effective action on climate change	121 (13%)	340 (37%)	261 (28%)	109 (12%)	91 (10%)	<b>922</b>
Physicians have a responsibility to bring the health effects of climate change to the attention of their patients	144 (16%)	373 (40%)	234 (25%)	89 (10%)	81 (8%)	<b>921</b>
Physicians have a responsibility to bring the health effects of climate change to the attention of the public	156 (17%)	362 (39%)	234 (25%)	81 (9%)	86 (9%)	<b>919</b>
Physicians should have a leadership role in encouraging offices, clinics, hospitals to be as environmentally sustainable as possible	228 (25%)	410 (45%)	176 (19%)	45 (5%)	57 (6%)	<b>916</b>

Outside your role as a health professional, to what degree have you personally experienced climate change?

<i>(95% CI: +/- 3% or less)</i>	N	%
Not at all	217	23
Only a little	320	34
A moderate amount	290	31
A great deal	76	8
Don't know	35	4
<b>Total</b>	<b>938</b>	<b>100</b>

Which, if any, of the following groups will disproportionately experience any negative health effects from climate change? [check all that apply]

	N	%
Young children ages 0 to 4	502	57
Older children ages 5 to 17	264	30
Young adults ages 18 to 39	169	19
Middle aged adults ages 40 to 60	135	15
Older adults ages 60+	470	53
People with chronic diseases	646	73
The poor and the working poor	440	50
People of color	179	20
None of the below because climate change isn't happening	99	11

Which of the following resources, if any, would be helpful to you?

(95% CI: +/- 3% or less)	Strongly Agree N (row %)	Agree N (row %)	Neutral N (row %)	Disagree N (row %)	Strongly Disagree N (row %)	Total Responses
(A) Policy statements provided by my professional associations	196 (22%)	408 (45%)	169 (19%)	48 (5%)	87 (10%)	<b>908</b>
(B) Continuing medical education (CME) on climate change and health	219 (24%)	431 (47%)	136 (15%)	49 (5%)	74 (8%)	<b>909</b>
(C) Patient education materials	182 (20%)	412 (46%)	164 (18%)	59 (7%)	83 (9%)	<b>900</b>
(D) Guidance on how to make my workplace sustainable	150 (17%)	370 (41%)	246 (27%)	65 (7%)	71 (8%)	<b>902</b>

Other resources or comments on the resources above [open-ended question; responses were organized into general themes by the researchers]:

**Selected representative responses (n=12). See appendix for remainder of responses (n=49).**

#### **Educational Resources**

*Getting people to pay attention and start to take a more sustainable view on energy, water, the food supply and financial resources to devote to healthcare (meaning preventative health) are all appropriately concerning, but we need to focus on this year's simple message, then get a new one the following year and so on. The public (and I) are easily overwhelmed by too much information.*

*Sustainable workplace, CME [Continuing Medical Education], and patient education materials.*

*I'd like to better understand how to raise this topic with my patients, as, again, I don't want to be seen as pushing a political agenda. It's not quite the same as vaccination policies.*

<i>Need help with patient information materials.</i>
<i>Information on the RATE of climate change, if such exists.</i>
<b>Policy Statements from Professional Organizations</b>
<i>I hope the professional organizations I belong to use scientific reason and not politics to create their resources.</i>
<b>Data</b>
<i>Data on the economic advantages of sustainable workplaces - that often makes the strongest argument</i>
<i>Data on regional pollen season changes and pollen concentrations that might be affected by changes in climate.</i>
<i>[Localized] information is probably more important and relevant. I am enjoying the huge snow storms (in Ohio, where it has been colder), although I cringe at the amount of salt that is spread on the roads... From my own garden, which was eaten up by cutworms last summer despite organic precautions, to the empty reservoir and dying almond trees in California, to the algae bloom on Lake Erie... to the flooding of parts of Brooklyn last year, to genetically modified crops that don't provide food for pollinators. Who in Congress is looking for the land (besides my Congresswoman)?</i>
<b>Internet, Film, and Social Media</b>
<i>NIEHS [National Institute of Environmental Health Sciences] website on climate change. HIE [Health Information Exchange], EPA [Environmental Protection Agency], California Air Resources Board, the ALA [American Lung Association] and the ATS [American Thoracic Society] all have GREAT resources.</i>
<i>Seminars broadcast on the web.</i>
<i>YouTube videos, Facebook, and [Twitter]. List of required reputable movies in case we missed it all, like Gore's 'An Inconvenient Truth.'</i>

How much do you trust each of the following as a source of information about the potential health effects of climate change?

<i>(95% CI: +/- 3% or less)</i>	Strongly Distrust N (row %)	Distrust N (row %)	Neutral N (row %)	Trust N (row %)	Strongly Trust N (row %)	Don't Know N (row %)	<b>Total</b>
American Academy of Allergy, Asthma, & Immunology	23 (2%)	32 (5%)	117 (13%)	280 (30%)	457 (49%)	17 (1%)	<b>926</b>
Centers for Disease Control and Prevention	44 (5%)	55 (6%)	111 (12%)	265 (29%)	427 (46%)	23 (2%)	<b>925</b>
Institute of Medicine (National Academy of Sciences)	42 (5%)	48 (5%)	160 (17%)	233 (25%)	366 (40%)	73 (8%)	<b>922</b>
United Nations Intergovernmental Panel on Climate Change (IPCC)	136 (15%)	84 (9%)	164 (18%)	207 (22%)	194 (21%)	137 (15%)	<b>922</b>
US National Climate Assessment (US Climate Change Research Group)	97 (11%)	66 (7%)	164 (18%)	233 (25%)	191 (21%)	171 (19%)	<b>922</b>
American Thoracic Society	25 (3%)	30 (3%)	163 (18%)	278 (30%)	340 (37%)	85 (9%)	<b>921</b>
American College of Asthma & Immunology	23 (2%)	36 (4%)	144 (16%)	306 (33%)	388 (43%)	29 (3%)	<b>926</b>

How big of an effort should your country make to reduce climate change?

<i>(95% CI: +/- 3% or less)</i>	N	%
No effort	120	13
A small-scale effort, even if it has small economic costs	107	12
A medium-scale effort, even if it has moderate economic costs	287	31
A large-scale effort, even if it has large economic costs	408	44
<b>Total</b>	<b>922</b>	<b>100</b>

How big of an effort should your country make to protect people from harmful health effects caused by unavoidable climate change (preparedness)?

<i>(95% CI: +/- 3% or less)</i>	N	%
No effort	87	9
A small-scale effort, even if it has small economic costs	130	14
A medium-scale effort, even if it has moderate economic costs	327	36
A large-scale effort, even if it has large economic costs	377	41
<b>Total</b>	<b>921</b>	<b>100</b>

Which of the following degrees or certifications do you hold? [check all that apply]:

	N	%
MD / DO (or equivalent)	841	91
PhD (or equivalent)	91	10
PA or CRNP	24	3
RN	22	2
Master's and other clinical degrees / certifications	108	12
<i>Public Health (MPH or MSPH)</i>	21	2
<i>Nursing / Health Sciences</i>	13	1
<i>Chemistry / Biochemistry / Medicinal Chemistry</i>	7	<1
<i>Biology / Microbiology</i>	6	<1
<i>Business Administration</i>	6	<1
<i>Hospital Administration</i>	2	<1
<i>Immunology</i>	3	<1
<i>Clinical research</i>	5	<1
<i>Physician Assistant</i>	2	<1
<i>Other Master's degree</i>	29	3
<i>Other clinical degree</i>	18	2
<i>Other non-clinical degree</i>	2	<1
<i>Fellowships</i>	6	<1

What is, or if retired was, your primary work setting?

<i>(95% CI: +/- 3 or less)</i>	N	%
Outpatient (clinical)	668	74
Academic	159	18
Hospital (clinical)	32	4
Non-clinical Administrative	6	1
Other non-clinical	23	3
<i>Research / Laboratory</i>	5	<1
<i>Regulatory / Government</i>	4	<1
<i>Consulting / Other Private Sector</i>	6	1
<i>Other</i>	8	1
Other clinical	13	1
<i>Academia</i>	3	<1
<i>Private practice</i>	6	1
<i>Education</i>	3	<1
<b>Total</b>	<b>901</b>	<b>100</b>

Which best describes your practice or type of work?

<i>(95% CI: +/- 2% or less)</i>	N	%
Allergy and Immunology	802	87
Primary Care	11	1
Pulmonary Medicine	13	1
Occupational/Environmental Medicine	3	<1
Other Specialty	18	2
Retired	42	5
I do not see patients (please specify work type):	33	4
<i>Laboratory / Research</i>	17	2
<i>Medical Education</i>	4	<1
<i>Regulatory / Government</i>	3	<1
<i>Consulting / Other Private Sector</i>	4	<1
<i>Other</i>	4	<1
<b>Total</b>	<b>922</b>	<b>100</b>

I have passed Medical Boards in the following specialty/ies:

	n	%
Allergy and Immunology	96	50
Internal Medicine	54	28
Pediatrics	37	19
Pulmonary	4	2
Other	2	1
<b>Total</b>	<b>193</b>	<b>100</b>

In which U.S. state do you work? (If you do not work in the US, you can skip this question)

<i>(95% CI: +/- 2 or less)</i>	N	%
Alabama	7	1
Alaska	3	0
Arizona	8	1
Arkansas	3	0
California	91	11
Colorado	22	3
Connecticut	16	2
Delaware	4	0
District of Columbia	4	0
Florida	39	5
Georgia	13	2
Hawaii	0	0
Idaho	2	0
Illinois	28	3
Indiana	11	1
Iowa	3	0
Kansas	10	1
Kentucky	9	1
Louisiana	6	1
Maine	3	0
Maryland	33	4
Massachusetts	37	5
Michigan	29	4
Minnesota	17	2

Mississippi	4	0
Missouri	21	3
Montana	2	0
Nebraska	11	1
Nevada	4	0
New Hampshire	4	0
New Jersey	26	3
New Mexico	7	1
New York	66	8
North Carolina	20	2
North Dakota	3	0
Ohio	27	3
Oklahoma	5	1
Oregon	4	0
Pennsylvania	37	5
Rhode Island	0	0
South Carolina	6	1
South Dakota	0	0
Tennessee	19	2
Texas	61	8
Utah	4	0
Vermont	3	0
Virginia	26	3
Washington	18	2
West Virginia	3	0

Wisconsin	30	4
Wyoming	0	0
<b>Total</b>	<b>809</b>	<b>100</b>

What is your gender?

<i>(95% CI: +/- 3% or less)</i>	N	%
Female	328	36
Male	568	62
Prefer not to answer	30	3
<b>Total</b>	<b>926</b>	<b>100</b>

What is your age?

<i>(95% CI: +/- 3% or less)</i>	N	%
18-30	9	1
31-50	351	38
51-65	332	36
66+	185	20
Prefer not to answer	43	5
<b>Total</b>	<b>920</b>	<b>100</b>

Please specify your ethnicity:

<i>(95% CI: +/- 3% or less)</i>	N	%
Hispanic or Latino	36	4
Not Hispanic or Latino	726	80
Prefer not to answer	141	16
<b>Total</b>	<b>903</b>	<b>100</b>

Please specify your race [check all that apply]:

	N	%
White	620	69
Asian	127	14
Black or African American	14	2
Native Hawaiian or Other Pacific Islander	2	0
American Indian or Alaska Native	8	1
Other	53	6
Prefer not to answer	106	12

In general, do you think of yourself as...

	N	%
Very Liberal	93	10
Somewhat Liberal	265	29
Moderate, middle of the road	281	31
Somewhat Conservative	193	21
Very Conservative	57	6
Other	27	3
<b>Total</b>	<b>916</b>	<b>100</b>

---

## Methods

---

The survey was conducted in February 2015 by George Mason University (GMU), and the American Academy of Allergy, Asthma, and Immunology (AAAAI), in order to assess physicians' beliefs about and experiences with climate change; including whether they were witnessing any health effects to their own patients. An online survey was sent to 5,615 AAAAI members in February of 2015.

## Design and Data Collection Procedures

### Contact Procedures & Methodology

The distribution of the survey was conducted online using Qualtrics software. In February 2015, surveys were distributed by email to the AAAAI membership. A letter of invitation and subsequent reminders came from the Executive Vice President of AAAAI with the link to the survey. The invitation letter outlined the importance of gaining member perspectives on climate change to help shape the organization's actions on the issue. Two incentives were offered: a \$5 donation to the AAAAI Research Trust for every completed survey, and entry into a raffle for one free registration to the AAAAI Annual Meeting. Only individuals who had not yet responded received reminders. Three reminders and one final appeal were sent at intervals of one week or more.

Participants were asked whether they were interested in receiving more information or volunteering to become involved with education or advocacy on the issue. If so, they were asked to provide their contact information on a separate website so that their contact information was recorded separately from their survey responses.

### Response Rate

The online survey was sent to 5,615 members; 141 bounced back because of incorrect email addresses. There were 1,184 respondents who completed the survey online, for a total response rate of 22%. Since every survey participant did not answer every question total responses are presented for each question.

### Analysis

Descriptive statistics were run on all data. No weighting was used to account for differences between the sample population and the general AAAAI population. Open-ended comments have been edited for minor grammar and spelling corrections, and some comments which did not directly address the question have been removed from this report. All open-ended responses can be found in the Appendix.

## Responder Characteristics

Over 90% of respondents held an M.D. degree; 10% a PhD. The predominant type of work was Allergy and Immunology practice (87%), while 2% were in other specialties, 5% were retired, and 4% didn't see patients. The ratio of males to females is 62% to 36%. Three quarters are between the ages of 31 and 65, while 20% are over the age of 65. Respondents were 69% White, 14% Asian, and 2% African American; 4% were Hispanic or Latino. Respondents self-identified as Very Liberal (10%), Somewhat Liberal (29%), Moderate or middle of the road (31%), Somewhat Conservative (21%), Very Conservative (6%), and other (3%).

The respondents were working in 46 states and the District of Columbia, representing all National Climate Assessment Regions: Northeast (29%), Midwest (21%), Southeast (19%), Southwest (17%), Great Plains (11%), Northwest (3%), and Alaska (.3%).

## Appendix

### Anecdotes about Patients from Physician Respondents (Selected)

Please describe if you have a relevant anecdote about a patient who has experienced one of these impacts [open-ended question; responses were organized into general themes by the researchers]:

(Tangential responses, which did not answer the question, were removed.)

*Personal experience of becoming mulberry tree sensitive with asthma, with widening of time frame over past two years to episodic need for Ventolin over whole year, related to very fine dust.*

*Patients move from areas of lower allergenicity to higher allergenicity and I see at least one each week.*

*The increase in bee sting anaphylaxis this summer is an indicator for a severe winter.*

*First, I have several patients who live in the Central Valley of CA in which there is a rate of 70% allergic rhinitis, 25% asthma, and where diesel exhaust is up to 4x the national average. We have studied this population at length and showed that the diesel exhaust is changing their DNA towards an allergic functional phenotype through epigenetics.*

*Second, on a personal patient level, the severe fires in CA with the droughts has affected the asthma severity of exacerbations and hospital admissions where I work.*

*What happened this year? The allergy shots worked well for 3 years. This May the amount of pollen was so much, I am miserable.*

*Air pollution as related to sinonasal diseases.*

*Air pollution causing asthma and COPD among people living in larger cities - e.g. New York, LA - but not when they move to New Hampshire, San Jose or Delaware. Is it pollution or allergen diversity? Not sure.*

*Air pollution definitely a concern where I practice - more and more kids with asthma and allergies, patients who move from northern locations tell me their asthma and allergies are much worse in the south.*

*Air pollution is a huge concern.*

*Asthma and allergy activity much more active this year and previous years when hard freeze was not persistent through winter. Last year, with a continuous freeze throughout most of winter, patient allergy and asthma symptoms were quite quiet. Also, pollen season in cooler spring last year was not as severe for allergy sufferers, compared to warmer years.*

*Asthma and COPD exacerbations.*

*Asthma patients probably have increased problems with air pollution. I used to think it was psychological, but I think it is real.*

*Asthma triggered by seasonal allergies which have been getting worse over the past 5 years, with longer pollen periods due to warmer weather.*

*Atmospheric CO2 has increased dramatically over the past 100 years. That is causing most creatures on earth to have compensated respiratory acidosis. However, that chronic compensatory mechanism is causing obesity. All creatures on earth are gaining weight, not just humans. Even creatures living in laboratories, on strictly calorie controlled diets, are heavier now than they were 10 or 20 years ago.*

*Change in pollen season due to change in weather pattern - more significant allergic disease. Extremes of heat and cold affecting the 'edges' of the population - the very young and the very old.*

*Changes in seasons, prolonged [seasons] causes persistence of symptoms.*

*Chickungunya has been identified in the southeastern US. Suspected tick-borne illnesses have increased (STARI, alpha-gal), COPD exacerbations have increased, and allergic sensitization to plants has increased in my practice.*

*Climate changes affecting pollination - allergic rhinitis.*

*Colorado northern front range has been impacted by extended drought, beetle kill, forest fires, flood damage increased by burns. Patients had asthma and had evacuations from home. Floods have required evacuation and home remediation and repair.*

*It's not just the diseases you mentioned above that have increased. Compared to 5 years ago, Viral upper respiratory infections/ pneumonias now occur at a higher rate. Influenza now does not only happen in Winter, there's now H1N1 flu that happens in summer! Every month, there are scores of patients who are infected and sick coming to the clinics. In the past, most infections only mainly occur in the Winter viral season. This is not true anymore.*

*COPD and asthma is great risk.*

*Current pollen season is a month before previous years, leading to an increase in pollen-induced symptoms.*

*Dengue fever in Florida.*

*Disruption of pollen seasons based on weather.*

*Drought in recent years has decreased severity of pollen allergy in my area in Texas.*

*Entire regions of the world have been affected by extreme, prolonged drought.*

*Every year the pollen season seems to have bigger impacts on my pollen-allergic patients. The so-called "pollen vortex" causes increased symptoms in my patients with both allergic rhinitis and asthma. They're then more likely to go on allergy shots, increasing health care costs and risk.*

*Expanding population of amblyomma americanum has led to a rise in red meat allergy.*

*Fall pollen allergic patients are, on average, symptomatic for a longer time in the fall season due to later hard frosts.*

*Five years ago, Nashville had a 100-200 year flood effecting many homes and exposing people to more dust mite, mold and irritants.*

<i>Flooding causing mold growth in homes impacting on asthma.</i>
<i>Forest fire asthma. Extended pollen seasons.</i>
<i>Frankly population overgrowth, pollution and conflict overlaid with global warming are the main issues affecting human health on this planet. For me it's hard to separate these issues. Infections that used to be confined by cold weather have definitely risen. A good anecdote as an allergist is the change in seasons truly are different in Colorado then 20 years ago. Our pollen free winter season gets shorter and shorter in my career.</i>
<i>Hard to separate and isolate out effects of increased temperature from all the other global degradation from overpopulation. My patients who travel to the Far East call with asthma exacerbations triggered by urban pollution. Friends who participate in summer running events are more likely to relate experiences with hyperthermia.</i>
<i>I have a patient whose home flooded in hurricane Sandy and she was forced to relocate. Certainly stressful, but unsure if health effects as a direct result.</i>
<i>I have seen more mold-induced illness secondary to moisture in homes, and some due to intrusion of insects such as pillbugs.</i>
<i>I seem more and more patients with mild allergy.</i>
<i>I suspect that global warming is increasing food allergy through increased production of stress lipoprotein production in plants and plant foods such as fruits, nuts, peanut. This is an extension of the mechanism of Oral Allergy Syndrome.</i>
<i>I'm seeing more and more skin itching and rash and chronic rhinitis related to poor air quality.</i>
<i>In Florida the oak season is starting earlier and we are seeing increased 'spring' allergy symptoms in the earlier on the year.</i>
<i>In Northern California it was extremely rare to have rains in the summer time (Mediterranean climate). We now routinely have three heavy rains during the summer.</i>
<i>In physical education classes at school, asthmatics are expected to participate no matter what the outdoor temperatures may be.</i>
<i>In San Diego, CA, the 'spring' started in February and we have earlier sings of seasonal allergies of patients exposed to pollens, including allergic rhinitis and asthma flare-ups.</i>
<i>Increased mold from rain, water damage at home.</i>
<i>Increased respiratory symptoms during particulate pollution during summer.</i>
<i>Longer pollination.</i>
<i>Longer weed pollen season and symptoms.</i>
<i>Many patients are mentioned that their seasonal allergies have never been this severe until past 5 years. Adults who have lived in the same area.</i>

<i>Many patients described worsening of asthma and allergic rhinitis over time but difficult to determine if related to climate change.</i>
<i>More patients are experiencing winter mold and mite allergy symptoms.</i>
<i>Multiple patients experiencing worse and longer allergy seasons regarding asthma and rhinitis.</i>
<i>Multiple patients who have moved to a city with higher automobile pollution become sensitized to allergens they were not sensitized to before.</i>
<i>My state (NJ) was, as you know devastated by Hurricane Sandy (2012), and many of my patients had increased respiratory symptoms following exposure to flooded homes and the stress of dealing with often large financial losses.</i>
<i>No anecdote but increased pollen counts noted over past 30 years.</i>
<i>We know the spring pollen season has been affected with earlier birch pollination (birch flowering has been followed since the 1860s by observation and since the 1930s by pollen counts).</i>
<i>Children report asthma exacerbations with travel to cities where smog is a problem.</i>
<i>Numerous patients with fall mold allergies whose symptoms now last well into December since the ground takes longer to freeze.</i>
<i>One of my patients suffers from urticaria, the episodes of urticaria increased in frequency and intensity during hot weather. Hotter the weather, more the episodes. The summers are getting hotter.</i>
<i>Patient about to retire bought a countryside small property to be close to nature. Improving house develops Lyme disease. Patient in good health develops acute onset fever diarrhea, dehydration after eating a lunch from a deli section in important store. Cultures of salmonella / paratyphus isolated on inspection samples from store. Patient traveled to areas with poor air quality, increased need for inhaler.</i>
<i>Patients living near freeways have a lot of chronic cough, asthma exacerbations, worse symptoms when keeping their windows open, most likely due to air quality problems.</i>
<i>Patients with asthma on high ozone days.</i>
<i>Pollen season is getting longer.</i>
<i>Possible mold-related respiratory illness in a patient who lives on Lake Erie (algae bloom summer 2014).</i>
<i>Seeing the worsening of allergic symptoms during pollen season where there might actually be lower counts as a result of increased allergenicity.</i>
<i>Several instances in the past few years of an earlier and longer spring pollen season.</i>
<i>Shigella spike after rains.</i>
<i>Some changes in the seasonality of the pollen seasons.</i>

*Spring season starts early in January and last almost 3-4 months, with higher exacerbation a of allergy and asthma symptoms.*

*Sudden flare-up of asthma after cleaning a basement after flooding.*

*Teenage athlete at a school located near a freeway with ozone monitoring nearby revealing high levels that correlated with patient having shortness of breath, wheezing, and coughing with mild exercise.*

*There were fires out of state that were occurring, and they caused her asthma to be an issue.*

*We all see each year the pollen counts breaking new records which directly impacts out allergic rhinitis and asthmatic patients.*

*We already have a lot of mold exposure in our area; this can be expected to get worse as the weather gets warmer and wetter.*

*We are seeing a lot more of tickborne illnesses such as the lone star tick because our winters are so mild it does not kill these insects off and this is causing the Alpha gal sensitization leading to anaphylaxis when eating mammalian meat.*

*We have all seen an increase in asthma and respiratory allergies over the last 30 years.*

*We have all seen increasing pollen and pollution levels affecting our patients---if you haven't seen it, your eyes aren't open.*

*Wildfires and asthma outcomes during fires.*

*Worsening of asthma when have high pollution.*

*Increased conjunctivitis through longer season duration.*

Do you include the following as part of your management of Asthma? Further comments:

(Tangential responses, which did not answer the question, were removed.)

**(A) Discussion of the effect of outdoor air quality on symptoms**

*I practice in Southern Alabama; Seasons are long and airborne allergens are always present.*

*I see a patient who, every time they report a flare-[up] of symptoms, always receives [counseling on all five topics].*

*Only as needed for allergic subjects and those wherein pollution worsens symptoms. Not a blanket discussion for all patients.*

*Only discuss were a patient to specifically inquire as these data are quite controversial, and to me are long-term cyclical variations, and only in that apolitical context am I comfortable in venturing in that direction of discussion, but all questions always answered to the best of my ability*

*Outdoor air quality meaning allergens, pollen and Alternaria. I do not discuss "air pollution," particulates or sulfur with them. Ragweed season has not lengthened in my part of the country. Grass pollen season is occurring earlier, however.*

*What matters most are patients' symptoms when they actually occur. Each season is terrible for some patients and mild for others despite pollen counts, length of season, etc.*

**(B) Instructions on use of outdoor air quality data**

*Air quality risk is generally low in my region during winter, so I tend not to discuss this for young children who wheeze only during colds and mostly in the winter. I just looked up the AQHI site for my region, so I will know how to direct my patients, when relevant, from now on.*

**(C) Information about where to find a regular source of air quality data**

*I have felt for years that our Academy should do a much better job of providing this sort of information. Information from the National Allergy Bureau has been disappointing to me, particularly in terms of providing information for specific geographic areas.*

*Weather and pollen/mold predictions are rampant online and news items. We need to take lead and be seen as the leaders in areas where we are. Easier said than done, but we are obligated with evidence based information. I believe we can co-exist and co-present our information with them (i.e. pollen.com, weather stations, online, etc.). Even supposedly knowledgeable medicine information providers do not know [how to differentiate predicted] allergen counts from real [ones].*

**(D) Information about the increase in length of the Ragweed pollen season**

*I live in Southwest Florida. It is warm and sunny here all year round. Always has been. Ragweed is detectable all year round but it always has been that way down here.*

*I sample the air locally and I haven't seen any changes pertaining to the above questions. The local ragweed season hasn't changed. My levels are actually lower now than they were years ago.*

*Here, the length of ragweed season is a smaller issue than flooding, water damage, and potable water source issues*

*In Central Florida, ragweed pollen counts and duration have always been different than in the rest of the country (can bloom May-November and never go over low/low-end moderate counts), and are not the pollen affected by climate change*

*In my area, ragweed season is not lengthening. In fact, the ragweed pollen counts are moderating, due to the effects on weed production of "Roundup Ready" GM crops on decreasing ragweed growth.*

*In New England, we seem to have less of a problem with ragweed; perhaps due to climate change. Perhaps this change is more relevant in the south.*

*It is difficult to predict the seasonal changes in the Northeast, but the Ragweed season is earlier each year and lasts longer.*

*The length of ragweed pollen in the area has not changed in my year of practice. Routine year-to-year variation greatly outweighs any negligible effect from purported long-term climate trends.*

*The ragweed season is not longer. Ragweed pollenates based on minutes of daylight/nightlight per day. Temperature has nothing to do with it. This has been well established. People who say otherwise are not scientific.*

*Ragweed is not present in my practice area*

*Alaska does not have ragweed and I practice in a rural area so rarely have air quality concerns*

*There is very little ragweed in our area so that question was not applicable to my patients.*

*Ragweed is not common in my area. I would like to see data on effect of climate change on season of pollination for other weeds/trees (California).*

*Don't practice in ragweed zone*

*No ragweed on the west coast*

*Ragweed not present significantly in this area (Pacific Northwest).*

*We don't have ragweed on the West Coast; therefore the question above is too restrictive.*

<i>We have a very short, mild ragweed season</i>
<i>I discuss pollens but not ragweed since there is very little ragweed where I practice.</i>
<i>I live high in the mountains. Air quality not a problem. No ragweed either</i>
<i>I live in a place with good air quality and not much Ragweed! (Lots of mold and trees and grass though)</i>
<i>No comment about ragweed-it is NOT relevant in my area</i>
<i>No pathogenic Ragweed in California</i>
<i>Ragweed is a relatively minor allergen here in northern California, but I do mention air quality and drought</i>
<i>Ragweed is an unimportant pollen allergen in my area.</i>
<i>I practice in Southern California, and we don't have the same "ragweed season" as other parts of the U.S., so it's not as big a topic here. Due to our climate, we have near year-round pollen season.</i>
<i>I practice in the Rocky Mountain region where there is little Ragweed. With increased temperatures the grass season will most likely become longer grass pollen being the most significant pollens in our area.</i>
<i>I see people in the U.K. so we do not have ragweed pollen here, but I do talk about the tree pollen season.</i>
<i>In the West Coast, our major pollen allergens are the trees and grasses, and not ragweed.</i>
<i>Other pollen cycles are also impacted, including birch.</i>
<b>(E) Mention climate change if / when addressing the lengthening pollen season</b>
<i>When we did pollen counts we did not see an increase in grass and ragweed pollen. Ragweed stopped pollinating long before the first freeze. Over 24 years we saw a significant increase in tree pollen. There are multiple explanations for this including climate change.</i>
<i>I practice in an area where many people vote in a certain way that predicts that they will be hostile to the scientific basis of climate changes. Usually, this topic is "safer" to discuss with teachers, professors and other middle class but highly educated individuals.</i>
<i>This is a controversial topic; certainly air quality in urban centers is understood to be primarily human derived, highly relevant for respiratory diseases, and "actionable" in that interventions can modify its impact; the discussion of a lengthening pollen season is also relevant, yes- but whether or not this is a result of human endeavor or natural causes is less clear and even less so whether the process is amenable to intervention and thus in a limited time appointment it is a low priority.</i>

*I have performed local pollen counts for 22 years. There has been no significant change in counts or "length of season" over that time. Best evidence is 0.3 degree Fahrenheit change over past 30 years. Average annual temperature varies by 1 degree Fahrenheit every 50 mile latitudes, which means our pollen season now mimics that found 15 miles south of here.*

*In the Northeastern U.S. this is leading to early and higher tree pollen levels, rather than increased ragweed.*

*Just earlier today, a pediatric patient's father asked me if I thought that climate change may be affecting the duration and severity of his son's pollen exposures.*

Which of the following, if any, are barriers that prevent you from addressing climate change-related health issues with patients? (Open-ended, "other" responses).

<b>(Tangential responses, which did not answer the question, were removed.)</b>
<b>Time</b>
<i>Clinic time.</i>
<i>Insufficient time.</i>
<i>Lack of time. (three responses)</i>
<i>Lack of time during visits.</i>
<i>No time during the visit.</i>
<i>Not enough time. (two responses)</i>
<i>Not enough time during clinic visit.</i>
<i>Not enough time to address.</i>
<i>Not enough time to discuss this in addition to everything else that needs to be discussed.</i>
<i>Time. (five responses)</i>
<i>Time constraints. (four responses)</i>
<i>Time limitation in clinic.</i>
<i>Too much else to talk about, no time to talk climate change during a visit.</i>
<b>Political Concerns</b>
<i>Climate change deniers.</i>
<i>Concern over offending people who do not believe in climate change.</i>
<i>Ideology, beliefs, politics.</i>
<i>I'm not a liberal.</i>
<i>It's too politically motivated a topic.</i>
<i>Many patients' politics to not admit possible climate change.</i>
<i>Patients' socio-economic status.</i>
<i>Political.</i>

<i>Political (i.e., deniers of climate change). Texas is a state of deniers, where AAAAI is meeting without me!</i>
<i>Political bias of some patients.</i>
<i>Political close-mindedness.</i>
<i>Political denial.</i>
<i>Political division on issue can make it tough to discuss in the healthcare setting where time is already limited with patients.</i>
<i>Politics.</i>
<i>Resistance to including politically charged topics in my discussions with patients, lack of time.</i>
<i>The fact the climate change seems to be a politically charged issue</i>
<i>The issue has politically polarized.</i>
<i>This would lend credibility to a political scare-mongering philosophy.</i>
<b>Lack of Knowledge / Resources</b>
<i>Discussing them in the context of their health problems and time. Would be good to have information to hand out to patients about facts and myths of climate change.</i>
<i>Frustration: since little that can be done about the issue, with the oil industry so prominent in Houston.</i>
<i>I work at Georgia Tech, the patients know more than I do.</i>
<i>Lack of my knowledge of subject.</i>
<i>My personal knowledge.</i>
<i>Need handout.</i>
<i>Patients want to learn.</i>
<i>What is the climate change related health issues?</i>
<b>Low Priority</b>
<i>It is a minor issue.</i>
<i>Not pertinent to our discussion.</i>
<i>Patients don't express much interest.</i>
<i>Patients don't really care, they want to get better and a long winded discourse on climate change is not warranted.</i>

<i>Patients feel it does not pertain to them.</i>
<i>Discussed in context of remediation, but I already have long discussions with most patients about something related to the medical problem, so discussions center on what is relevant to the patient now.</i>
<i>Some are convinced it is only a hoax by scientists.</i>

If there are specific topics you would like included in undergraduate or continuing medical education, please describe here:

<i>(Tangential responses, which did not answer the question, were removed.)</i>
<i>Lifestyle modification. Prevention is most important.</i>
<i>Effects of pollutants, gases, etc. should be discussed. Basic climatology and meteorology course would be helpful, as well as basic geology course.</i>
<i>Interaction of pollution with changes in climate and the role of dietary antioxidants in combating oxidative stress potentially related to climate change.</i>
<i>Migration of allergenic or toxic flora and fauna due to climate change.</i>
<i>Effect of air quality on respiratory disease.</i>
<i>Include presentations on air pollution, climate changes, and aeroallergen ecology in poster, oral abstract, and speaker sessions at the annual meeting - this has been done to a limited extent already.</i>
<i>Air pollution, environmental effects on allergic disorders and other health conditions.</i>
<i>Effect of climate change (air quality, processed food, stressors) on rhinitis and chronic rhinosinusitis.</i>
<i>How climate change affects different regions of US as part of decision to change living location.</i>
<i>Information on how global warming affects pollen levels and might be contributing to increasing incidence of food allergy in plant related foods.</i>
<i>Environment, climate change, and its effect on the body should be included as curriculum in medical schools so we can be prepared to treat patients in the future.</i>
<i>The effects on duration of pollen seasons.</i>
<i>Dietary changes and habits that must change with local changes in crop availability and agricultural changes due to increased heat. Spread of vector-borne diseases (such as Dengue fever and Chikungunya) which may come to the USA with increased warmer temps.</i>

<i>Differences between indoor and outdoor air pollution and how this impacts health.</i>
<i>How changes in the environment could affect health.</i>
<i>Effects on food resources, effects on water availability, and effects on disease vectors.</i>
<i>Articles on climate change and the environment should be included in the recommended readings for the resident and student rotation curriculum developed by the AAAAI.</i>
<i>What does the allergen count mean? Put germane to their, the public, and or depending on who the audience is, properly presented so they understand it. e.g. population health versus individuals, or regional differences.</i>
<i>I think these topics should occur at ALL levels of education....starting in elementary school. More courses need to be taught and mandated in all schools as required courses.</i>
<i>I am presently developing a course of undergraduate education on Health and Climate Change.</i>
<i>Climate change and impact on health is appropriate in education. Similar to occupational hazards and health.</i>
<i>Recognize the importance of allergic diseases, which are very common.</i>
<i>The facts and the controversies, point and counter point facts. Educate us about both.</i>
<i>As outlined above - heat, elevated temperatures, impact of reduced water supplies, weeds etc....</i>
<i>Importance of recycling, and the finite resources we have on our planet.</i>
<i>Pollen counts and climate change.</i>
<i>Possible effect of climate changes of the plant growing season.</i>
<i>My concern over climate change is more about future flooding and destruction of coastal areas. Climate change effects on individuals still seem a long way off. If immediate effects (occurring now and in the next 10-20 years) were established, I would answer "strongly agree" to all of these.</i>
<i>Known effects of particulate pollution on deaths from CV disease. How horrible China's pollution is and how it drifts to affect other continents.</i>
<i>All of the above-mentioned climate-health topics, plus mental health impacts.</i>
<i>The relation between the obstructed nasal airway in children under four years old, and the changes of the cranial-facial bones that lead to orthodontic problems, TMJ, and eventually OSA...plus sleep and learning problems in early life of these mouth breathers.</i>
<i>Air quality effects on health.</i>
<i>Rise in pollution.</i>

<i>Indoor air quality.</i>
<i>CME- role of climate change on medical conditions.</i>
<i>I would be interested in examining the possible benefits of "earthing" on patients with allergic inflammation (grounding people to the earth's electric field on a regular basis).</i>
<i>Strategies for minimizing medical solid waste.</i>
<i>Would appreciate more provider inclusive language and focus regarding all health care issues. Including impact of environment on health. All health care professionals can educate and be advocates.</i>
<i>Teaching should also involve physicians in academics and practice.</i>
<i>I recommend integrating advocacy into medical education and getting formal programs up and running at your institution.</i>
<i>Given the general ignorance regarding allergies in most medical schools, perhaps climate change is the way to approach improving the dialogue.</i>
<i>Strong emphasis on environment quality in buildings, and places of work. Also political work on environmental regulation for [indoor] quality of air in new houses, offices [or other new buildings] for human [to] work or live.</i>
<i>How to be nice to each other and the earth itself.</i>
<i>We should add to teach medical student.</i>
<i>Exposure to allergists in undergraduate and resident medical education is woefully inadequate. Instead of mandatory rotations through an allergy department, it is mostly passed on information from the resident one year ahead; the blind leading the blind.</i>
<i>Having comparative data, over last 50 years to report in an efficient manner the data. Have a pro and con argument. Like Arnold Schwarzenegger just changed his Hummer to a hybrid after he was convinced of the effect.</i>
<i>How to objectively evaluate scientific research and separate from political or emotional hyperbole.</i>
<i>Truth in science.</i>
<i>An unbiased evaluation of studies that claim or disprove human causation of Climate Change. Correlation does NOT equal causation.</i>
<i>Present the scientific data not the politically charged misinformation.</i>
<i>Better controlled studies and case based approach will instill science behind many observations.</i>

Which of the following resources, if any, would be helpful to you (additional comments)?

(Tangential responses, which did not answer the question, were removed.)

#### **Educational Resources**

*Include teaching of students in high school and various college levels/fields.*

*All of the above. Resources regarding how to discuss climate change with patients.*

#### **Policy Statements from Professional Organizations**

*AMA already involved in too many items that have a political component to them.*

*Need more data before policy statements from societies.*

*Last thing we need is the bureaucrats and ivory tower types speaking for us.*

#### **Data**

*Have climate experts and researchers publish their findings in science journals outside their field of specialty. For example, how warmer temps in subtropical areas contributes to wider distribution of malaria.*

*Unless they contain information about atmospheric CO<sub>2</sub>, any of the above efforts are worthless.*

*Objective reviews.*

*I think we need emotionally neutral data.*

#### **Internet, Film, and Social Media**

*Most and all information is now online! And personal computing devices or smart phones. Also social media! We are barely, if at all, present there.*

Do you have any other comments, patient anecdotes, or feedback?

#### **Open-ended comments have been edited for minor grammar and spelling corrections**

#### **Education and outreach**

*The vast majority of people in the world will ignore climate change as a problem as they are too busy trying to survive. If half the population in the world today suddenly disappeared, there would be no serious discussion about climate change. If climate changes exist today, it is a byproduct of the population explosion around the world. In short, it is a symptom only. Treat the illness not the symptom.*

*Thanks for doing this research. Of course it is prone to selection bias because people who don't believe climate change is happening or don't think it affects them will likely not take time to fill out this survey. Still, I would be*

*interested to see the results and hope you will present them soon.*

*Glad these efforts are starting for the good of future generations.*

*Allergists should only drive hybrids, natural gas or electric cars.*

*Very interesting survey and an important initiative to bring awareness to the medical community of how can we may play a role in helping promote solutions to this complex problem.*

*There are many areas that physicians can 'lead the charge' and be good examples for our communities. When we are stretched due to paperwork, compliance issues, continuing education AND trying to balance all other aspects of life- choices must be made. Climate change is important- if we destroy our environment, it really does not matter what else we do.*

*Send results to your two U.S. senators and governing members of AAAAI.*

*Validated information from well controlled studies and trends need to be published and not opinions from financially driven companies, who want to sell products. Then again, even benefit of vaccination is touted, and groups who do not believe are more vocal than scientific groups. Where are the clinical immunologists explaining these to public? They hide behind their own RO1 or animal models- and contribute nothing to population health care. AAAAI, ATS, National academy of sciences need to do more.*

*The professional medical organizations should be strongly active in their opposition to the oil and gas industry driven opposition and misinformation behind the denial of climate change. This is exactly the same thing we saw with support for cigarettes from the greed-driven tobacco lobby in the past. The lives and well-being of ourselves, our patients and the world depend on our taking a strong stand in this matter.*

*I have not researched climate change myself. My information comes from the media generally. It seems like the information is biased either for or against the concept. Everyone seems to have an agenda, even the scientists. That is what makes climate change information difficult to interpret as a clinician. We need better data distribution and better transparency regarding biases. Also we need concrete solution proposals that we can advocate. General statements like "make less pollution" are not helpful. Also, we also need a global solution, not just a U.S. solution. As for my specialty, it would be nice to have some bullet points to refer to when seeing patients.*

*I believe that the justification for minimizing pollution, etc., is responsible stewardship of what we have.*

*This is an important but unmet educational need.*

*Not just USA, but China, India, Middle East, Soviet Union need to address climate change, we all share the same Earth.*

*I have lived with an urban planner, so perhaps I am slightly biased. There are many studies in urban planning on effects of climate change (e.g., urban heat islands, etc.), but few of these seem to trickle down to the medical community.*

*Whether human-caused or not, there are changes in weed distribution and possibly house dust mites and molds that can have an impact in allergic sensitization and elicitation. We should make some effort to study that, and maybe the data can be used in terms of treatment, but probably only if we can verify changed clinical patterns.*

*I'd like to be involved with the movement for climate restoration.*

*This is an important step in educating the public and the profession. I am basically a conservative person and feel that "environmentalism" is often more of a religion than a science. Nonetheless, climate change is real and will no doubt be a force to be dealt with as time goes by. The extent that individual and group efforts will have on climate change is a matter of speculation. It is utterly important that trenchant advocates and doomsday philosophers not prevail as they may have negative rather than positive effects on public acceptance of true scientific fact, unclouded by political, social, and economic agendas. As the ancient Chinese philosopher said, "A journey of many miles begins with a single step". – FCHMD*

*The medical profession should focus on the negative health effects of pollutants, regardless of whether those pollutants are causing climate change. I don't believe we have enough data to prove whether human activities are causing the warming that we have monitored for the past 150 years on a planet that is 4.5 billion years old. We can prove the adverse effects of pollutants on cardiovascular health and the public might accept this as a better argument than the over-politicized global warming apocalypse argument.*

*Until big oil and big industry are restrained from running the government everywhere and cornering the water resources in the west, and sensible programs such as homeowner financial incentives to support improved insulation in homes, public transportation on a larger scale, eliminating the floating trash can in the pacific, etc. I don't see much hope for education of the public making a significant dent... until it is too late and a huge chunk of the country is under water (that is not safe for living thing, including fish).*

*The threat of accelerating global warming is not accepted by many people in the USA. I am afraid that any interventional efforts by our society may be too late.*

### **Skepticism about climate change**

*Some of my answers are based on the fact that I am not clear on true climate changes and, if climate change is in fact occurring, what the health effects/potential health effects are.*

*We have been able to accurately measure temperature worldwide for 100-150 years. The earth has had cooling and warming effects from unknown causes prior to man made changes. We must reduce our pollution as it is, is simply common sense. I do not think man directly causes 'global warming'. Emerging nations like China and India are the largest polluters. So we need to figure out how they can have the benefit of cheap, CLEAN energy.*

*I take issue with the way in which this survey is framed as "climate change" when you are really asking about global warming. The earth's climate has always changed over time and will continue to change in the future. I believe that the potential for humans to cause [climate] change is miniscule compared to the forces contained in the earth (volcanoes, earthquakes) and the solar system. The data does not show warming over the past twenty years unless the numbers are adjusted. The issue of global warming is political, and our organization should stay out of this issue because it will tarnish our reputations if we jump on this bandwagon. If we get involved, it should be as unbiased scientists who look at evidence objectively and hold researchers on both sides*

*to high standards-- not accepting every flawed study suggesting global warming and calling skeptics "deniers."*

*I would be thought a fool to offer assistance teaching such nonsense. I have worked too long in my community to build the trust of referring physicians to make such a fool of myself. As a matter of fact I will do just the opposite and work to discredit anyone claiming climate change has resulted in health effects. They will be seen as snake oil salesman akin to the medi-spas and bio-identical hormone cultists.*

*I think the climate change data are showing no significant global warming in 15-17 years. Local variations of course. There is more political science manipulation than would be tolerated for a minute in the basic science labs and societies in which I have worked. The quality of science supporting catastrophic human induced climate change globally is pathetic and in some cases falsified.*

*This winter has been very cold and snowy. It is hard to believe that there is global warming. This summer was not particularly hot in the Northeast as well. I believe change in overall temperature should be closely monitored.*

*I believe that issue of climate changes evolved from initial idea of global warming and is part of political correctness. I am not aware of any convincing evidence that it is caused by man related activities. In fact I am not aware of any serious discussion on this subject and Al Gore presentations is not it. However it quite believable that Earth is subjected to cyclical temperature and climate changes as recorded in past several centuries.*

*The so-called science of this movement is appalling and much of it is outright faked, or analyzed while competing data are completely ignored. We should not let our serious concerns for patients be diverted into this political quagmire.*

*How can we believe global warming when they make up temperature readings?  
<http://www.telegraph.co.uk/news/earth/environment/globalwarming/11395516/The-fiddling-with-temperature-data-is-the-biggest-science-scandal-ever.html> .*

*I think this survey is biased. It is sad that the academy is using its platform to support political issues like global warming which IS a natural phenomenon and using health issues to scare people and using the data obtained here to support directly or indirectly ideas that has not been proven. Unfortunately my voice is only minute, I realize that, but at least now I clearly know what AAAI's position is on this, which makes me disgusted.*

*I just cancelled my ski vacation because it is going to be 5 below zero for 4 days this weekend. Last week we had over 25 inches of snow in Boston, shutting down our practice for 2 days. I DID GET TO REREAD THE ARTICLE IN THE NEWYORK TIMES on the end of snow in New England published last year. I was able to ski at Stowe, Vermont in beautiful snow over thanksgiving weekend earlier than usual this year. Come to New England and let's discuss climate change myth outside this someday. What a waste of effort and money for the academy to spend time on this when insurance companies won't pay for life saving epi pens for kids with peanut allergy. - David Riester*

*Gosh this survey wasn't a bit prejudiced, was it? I can't wait for the validation... just like global warming, which*

*is 99% political. It will be nice to grow rice in Siberia and Canada.*

*I believe there is much we don't know about climate change. Many pundits proposing that humans are the primary cause of climate disturbances and ill-informed.*

*Sustainability and global warming are political agendas that have very little relevance to health care. It is a waste of resources to pursue this; it is fiscally irresponsible for medical organizations to involve themselves in such endeavors, but to remain "apolitical" and focus on patient care, not governmental agendas.*

*This is entirely inappropriate for this organization. Who do you think that you are? Climate change has ALWAYS occurred and blaming it largely on man is either arrogant and/or foolish. The clear liberal bias makes me consider dropping my membership.*

*I am not against a properly scientific, rigorous investigation of long-term climate trends. But when a single volcanic eruption puts more carbon into the air than all of human industry and I see the discourse of 'climate change' supporters devolve into the language of religion I worry that climate has been hijacked by the ideological left as yet another expedient concept to justify the latest scheme of resource redistribution according to the whims of centralized authorities. We should not rush to impose sweeping health care edicts in such a setting.*

*Poorly worded questions (most would truly be unanswerable) for those who respond "DON'T KNOW" to the question, "What do you think: Do you think that climate change is happening?"*

*History tell us that the earth temperatures vary tremendously from the ice age period up to Greenland being green long before the invention of the combustion engine etc. It is my understanding from NASA data and astrophysicists that these variations occur more because of astronomical issues unrelated to humans on earth (i.e. variations in solar activity, variations in our solar system position in milky way, etc. that results in increase or decrease of radiant heating from sun etc.). Thus, while we should be friendly to the earth's environment (which we all agree), I believe it is overly presumptuous to blame human activity for the variations in temperature of the earth that are still within the normal historical ranges.*

*The climate is always changing. How much of this is man-made is the question which sadly to say has become a political rather than a scientific one.*

*Your questions assume that climate change is caused by human activities. Last I read, the amount of the warming caused by human activities was 20% of the total warming. So if we ended all human activities that cause warming, it would not make a significant difference in the amount of climate change in the future.*

*This is a controversial and unproven subject with scientist split 50/50. I have seen no evidence global warming has in any way adversely affected my patients. Our indoor environment (carpeting, pet dander, and mold) is more problematic - not the outdoor clean air.*

*You did not include the possibility that there is climate change (which there always is) and that it is not necessarily caused by human activity.*

*"Would you like to assist in education or advocacy focused on climate and health in your community?" You wouldn't have a bias, would you?*

*Your survey seemed politically focused.*

*Bad questionnaire; rather worthless if you are trying to get honest opinions.*

*This was a very biased study.*

*This is a patently biased and poorly-conceived "survey". The questions are very leading. And you fail to make a distinction between climate change and possible health effects thereof. One doesn't necessarily lead to the other. It probably was written by a naive college student.*

*The nature of the questions in this survey strongly suggest that it has been designed by people who have already made up their minds on this issue and are mainly interested in advocacy for a predetermined point of view. This is not going to be seen as a "scientific" study of any kind. Shame on you!*

*This survey had an enormous editorial bias. That is confirmed when it concludes by recruiting those being surveyed to join environmental activist groups in their community. You ask those being surveyed how knowledgeable they are. I ask in return, how knowledgeable are you?*

*When was the last time you prepared a scientific survey of physicians regarding their medical opinion and included a question re their political leanings? That alone ought to tell you something.*

*Very biased survey! Some questions cannot be answered if one does not accept the premise that climate change exists, please consider me a skeptic. Your survey has an evident 'liberal' bias. You have wasted my and others time.*

*See my comments within this extremely unscientific, biased survey. This is the equivalent of push polling by either of the major political parties and am embarrassed the AAAAI would be a party. The AAAAI should be more responsible with the moneys it receives from its membership and stick to medical science rather than joining the political activists trying to use science to justify ways to achieve their own socioeconomic goals.*

*Your survey makes assumptions that climate change is a relatively new phenomenon rather than a continuing evolutionary process of warming and cooling of our planet. Your presumption that man can impact this process is pure folly.*

*Climate is always changing. If you objectively look at the data there has been no significant change in average temperatures in the US or globally in the past decade or longer. Global warming, now euphemistically called climate change, has been discredited by professionals looking at the facts alone.*

*Global warming may be happening. Contribution of human activity is highly questionable. Why was there global warming 10,000 years ago? Nobody would say it was due to human activity. "Global warming" has become a very big business. Certain people particularly the academics are making a living out of this. Government has spent billions of dollars in this research so certain people, particularly the academics, have to keep the pot boiling to earn a livelihood. It all may be a big hoax.*

*I believe the AAAAI has specific and definable targets for action that it should pursue, such as the migration of invasive species, the changing incidence and prevalence of certain allergies, rather than participation in some omnibus consortium where that fact-based message is lost in a political debate.*

*This is one of the poorest and most biased "research" tools I've come across. I feel the AAAAI should NOT have sent it to members.*

*The time and effort associated with creating and responding to this survey could more effectively be directed elsewhere.*

*Science is not based on consensus!*

*AAAAI needs to focus on important issues for the specialty. That is why we pay dues.*

*It seems Advocacy is a done deal for AAAAI. Stay out of politics!*

*Since global warming and climate change is already a "proven fact," this survey is a waste, or intended to target those "deniers."*

*If human influence is the major impetus for climate change, then crippling the US economy is not going to make a significant difference. Deforestation of the rain forests of South America, the Pacific Islands and Africa; horrendous air pollution; and fouling of the water in huge population centers like China, Brazil and India are much more damaging to the Earth than coal burning US power plants.*

*Your survey data will be flawed because you are equating climate change to concern over the environment. One can be a climate change "skeptic" and still be extremely concerned about the environment.*

*Your survey showed a bias toward assuming that climate change is occurring. I do not have the expertise to make this conclusion and I am open to peer reviewed scientific data. In many questions of your survey it was not easy to make a decision that was free of the bias that climate change is occurring. Your survey should be neutral. I am not a naysayer to climate change and I depend on rigorous data. I think it is occurring but I really do not know. Because I believe that your survey was not neutral I question whether it is a bona fide data gathering exercise or a disguised effort at advocacy.*

#### **General Feedback**

*Thank you for conducting this survey.*

*Long survey - should have been shorter.*

*I wasn't able to connect to the separate website for advocacy.*

<i>In my opinion, questions about race belongs to the 1930-ties.</i>
<i>Didn't get to answer some questions right. The program kept jumping ahead, and if I wanted to go back. I had to start at the beginning. I retired from private allergy practice in 2010 and currently teach at a medical school in Arizona. For about a third of the questions I wish we had a choice of a different option, or write in answer.</i>
<i>Some of the questions could not be answered because the bubbles did not respond.</i>
<i>Many of the questions do not fit in a yes or no format. Unfortunately, I would need to study the data before being able to answer these questions.</i>
<i>I would like to see results.</i>
<b>Other Responses</b>
<i>I find it interesting that we are trying to engage allergists and their leadership on climate change and other issues when they don't seem to be leading themselves very effectively.</i>
<i>When I saw Al Gore's movie I tried to have the temperature in our office changed by just two degrees Fahrenheit. The immediate reaction from the multi-specialty practice I was in was no. It went nowhere from there.</i>
<i>I have noticed among my patients who are practicing Christians, that generally Catholics who read and study the new testament are more likely to "believe in a human role in climate change" and the importance of recycling even if they are very conservative otherwise, versus other Christians who may focus more on the old testament "teachings" display a different attitude such as humans were given infinite resources and free hand on Earth and that God takes care of things. Appeasing deities was the way primitive civilizations approached climate changes thousands of years ago. This subject is at the core of how humans understand their own existence and reason of being. J. Younes, M.D.</i>
<i>My house burned down in one of the California wild fires as a result of drought.</i>
<i>Lobbying in Congress.</i>
<i>In KY, we have been having the coldest winters in many years.</i>
<i>A review article entitled Climate Change and Allergic Disease (Dapul-Hidalgo, Bielory) addressing these issues was published in the September 2013 issue of Annals of Allergy, Asthma and Immunology.</i>