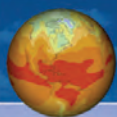


# GLOBAL WARMING'S SIX AMERICAS IN OCTOBER 2014:

PERCEPTIONS OF THE HEALTH CONSEQUENCES  
OF GLOBAL WARMING AND UPDATE ON KEY BELIEFS



YALE PROJECT ON  
**CLIMATE CHANGE  
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George Mason University  
Center for Climate Change Communication

**Global Warming's Six Americas, October 2014:**  
*Perceptions of the Health Consequences of Global Warming  
and Update on Key Beliefs*

Connie Roser-Renouf, Edward Maibach, Anthony Leiserowitz,  
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## Introduction

This report is based on findings from a nationally representative survey – *Climate Change in the American Mind* – conducted by the Yale Project on Climate Change Communication (<http://environment.yale.edu/climate-communication>) and the George Mason University Center for Climate Change Communication (<http://www.climatechangecommunication.org>). Interview dates: October 17-28, 2014. Interviews: 1,275 Adults (18+). Average margin of error: +/- 3 percentage points at the 95% confidence level. The research was funded by the 11th Hour Project, the Energy Foundation, the Grantham Foundation, and the V.K. Rasmussen Foundation.

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## Overview and Key Findings

This report, the seventh on *Global Warming's Six Americas*, focuses on the segments' understanding of the human health consequences of global warming, as recently described in the U.S. *National Climate Assessment*. Our findings indicate that even the segments most concerned about global warming have little understanding of its human health consequences. The limited awareness of global warming's health consequences strongly suggests a need for more public education on the topic.

### Global Warming's Six Americas

- *Global Warming's Six Americas* are six unique segments that together comprise the entire U.S. adult population. Each segment is characterized by a unique pattern of global warming beliefs, attitudes, policy preferences, and behaviors.
- The Six Americas range across a spectrum of concern and issue engagement, with segments that accept and reject climate science at the ends of a continuum, and those that are less certain and less engaged in the middle. At one end of the spectrum are the *Alarmed*, who are very concerned about the threat of global warming and support aggressive action to reduce it. At the other end are the *Dismissive*, who do not believe global warming is real or a problem, and are likely to think it is a hoax. Between these two extremes are four groups – the *Concerned*, *Cautious*, *Disengaged* and *Doubtful* – with weaker beliefs that fall between the two extremes.

### Global Warming and Health

- On a holistic rating scale, large majorities of the *Alarmed*, *Concerned* and *Cautious* said the effects of global warming on Americans' health are "bad" (95%, 92% and 65%, respectively), as do half of the *Disengaged* (49%). Majorities of the *Doubtful* and *Dismissive*, however, said that global warming has no effect on Americans' health (60% and 64%), and 20 percent of the *Dismissive* said the effects are positive.
- These overall ratings of health impacts, however, mask a relatively low level of prior thought about the issue: a quarter of the *Alarmed* (24%) and over half of the *Concerned* (57%) said they have thought "only a little" or "not at all" about the health effects of global warming. Majorities of the *Disengaged*, *Doubtful* and *Dismissive* said they have given the effects no thought or that they are "not sure."

### Shallow Understanding of the Health Risks

- Asked in an open-ended question to name a health problem associated with global warming, majorities of three segments – the *Cautious*, *Disengaged* and *Doubtful* – either said they didn't know or skipped the question and gave no response. Forty percent of the *Dismissive* and 20 percent of the *Doubtful* said there are *no* health problems associated with global warming.
- A majority of the *Alarmed* (60%) accurately named at least one health problem associated with global warming, but they were the only segment in which a majority did so. In contrast, only three percent of the *Disengaged* accurately named a health problem – a finding of some importance, given that this group contains the highest proportions of some high-vulnerability groups, such as racial and ethnic minorities and those with low incomes.
- Lung diseases are the most cited global warming-related health impacts among Americans, mentioned by about one third of the *Alarmed* (32%) and one quarter of the *Concerned* (23%).

Among the remaining four segments, only 6 percent cited a lung disease – a small proportion, but nonetheless the health problem they were most likely to correctly identify.

- Fewer than 10 percent of any segment correctly identified any other health problem related to global warming, such as allergies, heat-related illnesses, vector-borne infectious diseases, and the injuries and deaths that occur due to extreme weather events.
- While few respondents named specific health threats of global warming unprompted, the *Alarmed* and *Concerned* did anticipate increased future prevalence of a number of global warming-related health threats. When asked in *closed-ended* measures to estimate changes due to global warming in health conditions over the coming decade, a quarter or more of the *Alarmed* say all twelve will become "somewhat" or "much more" common, as do 16 percent or more of the *Concerned*.
- The health threats viewed as most likely to increase are air pollution (42% of *Alarmed* and 31% of *Concerned*), allergies (42% and 30%), and lung diseases (39% and 29%).
- The contrasts between the closed- and open-ended question are apparent for every impact: For example, harm from extreme weather was cited by six percent of the *Alarmed* and three percent of the *Concerned* in the open-ended question, but estimated to increase by 28 percent of the *Alarmed* and 27 percent of the *Concerned* in the closed-ended item.
- The tendency of the *Alarmed* and *Concerned* to estimate increases in global warming-related health threats when prompted by seeing them named in the closed-ended questions, combined with their failure to name these consequences in the open-ended questions, suggests that their familiarity with health impacts is not deep, but that they are nevertheless inclined to accept them as real.
- In the remaining four segments, fewer than six percent of members expect any health problem to increase – a strong indication that they simply are unaware of the health consequences of global warming.

### Groups at Risk

- Asked whether some Americans are at higher risk than others, two-thirds of the *Alarmed* (66%), close to half of the *Concerned* (46%), and a quarter of the *Cautious* (25%) said "yes." Majorities of the *Cautious*, *Disengaged*, and *Doubtful* said they were not sure, and nearly three-quarters of the *Dismissive* said no groups are more vulnerable than others (71%).
- When asked to name vulnerable groups in a follow-up question, the *Alarmed* (22%) were most likely to cite the heightened vulnerability of poor, homeless and/or uninsured people, as did 12 percent of the *Concerned*. Fewer than 1 percent of the remaining four segments said that poverty is associated with higher vulnerability; rather, they were more likely to cite the vulnerability of seniors (4%) and sick or disabled people (3%), although these proportions are still very low.

### Concern About the Health Risks and Harm

- In spite of their lack of specific knowledge about global warming-related health problems, seven in ten of the *Alarmed* (69%) and one third of the *Concerned* (35%) say they have worried about the health effects of global warming "a moderate amount" or "a great deal." Fewer than 20 percent of the members of the remaining four segments have worried more than "a little," and majorities of the *Disengaged*, *Doubtful* and *Dismissive* say either they have "not worried at all," or are "not sure."



- When asked to estimate the number of people who are currently being injured or killed by global warming, and how many will be harmed in 50 years, large proportions say that they don't know, including 9 out of 10 of the *Disengaged* and half or more of the *Cautious*. Even among the *Alarmed*, 28 to 40 percent say they don't know; the only segment that is relatively sure is the *Dismissive*, with 85 to 90 percent saying no one is currently being harmed by global warming or will be harmed by it 50 years from now.
- Asked about current harm to people in the U.S., two-thirds of the *Alarmed* (66%), nearly half of the *Concerned* (45%), and a quarter of the *Cautious* (27%) say Americans are being harmed "a moderate amount" or "a great deal."

## Policy Support

- The *Alarmed* and *Concerned* strongly support action to protect people from global warming's health effects from every level of government. Pluralities of the *Cautious* and *Doubtful* say that government, at all levels, should maintain its current level of effort. A plurality of the *Disengaged* say they aren't sure, but of those who express an opinion, most wish to see current levels of effort maintained. A large majority of the *Dismissive* say there should be much *less* government effort.
- Majorities of the *Alarmed* and *Concerned* support increases in funding to local and state public health departments and to federal health agencies to protect people from global warming's health threats. Three-quarters of the *Alarmed* support increased funding to federal health agencies (78%) and their state's public health department (76%), and 69 percent support increases to their local public health department. The *Concerned* are similar: 65 percent support increased funding for federal agencies, 58 percent for state health departments, and 55 percent for local health departments.

## Trusted Sources of Information

- Trusted sources of information about global warming's health impacts vary considerably by segment. The *Alarmed* and *Concerned* are most likely to say they trust -- "strongly" or "moderately" -- climate scientists (72% and 59%, respectively). By contrast, only one third or fewer of the members of the remaining segments trust climate scientists as sources about the health impacts. Similarly, the U.S. Centers for Disease Control and Prevention (CDC) are strongly or moderately trusted by 68 percent of the *Alarmed* and 57 percent of the *Concerned* but only by minorities of the remaining four segments. The World Health Organization (WHO) is strongly trusted by 30 percent of the *Alarmed*, but just one percent of the *Dismissive*.
- Across segments, primary care physicians and family and friends have the highest credibility of any source – i.e., they are trusted by larger proportions of each segment than most other sources and distrusted by fewer. The Centers for Disease Control and the American Medical Association have the highest credibility across segments among the health-related organizations assessed.
- Taken together, the trust placed in primary care physicians, the CDC, and the AMA suggests the potential for a traditional two-step flow of information about the health impacts of global warming, in which health organizations provide information to doctors, who in turn, provide information to their patients.

## Introduction to Global Warming's Six Americas

The divergent views about global warming in the United States present a challenge to decision-makers and educators who wish to communicate effectively about the topic. Audience segmentation offers a method of identifying and understanding the differences in Americans' beliefs, attitudes, and informational needs regarding global warming by identifying cohesive groups within the public that share common characteristics. Understanding the differences between these groups can help communicators more effectively provide audiences with the information they need and desire, address their audience's concerns, and speak to their values.

The segmentation framework described in this report divides Americans into six distinct audiences that range along a spectrum of global warming concern and issue engagement. The first report identifying these groups – *Global Warming's Six Americas, 2009* – profiled the segments in detail. Since then, we have tracked changes in the sizes of the segments, and described additional characteristics and beliefs of the six groups in a series of reports that are publicly available at our websites.<sup>1</sup> The methods used to gather and analyze these data are described briefly at the end of this report, and a full description of the analysis methods may be found in Maibach *et al.*, 2011.<sup>2</sup>

The report is divided into two sections: The first section introduces the six groups and briefly describes the key beliefs that distinguish them. The data presented in this section updates prior reports describing these characteristics.

The second section provides new information about the segments, examining their understanding of the health threats posed by global warming, their support for government action to protect people from these threats, and the sources they trust for information on global warming-related health threats. Overall, Americans have limited understanding of the health threats, and understanding and support for action vary by segment.

The public's understanding of global warming's health effects is of particular importance for education and communication efforts. Recent research finds that a public health framing of climate change is effective across segments because it tends to evoke positive responses even among those segments doubtful or dismissive of the reality and danger of climate change.<sup>3</sup>

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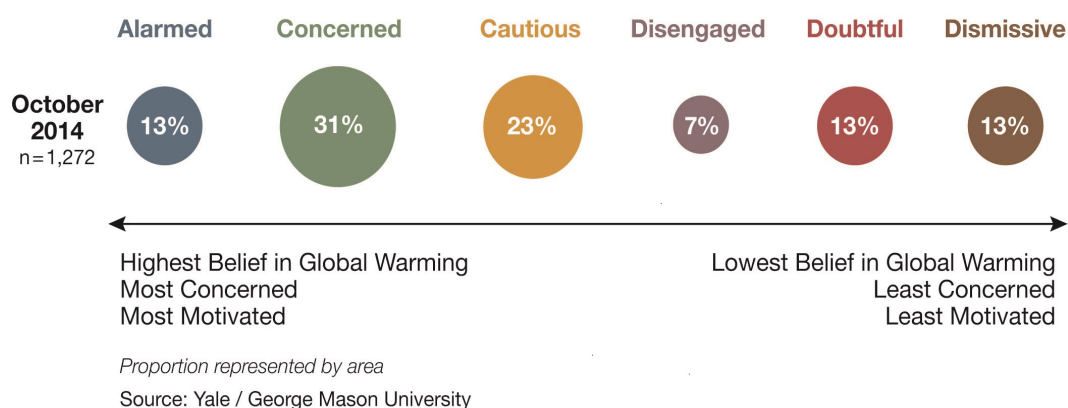
<sup>1</sup> Reports may be accessed at: <http://environment.yale.edu/climate/publications/> or <http://climatechange.gmu.edu>.

<sup>2</sup> Maibach, Edward, Anthony Leiserowitz, Connie Roser-Renouf & C.K. Mertz. (2011). Identifying Like-Minded Audiences for Climate Change Public Engagement Campaigns: An Audience Segmentation Analysis and Tool Development. *PLoS ONE*, <http://dx.plos.org/10.1371/journal.pone.0017571>

<sup>3</sup> Myers, T. A., Nisbet, M. C., Maibach, E. W., & Leiserowitz, A. A. (2012). A public health frame arouses hopeful emotions about climate change. *Climatic Change*, 113(3-4), 1105-1112.



## The Six Americas Audience Segments



The Six Americas do not vary much by age, gender, race or income – there are members of every demographic group in each of the segments. The segments range instead along a spectrum of belief, concern and issue engagement, from the *Alarmed* to the *Dismissive*. Groups on the left of this spectrum (above) are more concerned about global warming and desire more action to reduce it, while groups on the right are relatively unconcerned and oppose action. The middle groups tend to have lower issue involvement, do not think about global warming often and do not have strong – if any – opinions on the course the U.S. should pursue.

The *Alarmed* (13%) are very certain global warming is happening, understand that it is human-caused and harmful, and strongly support societal action to reduce the threat. They discuss the issue more often, seek more information about it, and are more likely to act as global warming opinion leaders than the other segments. They are the most likely of the six groups to have engaged in political activism on the issue, although only about one quarter have done so.

The largest audience segment is the *Concerned* (31%), who are moderately certain that global warming is happening, harmful and human-caused; they tend to view global warming as a threat to other nations and future generations, but not as a personal threat or a threat to their own community. They support societal action on climate change, but are unlikely to have engaged in political activism. In 10 of 11 national surveys tracking the Six Americas, the *Concerned* have been the largest of the six segments.

The *Cautious* (23%) – the second-largest group – are likely to believe that climate change is real, but they aren't certain, and many are uncertain about the cause. They are less worried than the *Concerned*, and view global warming as a distant threat, if any. They have given little thought to the issue and are unlikely to have strongly held opinions about what should be done to address it.

The *Disengaged* (7%) are currently the smallest segment of the U.S. population. They have given the issue of global warming little to no thought. They have no strongly held beliefs about global warming, know little about it, and do not view it as having any personal relevance. They tend to have the lowest education and income levels of the six groups.

The *Doubtful* (13%) are uncertain whether global warming is occurring or not, but believe that if it is happening, it is attributable to natural causes, not human activities. They tend to be politically conservative and to hold traditional religious views.

The *Dismissive* (13%) are certain that global warming is *not* happening. Many regard the issue as a hoax and are strongly opposed to action to reduce the threat. About one in nine have contacted an elected representative to argue against action on global warming.

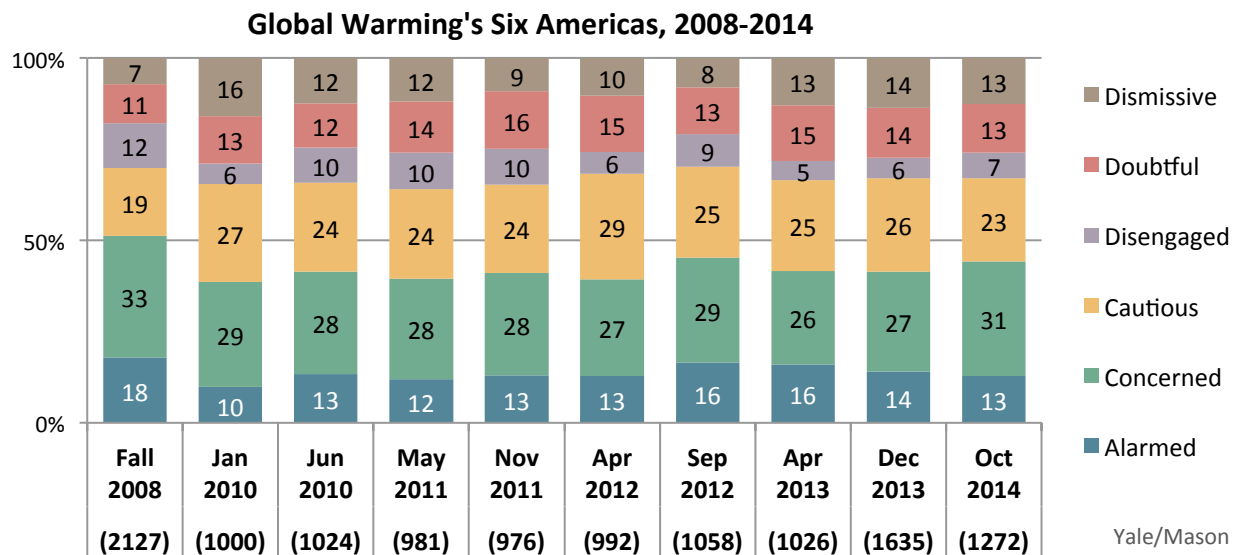
Together, the three segments on the left side of the continuum – the *Alarmed*, *Concerned* and *Cautious* – comprise two-thirds of the American public (67%). Although they range in certainty about the reality and dangers of climate change, they are similarly inclined to believe it is a real threat that should be addressed. Thus, some level of support for action is the predominant view among the majority of Americans.

### Changes in the Segment Sizes Over Time

When the six segments were first identified in the fall of 2008, half of the U.S. population belonged to one of the two most concerned segments – the *Alarmed* (18%) and *Concerned* (33%). By January 2010, the proportion in those segments had shrunk by 13 percentage points, and the *Cautious* had grown from 19 to 27 percent – an indication that the majority still recognized the reality and danger of climate change, but had become less concerned. At the same time, the proportion in the least concerned segment, the *Dismissive*, more than doubled from 7 to 16 percent of the population.

These changes were consistent with multiple national polls showing similar shifts in public opinion at the time, which were attributed to several factors, including the recession, decreases in media coverage, “climategate,” and cues from political elites. Recent research suggests that of these, elite political cues were the primary driver of the downward shift in public opinion, with Republicans and conservatives moving to less concerned segments, while Democrats and liberals remained relatively stable.<sup>4</sup>

By June of 2010, the *Alarmed* had rebounded by 3 percentage points, while the *Dismissive* shrank by 4 percentage points. Since then, there have been minor changes in the segment sizes, but no clearly identifiable trends. Currently, the proportion of *Alarmed* has returned to June 2010 levels at 13 percent – equal in size to the proportions of *Doubtful* and *Dismissive*.

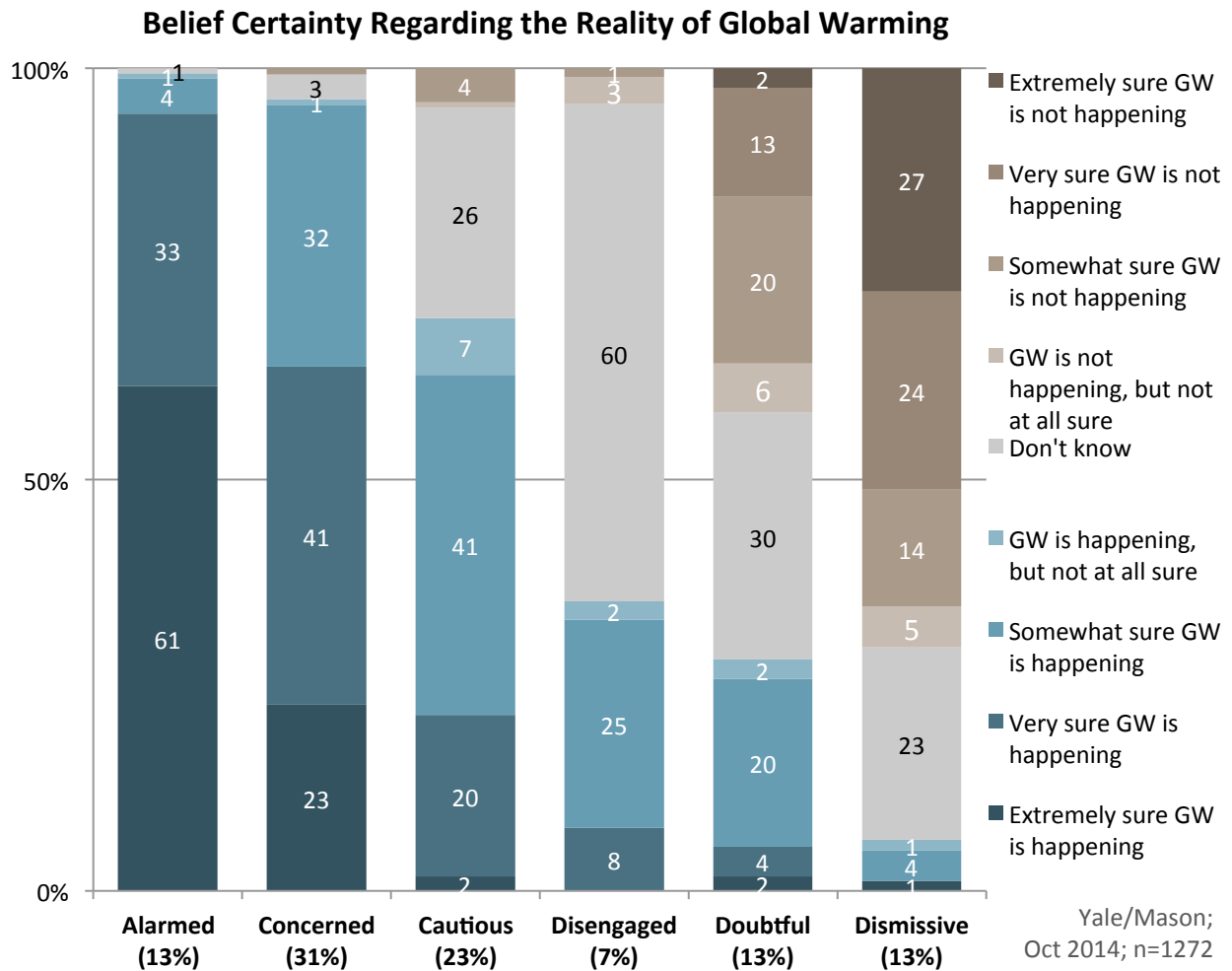


<sup>4</sup> Mildenerger, M. & Leiserowitz, A. (in revision). Why did public concern for climate change decline?: Evidence from an opinion panel. *Global Environmental Change*. Manuscript is under revision and available upon request.

## Key Beliefs

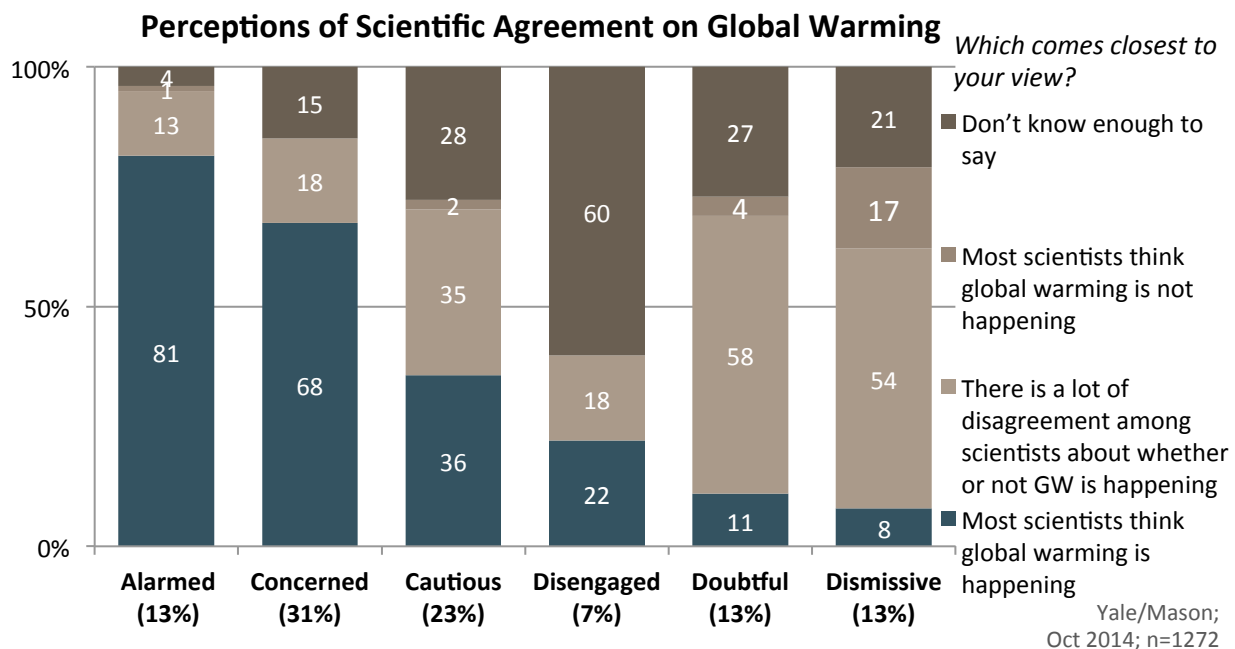
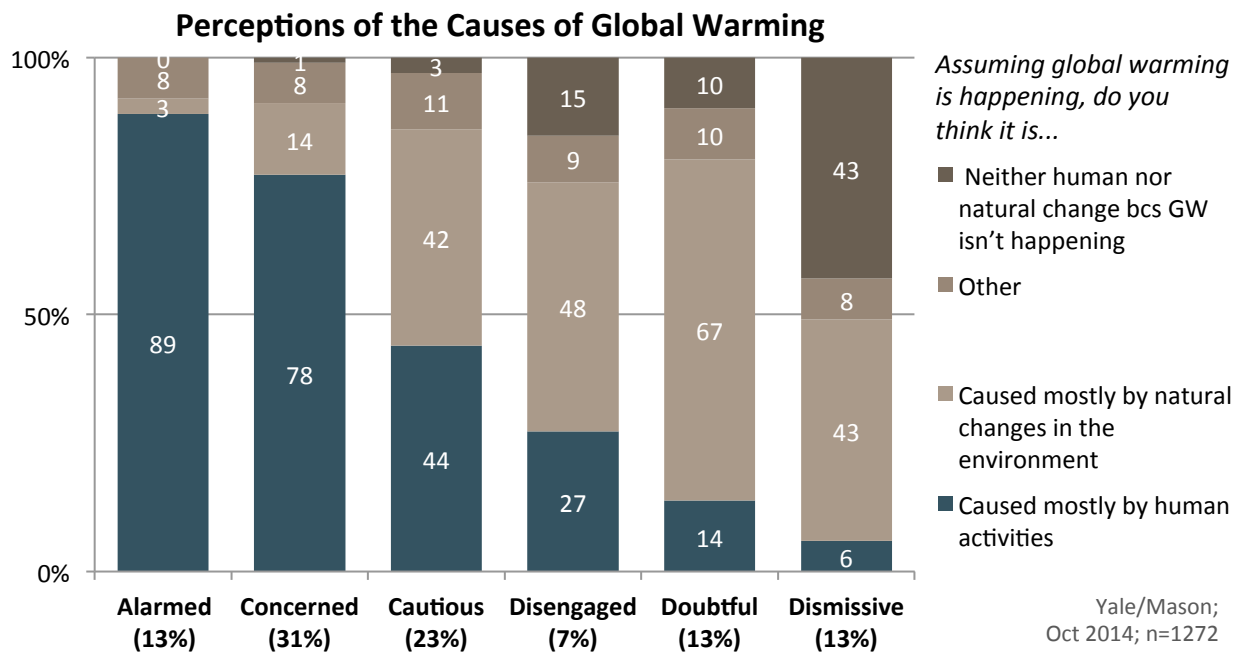
A growing literature shows that support for national action on global warming is strongly related to a number of key beliefs: certainty that global warming is real, human caused, dangerous, and solvable; and that most scientists have reached a consensus that it is real and human caused.<sup>5</sup> The six segments differ dramatically on these beliefs, and in their support for national action on the issue. In this section we briefly review these differences.

**Belief Certainty:** While 94 percent of the *Alarmed* are very or extremely sure global warming is happening, half of the *Dismissive* (51%) are equally sure it is not happening. Majorities of the *Concerned* and *Cautious* believe global warming is happening, while the majority of the *Disengaged* (60%) say they don't know, and the *Doubtful* hold opinions across the range.

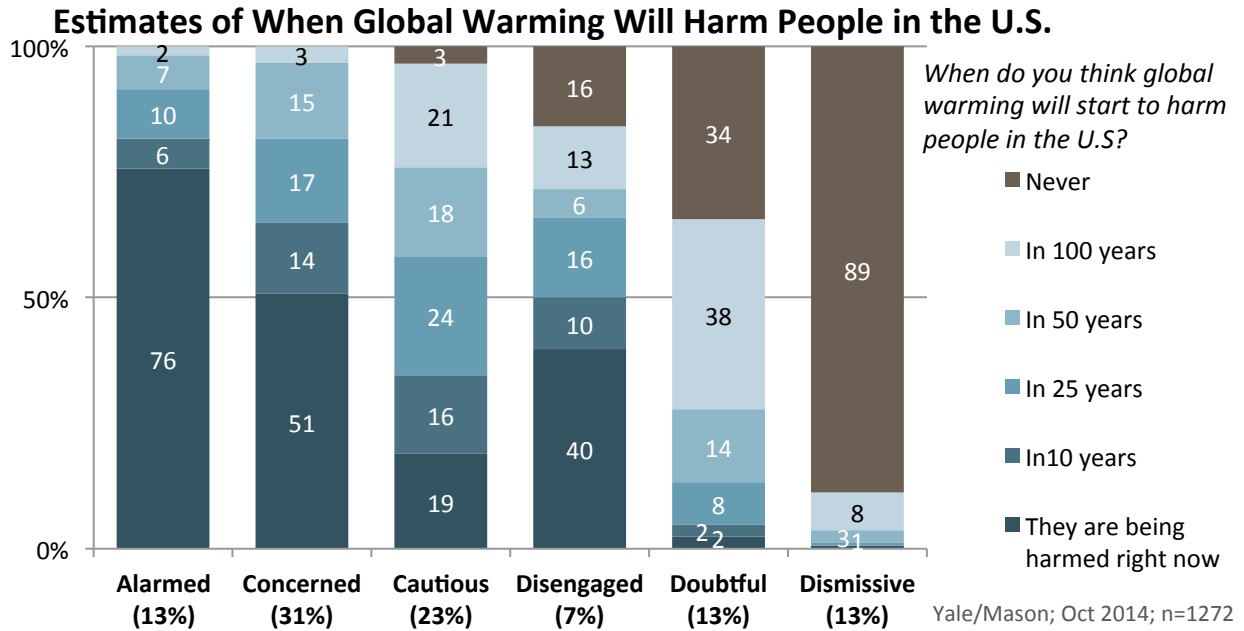


<sup>5</sup>Ding, D., Maibach, E., Zhao, X., Roser-Renouf, C. & Leiserowitz, A. (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change*, 1, 462-466. doi: 10.1038/NCLIMATE1295. Roser-Renouf, C., Maibach, E., Leiserowitz, A., & Zhao, X. (2014). The genesis of climate change activism: From key beliefs to political action. *Climatic Change*, 125(2): 163-178. doi: 10.1007/s10584-014-1173-5.

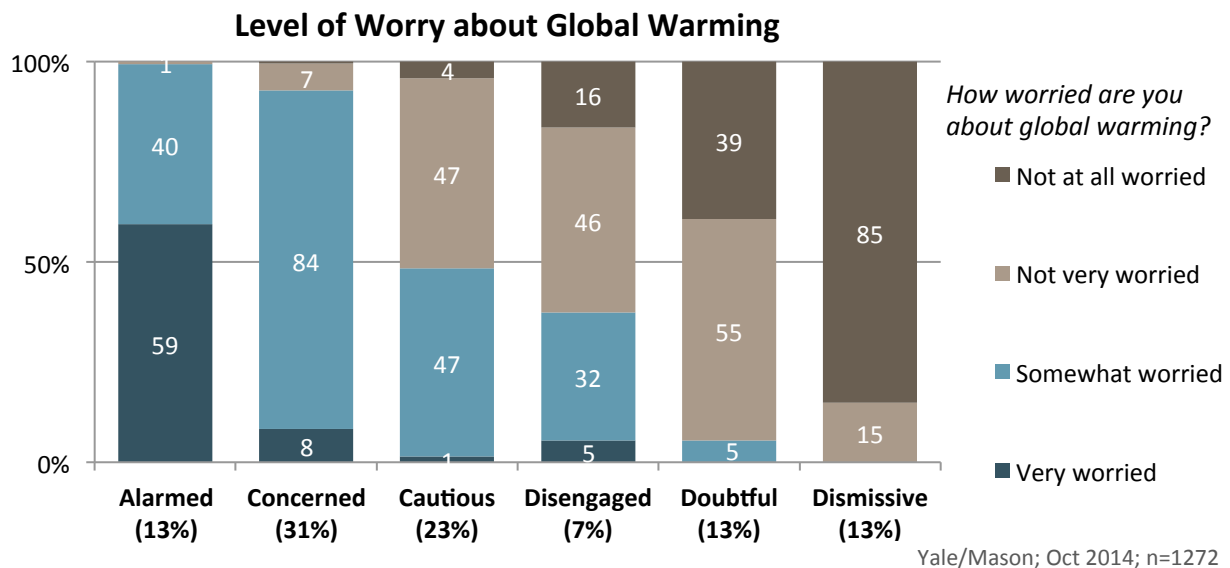
**Causation & Scientific Consensus:** Recognition that global warming is human-caused, and that most scientists think it is happening, is highest among the *Alarmed*, with large majorities understanding these facts (80% to 90%), and lowest among the *Dismissive* (less than 10%). Moving from left to right in the figures below, understanding decreases steadily: the *Concerned* have lower understanding than the *Alarmed*, the *Cautious* less than the *Concerned*, the *Disengaged* less than the *Cautious*, etc.



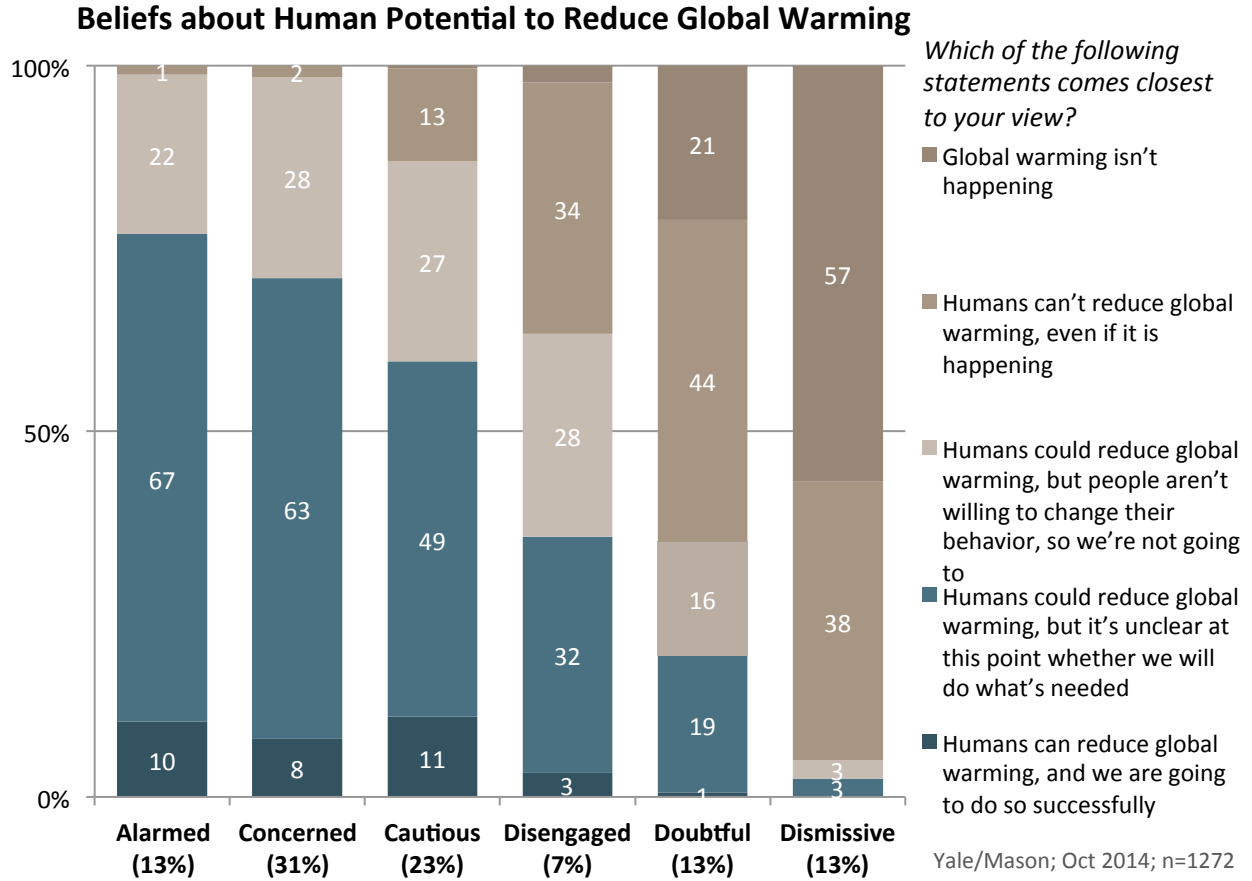
**Harm Caused by Global Warming:** Three-quarters of the *Alarmed* (76%) say that global warming is harming people in the U.S. today, while 89 percent of the *Dismissive* believe people in the U.S. will never be harmed. Notably, 40 percent of the *Disengaged* say that people are being harmed now. However, had they been offered a "don't know" response option, many or most might have selected it, as members of the *Disengaged* do on other risk perception questions. But when pressed for a response, as they were here, 66 percent of the *Disengaged* say people will be harmed within the next 25 years.



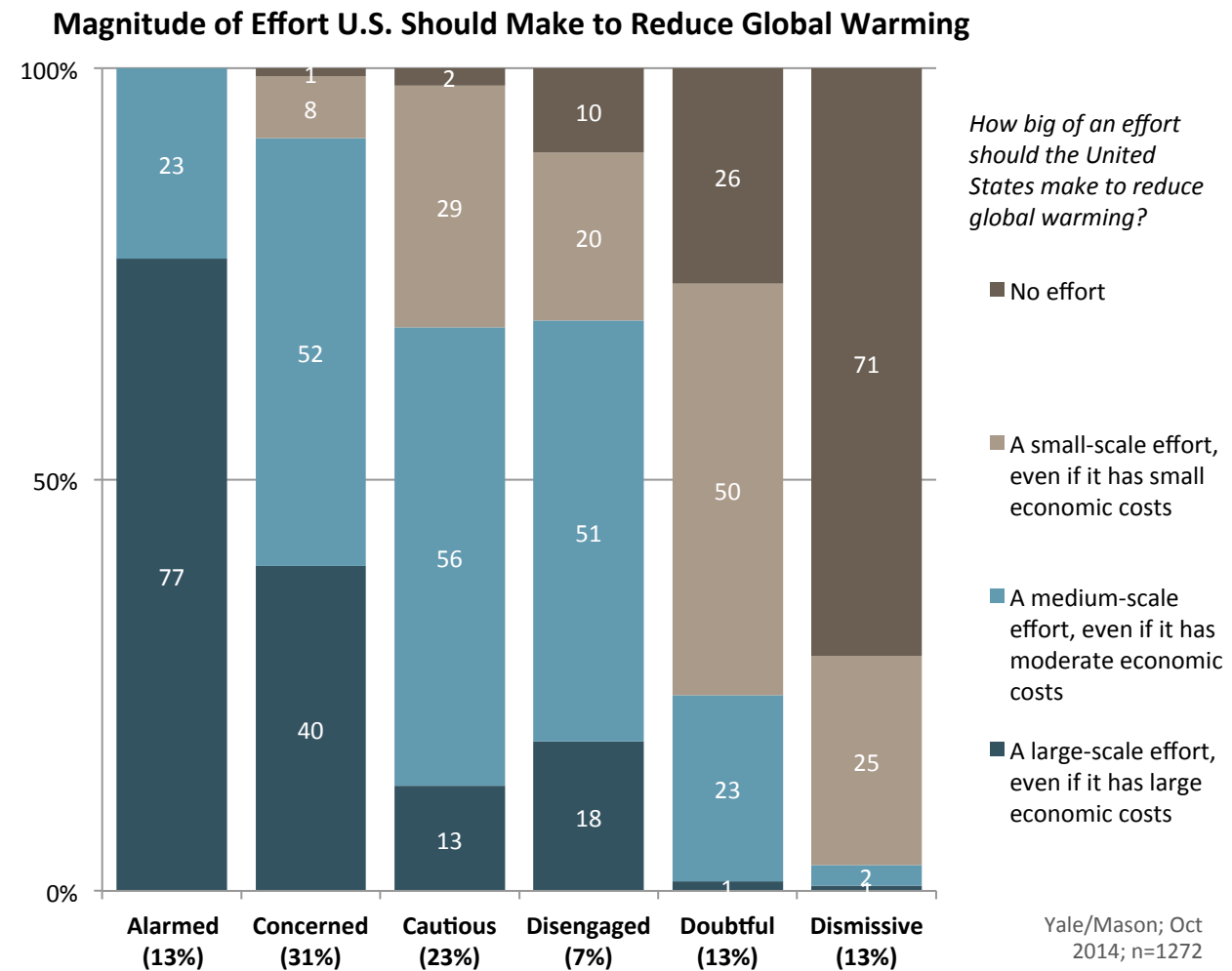
**Worry:** The *Alarmed* are the segment most worried about global warming, with virtually all stating that they are somewhat or very worried. More than 90 percent of the *Concerned* also say they are worried. Fewer than half of any other segment say they worry about the issue, and 85 percent of the *Dismissive* say that they are not at all worried.



**Potential to Reduce Global Warming:** Believing that global warming is dangerous, but that nothing can be done to reduce it may foster feelings of helplessness and despair; conversely, believing that action can reduce the threat may spur people to action. When asked about the human potential to reduce global warming, none of the segments express confidence that we will successfully do so. Majorities of both the *Alarmed* and *Concerned*, however, believe we *could* reduce the threat if we do "what's needed." Half of the *Cautious* also hold this view, but fewer than half of the remaining three segments believe we will reduce the threat.



**Support for U.S. Action:** Together, the understanding that global warming is real, human-caused, dangerous, and solvable - and that scientists agree on its reality and cause - has been shown to increase support for action and political activism.<sup>6</sup> Large majorities of four segments – the *Alarmed*, *Concerned*, *Cautious* and *Disengaged* – support at least a medium-scale effort to reduce global warming, even if it has moderate economic costs. Three-quarters of the *Alarmed* (77%) favor a large-scale effort to reduce global warming, even if it has large economic costs, as do 40 percent of the *Concerned*. In contrast, seven in ten *Dismissives* (71%) say the U.S. should make *no* effort to reduce global warming, and three-quarters of the *Doubtful* say the U.S. should make at most a small-scale effort (50%) or no effort at all (26%).



<sup>6</sup> Ding, D., Maibach, E., Zhao, X., Roser-Renouf, C. & Leiserowitz, A. (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change*, 1, 462-466. doi: 10.1038/NCLIMATE1295. Roser-Renouf, C., Maibach, E., Leiserowitz, A., & Zhao, X. (2014). The genesis of climate change activism: From key beliefs to political action. *Climatic Change*, 125(2): 163-178. doi: 10.1007/s10584-014-1173-5.



## The Six Americas and Health Impacts of Global Warming

The third U.S. National Climate Assessment<sup>7</sup> concluded that climate change threatens human health and well-being in many ways, including injuries and deaths from extreme weather events, wildfires, and decreased air quality; threats to mental health; and illnesses transmitted by food, water, and disease carriers such as mosquitoes and ticks. Some of these health impacts are already underway in the United States, and certain people and groups are especially vulnerable, including children, the elderly, the sick, the poor, and some communities of color.

To help Americans recognize and respond appropriately to these threats, communicators need to convey specific types of information. Research on the communication of risk has shown that people respond to health threats if they recognize that the threat *exists*, that it is *dangerous*, that they are *vulnerable*, and that *steps can be taken to reduce the threat*.<sup>8</sup>

In the pages below, we examine these beliefs, focusing on the differences among the Six Americas. We analyze their awareness and understanding of the health consequences of global warming; their perceptions of the harm to them, their families, other Americans, and people worldwide; and their support for government action to protect people from the threats. We conclude with an analysis of the information sources the segments trust for information on global warming's health threats, as the use of trusted sources for risk communication can increase the public's receptiveness to risk information.

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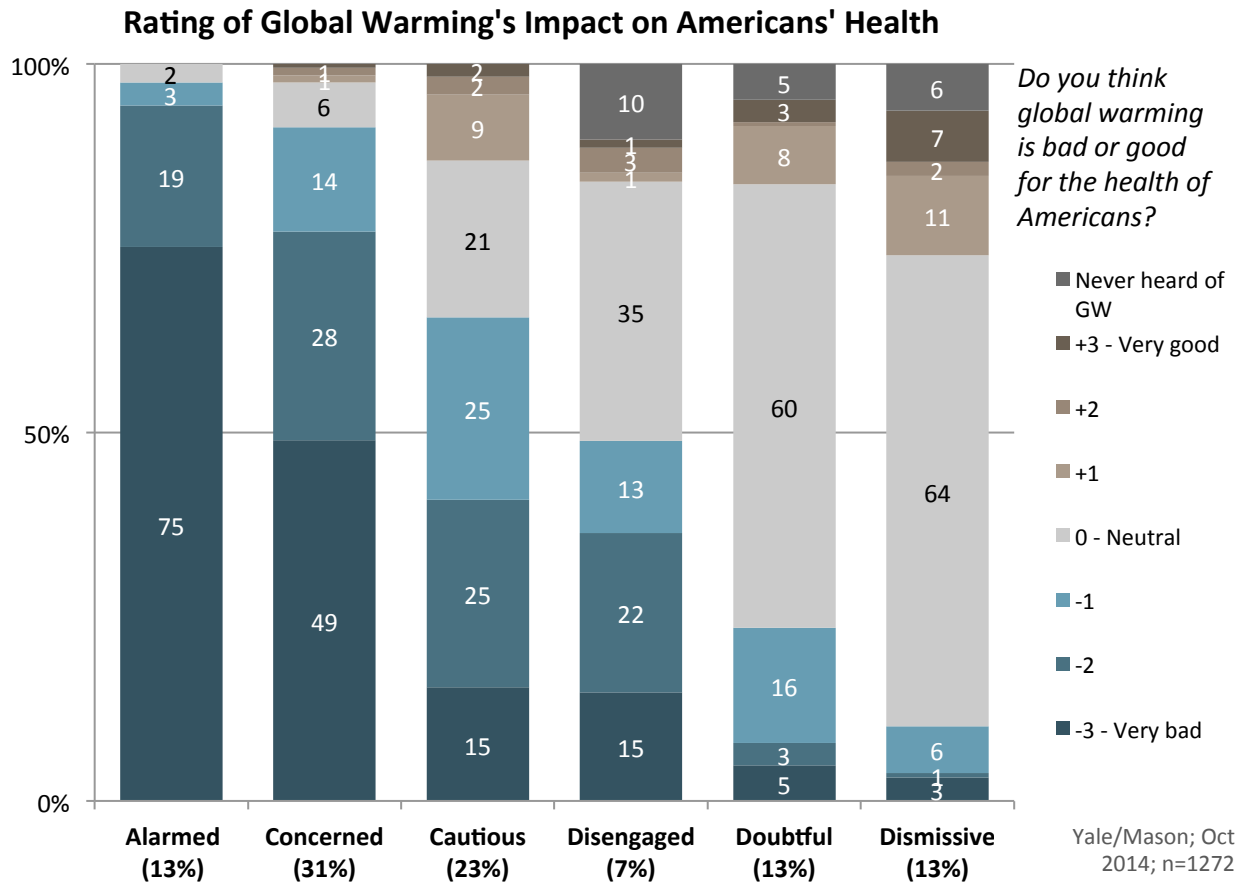
<sup>7</sup> U.S. Global Change Research Program (2014). <http://nca2014.globalchange.gov/report>

<sup>8</sup> Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior*, 27(5), 591-615.

## Awareness and Understanding of the Human Health Problems Caused by Global Warming

We have previously reported that Americans are largely unaware of the health consequences of global warming and have given the issue little thought.<sup>9</sup> Here we focus on differences among the segments in their awareness of the threat, finding that although the segments that are most concerned about global warming (i.e., the *Alarmed* and *Concerned*) have higher awareness of the danger posed by global warming to Americans' health, even among these groups, awareness is low.

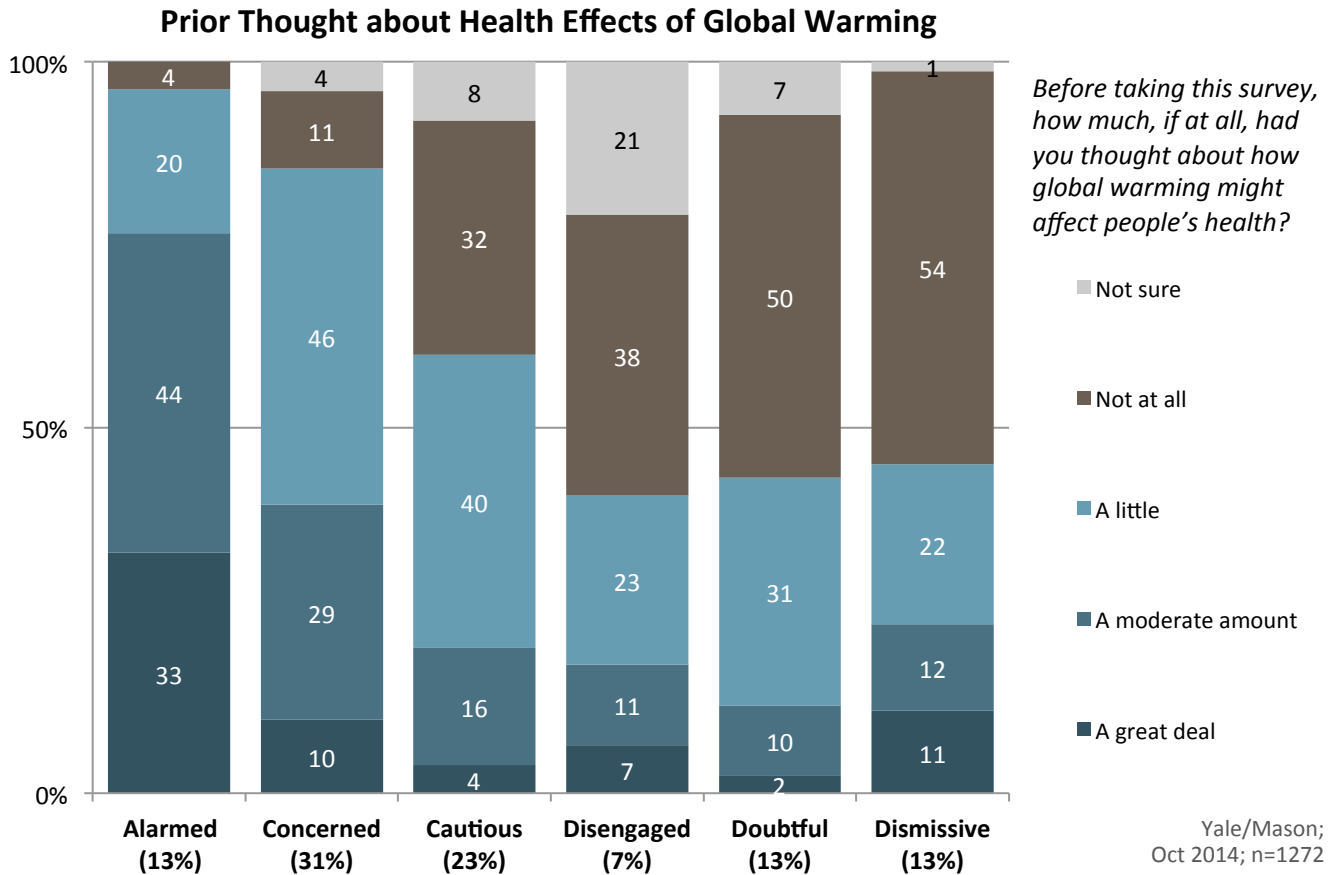
Initially, it appears that many Americans recognize the dangers: Asked for an overall rating of the impact of global warming on Americans' health, large majorities of the *Alarmed*, *Concerned* and *Cautious* say the effects are "bad" (98%, 91% and 66%, respectively), as do half of the *Disengaged* (49%). Majorities of the *Doubtful* and *Dismissive*, however, say that global warming has no effect on Americans' health (60% and 64%), and 20 percent of the *Dismissive* say the effects are positive.



These overall ratings of health impacts, however, mask a relatively low level of prior thought about the issue: a quarter of the *Alarmed* (24%) and over half of the *Concerned* (57%) say they have thought

<sup>9</sup> Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., Rosenthal, S., & Marlon, J. (2014). *Public Perceptions of the Health Consequences of Global Warming: October, 2014*. Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change Communication.

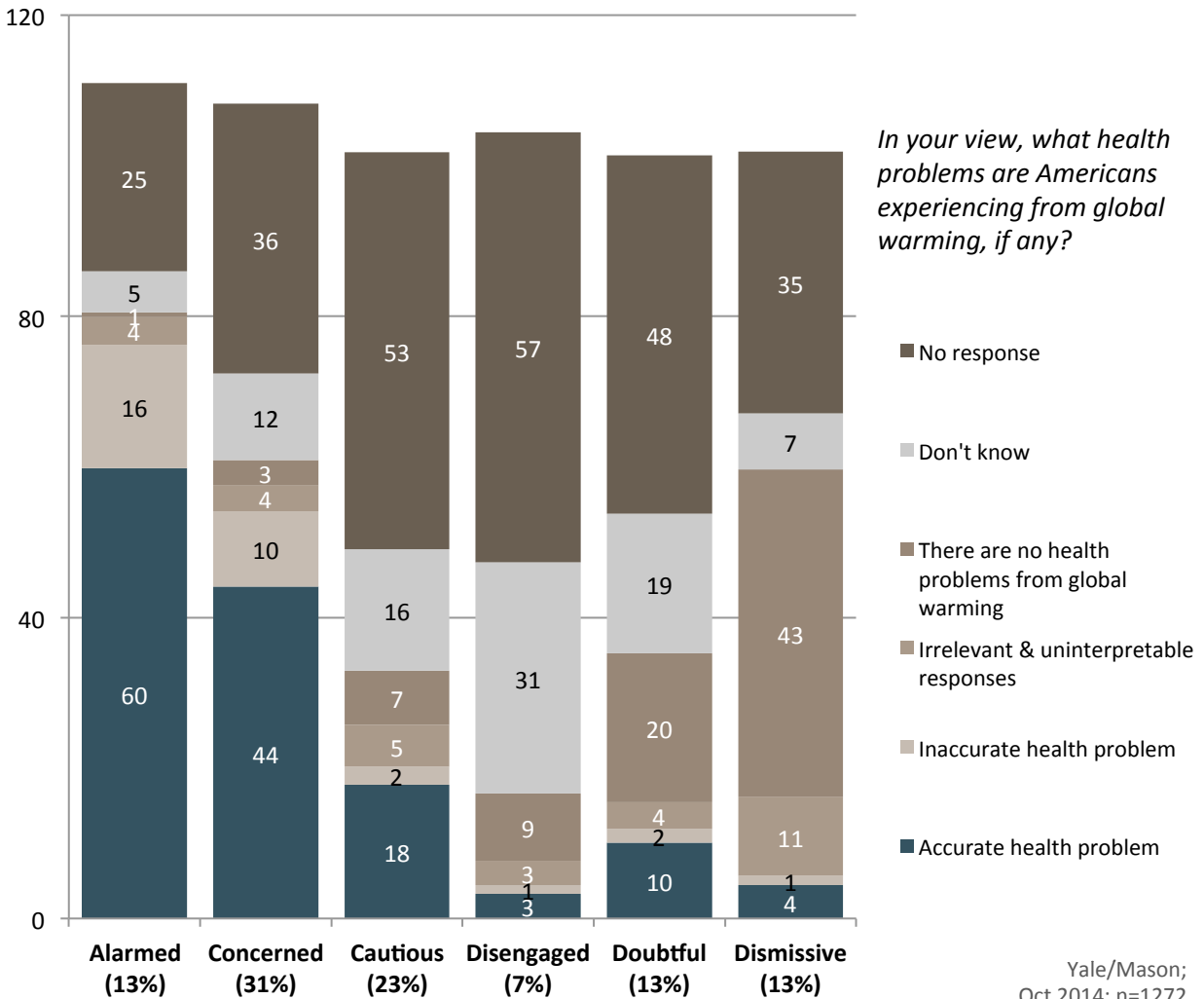
"only a little" or "not at all" about the health effects of global warming. Less than a quarter of respondents in the remaining segments say they've given the effects more than "a little" thought, and majorities of the *Disengaged*, *Doubtful* and *Dismissive* say they have given the effects no thought or that they are "not sure."



A more nuanced picture of respondents' awareness of the health problems associated with global warming was obtained using open-ended questions, which require respondents to call upon their own knowledge, rather than simply checking a response on a pre-determined scale.

We asked respondents' views about what health problems, if any, Americans are experiencing from global warming, and then asked whether any particular groups or types of Americans are particularly vulnerable to these problems. Respondents could write as much or as little as they wished in answering the questions. The results below show that few people accurately described either the health impacts of global warming or the highly vulnerable populations.

## Awareness of Global Warming-Related Health Problems in U.S.



*Note: Totals can be greater than 100 percent because the question was open-ended and respondents could give answers that fell into multiple categories, giving both accurate and inaccurate responses.*

Only among the *Alarmed* did a majority accurately name a health problem associated with global warming or a vulnerable group.<sup>10</sup> On the first open-ended question, asking about the types of health problems, majorities of three segments – the *Cautious*, *Disengaged* and *Doubtful* – either said they didn't know of any health problems caused by global warming or provided no response to the question. Forty-three percent of the *Dismissive* and 20 percent of the *Doubtful* said there are *no* associated health problems. Only three percent of the *Disengaged* accurately named a health problem – a finding of

<sup>10</sup> The coding of health problems as accurate or inaccurate is based on findings reported in the National Climate Assessment, and on: Andersen, L. K., Hercogová, J., Wollina, U., & Davis, M. D. (2012). Climate change and skin disease: a review of the English-language literature. *International journal of dermatology*, 51(6), 656-661. Two of this report's authors collaborated in developing the coding scheme, and three coded the data and resolved inconsistencies between coders. The health conditions and vulnerable groups coded as accurate and inaccurate are shown in more detailed analyses of these results on pages 17 through 22.

some importance, given that this group contains the highest proportions of low income and minority members, who are among the groups that are more vulnerable to global warming-related health problems (see Appendix 1). Many of the responses from the *Dismissive* asserted that global warming is a hoax. Even among the *Alarmed*, awareness is not as high as might be expected: although 60 percent correctly named at least one health problem, 16 percent also named a health problem that is unrelated to global warming, 5 percent said they didn't know of one, and one in four gave no response.

In light of the few correct responses among all segments except the *Alarmed* and *Concerned*, we compare below the responses of those two segments to the responses of the remaining four groups. The accurate written responses may be subdivided into two sub-categories, which we present separately below. Some responses are actual health conditions (such as allergies and lung diseases), while others describe the environmental changes that cause the health problems (such as extreme weather and drought). Although the majority of respondents who gave a correct answer identified a health condition as requested (22%), a large number of respondents wrote about environmental changes underlying the health problems (10%), and a small number explicitly linked the two (6%).

Responses that included both environmental changes and health conditions may reflect a deeper understanding of both the nature of climate change impacts and the implications of these impacts for human health and well-being. A quarter of the *Alarmed* mentioned both environmental changes and health impacts (24%), as did 8 percent of the *Concerned*; only about 1 percent of the remaining segments listed both environmental changes and their health effects.

Of the specific health conditions named, lung diseases were the global warming-related health impact Americans are most familiar with. This includes asthma, chronic obstructive pulmonary disease (COPD), and other respiratory problems. Close to one third of the *Alarmed* (32%) and one quarter of the *Concerned* (23%) mentioned one or more lung diseases in their responses. Among the remaining four segments, only 6 percent cited a lung disease – a small proportion, but it was nonetheless the health problem they were most likely to correctly identify.

Fewer than 10 percent of any segment correctly identified any other health problem related to global warming, including allergies, heat-related illnesses, vector-borne infectious diseases and the injuries and deaths that occur due to extreme weather events. A mere one percent of the *Alarmed* named/identified a mental health problem, despite the fact that close to half of the *Alarmed* report feeling depressed about the issue (48%), two-thirds feel helpless (67%) and three-quarters feel afraid (75%).<sup>11</sup>

The second-most-named health impact among the *Alarmed* and *Concerned* was skin disease, which includes skin cancer. While some research suggests that some skin diseases may be linked to global warming,<sup>12</sup> most respondents were unlikely to be aware of this link and were probably confusing skin cancer caused by the ozone hole with a health impact of global warming. The public's conflation of global warming with the hole in the ozone layer has long been documented,<sup>13</sup> and the fact that this is the second-most named health consequence suggests that educational efforts to distinguish these two different health threats are still needed.

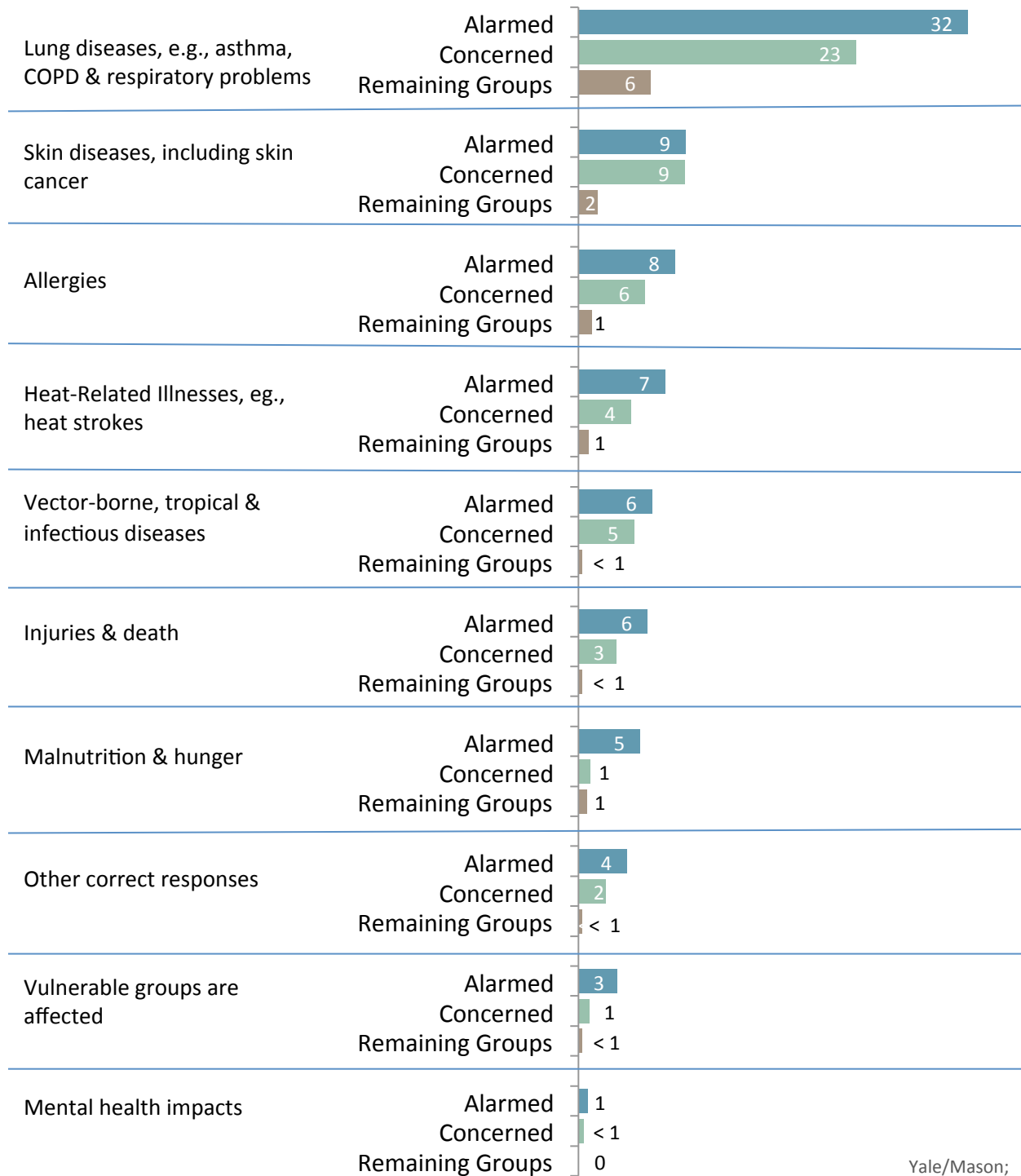
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<sup>11</sup> Leiserowitz, A. et al (2010) Global Warming's Six Americas, June 2010, Yale University and George Mason University, New Haven, CT. <http://environment.yale.edu/climate-communication/files/SixAmericasJune2010.pdf>

<sup>12</sup> Andersen, L. K., Hercogová, J., Wollina, U., & Davis, M. D. (2012). Climate change and skin disease: a review of the English-language literature. *International journal of dermatology*, 51(6), 656-661.

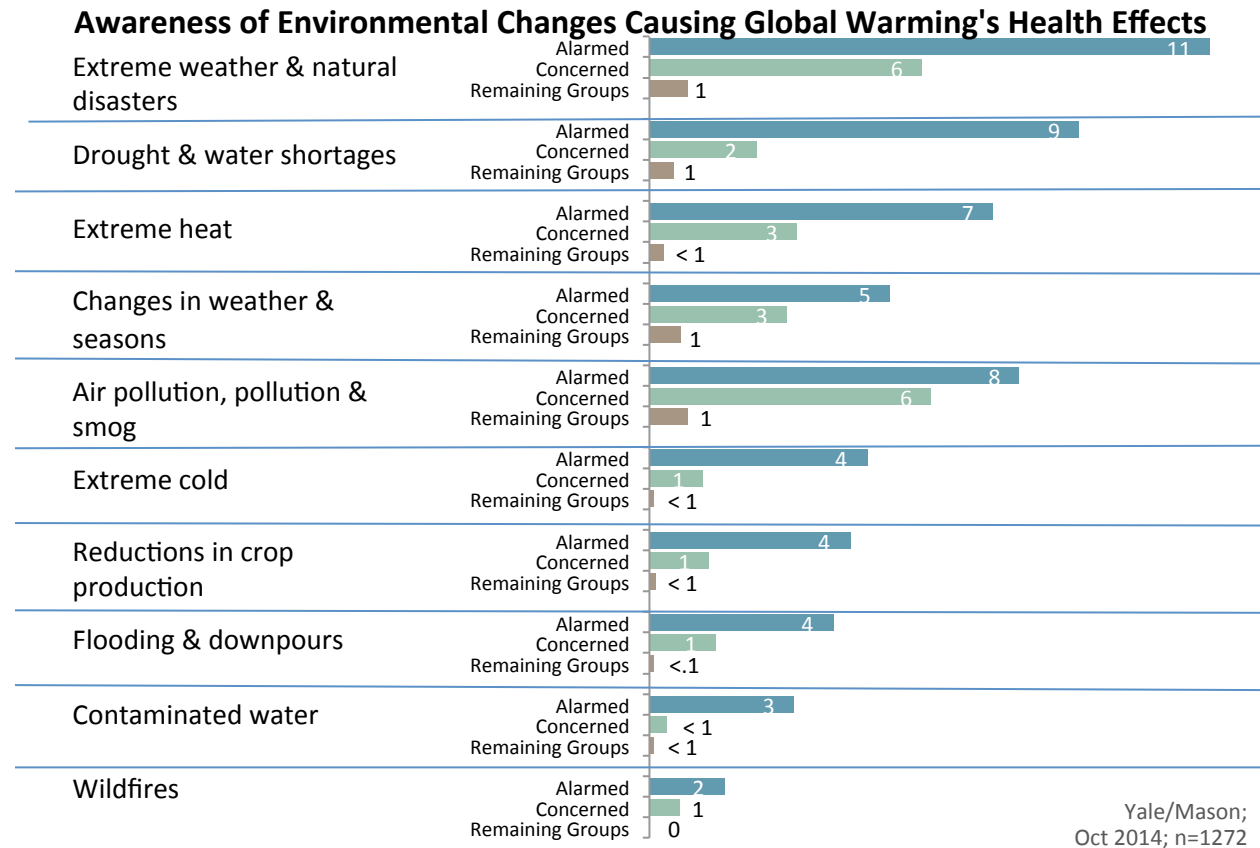
<sup>13</sup> Ungar, S. (2000). Knowledge, ignorance and the popular culture: climate change versus the ozone hole. *Public Understanding of Science*, 9(3), 297-312.

## Awareness of Health Problems Resulting from Global Warming



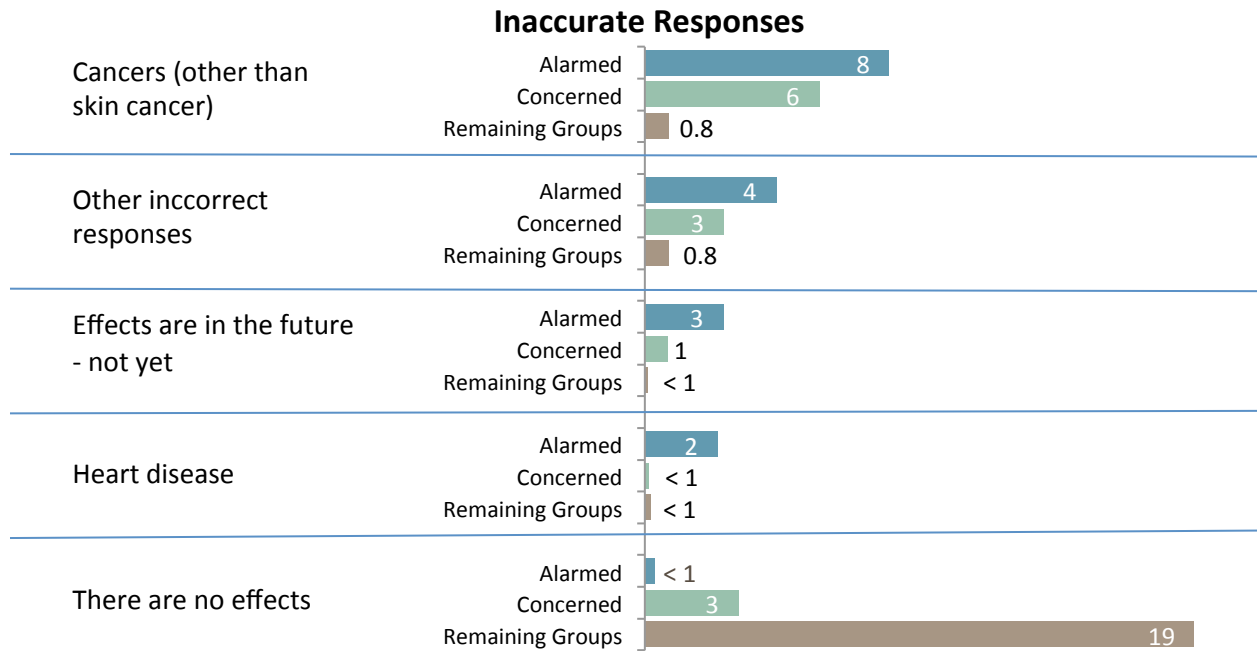
Yale/Mason;  
Oct 2014; n=1272

The environmental change associated with global warming-related health problems most often cited by the *Alarmed* was the increase in extreme weather events (11%); fewer than 10 percent of the *Alarmed* named any other environmental change. None of the environmental changes were cited by more than 6 percent of the *Concerned* or 1 percent of the four less engaged segments.





While the *Alarmed* and *Concerned* are the groups most likely to correctly name impacts of global warming on human health, they also made more mistakes than did members of the other segments, reporting, for example, that cancer and heart disease are related to global warming. However, even if they are not able to name many (or any) health impacts correctly, virtually all of them realize that there are health effects. Among the remaining four groups, close to one in five (19%) believes there are no health effects of global warming.

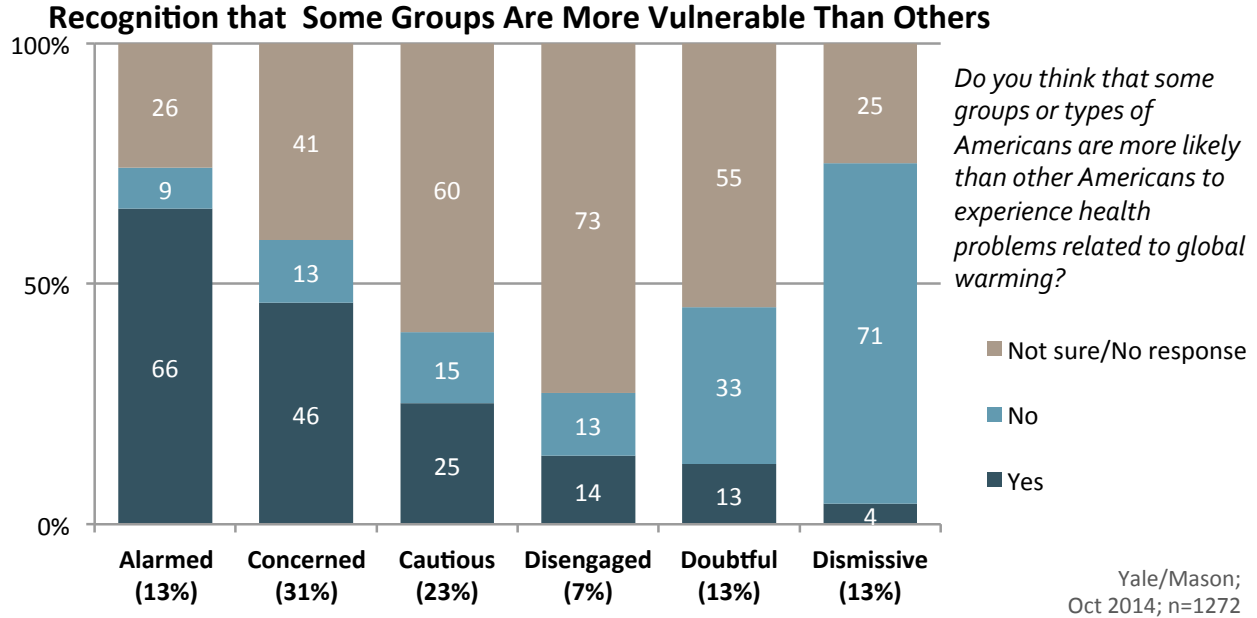


Yale/Mason;  
Oct 2014; n=1272

Together, these results point to the pressing need for public education on the human health consequences of global warming; even among the group that is most concerned about the issue – the *Alarmed* – few are able to name its many implications for the health of their families and communities.

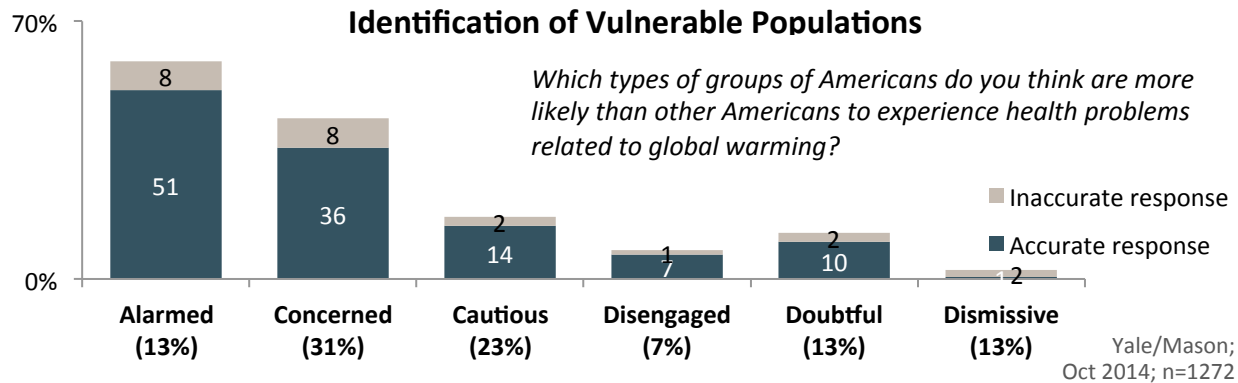
## Awareness of Vulnerable Populations

Two-questions – one closed-ended and the other open-ended – assessed respondents' awareness of the individuals and groups most likely to experience global warming-related health problems. In the closed-ended question, respondents were first asked whether some groups of Americans were more vulnerable than others to global warming-related health problems, with "yes," "no," and "not sure" response options.



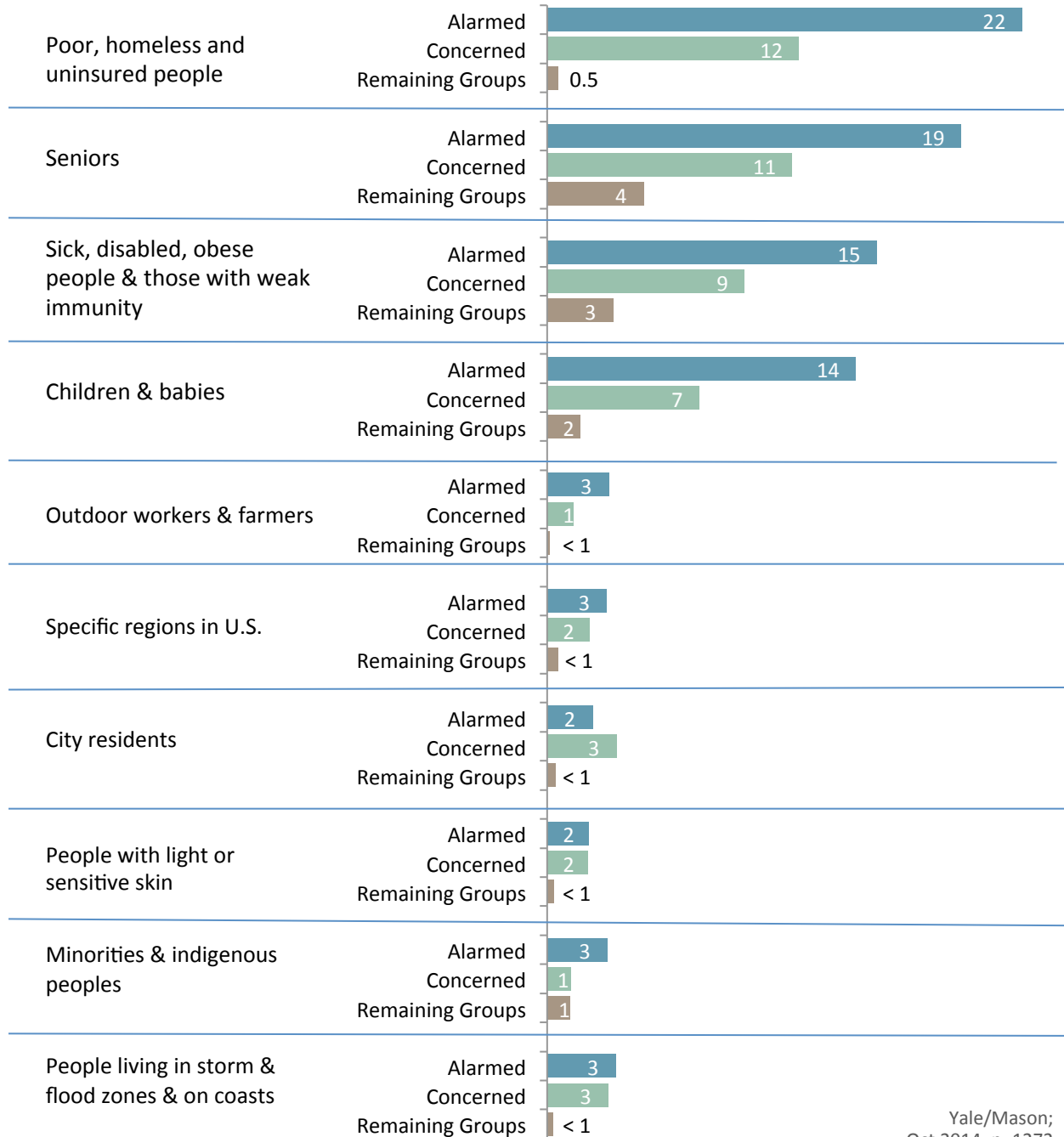
Two-thirds of the *Alarmed* (66%), close to half of the *Concerned* (46%), and one quarter of the *Cautious* (25%) said that some groups are more vulnerable than others. Majorities of the *Cautious*, *Disengaged* and *Doubtful* said they weren't sure, and close to three-quarters of the *Dismissive* said no groups are more vulnerable (71%).

Respondents who said "yes" to the first question were next asked in an open-ended question to identify the vulnerable groups. Half the *Alarmed* (51%) and just over one third of the *Concerned* (36%) accurately identified a vulnerable group; less than 15% of the members of the remaining four segments correctly named one of the vulnerable groups.



The vulnerable groups most likely to be named by the *Alarmed* and *Concerned* were people who are poor, homeless and/or uninsured. Close to one quarter of the *Alarmed* (22%) cited the vulnerability of these people, as did 12 percent of the *Concerned*. Less than 1 percent of the remaining four segments said that poverty is associated with higher vulnerability. They were more likely to cite the vulnerability of seniors (4%) and sick or disabled people (3%), although these proportions are still very low.

### Awareness of Vulnerable Populations



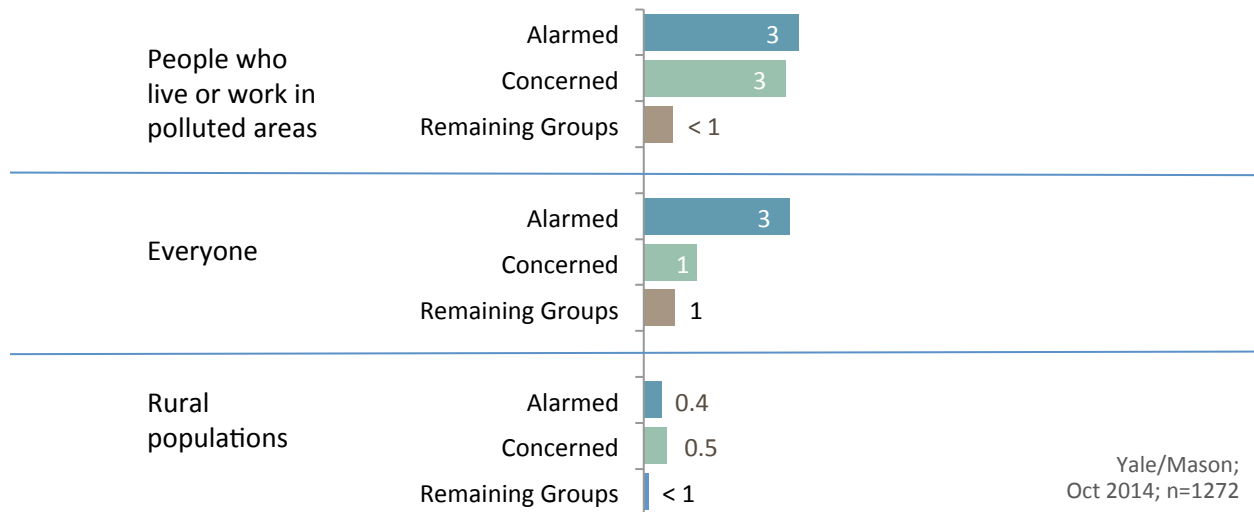
Yale/Mason;  
Oct 2014; n=1272

A fair number of the *Alarmed* and *Concerned* mentioned the threat to seniors (19% and 11%), the sick and disabled (15% and 9%), and to young children and babies (14% and 7%), but less than 5 percent of any segment mentioned the vulnerability of any other group of Americans.

The most common inaccurate perception of vulnerability related to global warming was that people who live or work in polluted areas are at heightened risk. While it's certainly true that they are vulnerable to the effects of pollution, this is not a problem that is specific to global warming.

The second most common inaccurate perception was that everyone is at risk. Arguably, this is a correct response, since all people are likely to suffer if global warming proceeds unchecked; the question asked, however, if some groups are more vulnerable than others, and it is clearly not the case that all people are at equal risk.

### Inaccurate Perceptions of Vulnerable Groups

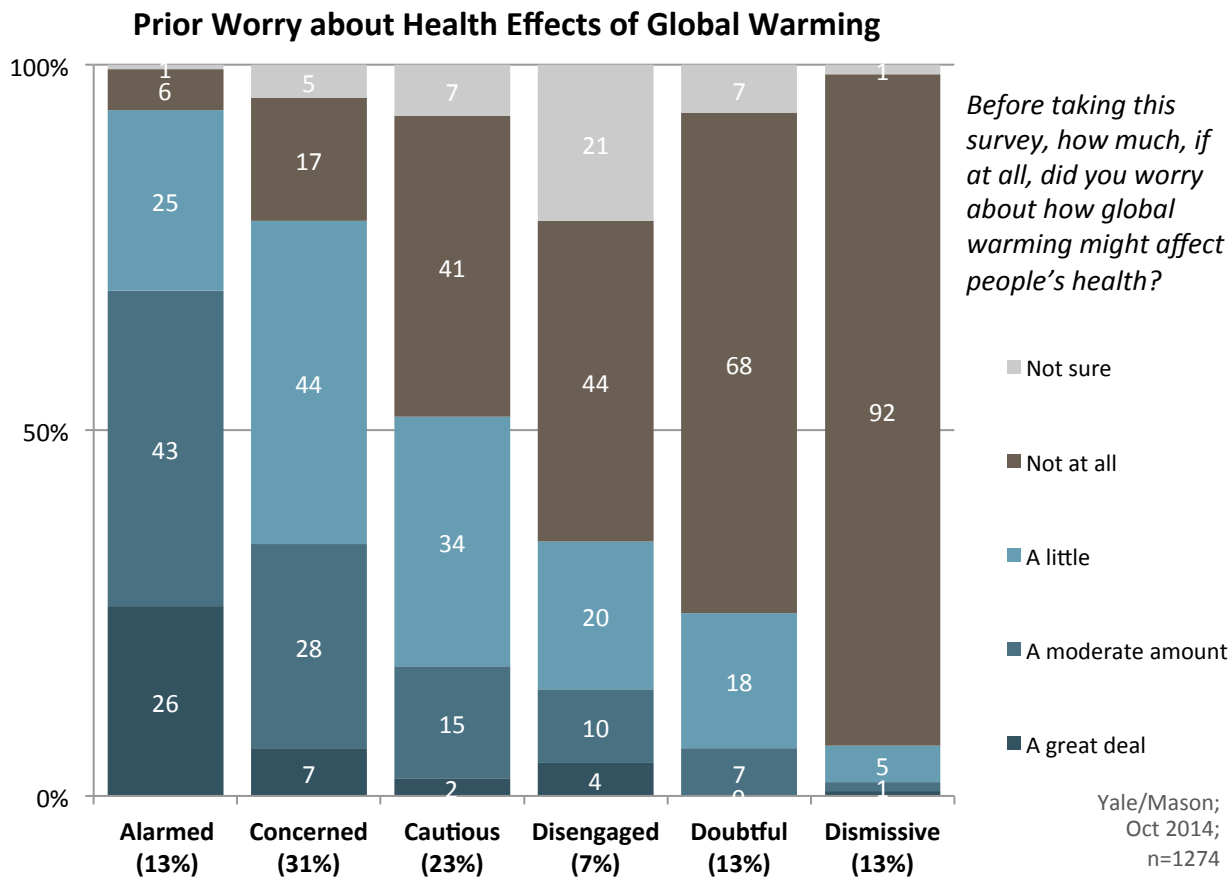


## Perceived Risk

In spite of their lack of specific knowledge about global warming-related health problems, the *Alarmed* and *Concerned* are worried about it. They anticipate that these effects will increase over time, impacting them, their families, other Americans and people worldwide. The remaining four segments, however, are fairly confident that minimal or no health effects will occur, and they express little concern about them. For all segments, health risk perceptions may be understood as an extension of general beliefs about global warming. Those who recognize that global warming is dangerous infer that it is dangerous to human health, even if they are unaware of the specific impacts it has. In contrast, those who are unconvinced that global warming is a dangerous threat also infer that it is not threatening to human health.

### Worry about Health Impacts

Seven in ten of the *Alarmed* (69%) and one third of the *Concerned* (35%) say they have worried about the health effects of global warming "a moderate amount" or "a great deal." Less than 20 percent of the members of the remaining four segments have worried more than "a little," and majorities of the *Disengaged*, *Doubtful* and *Dismissive* say either that they have not worried at all, or are not sure.



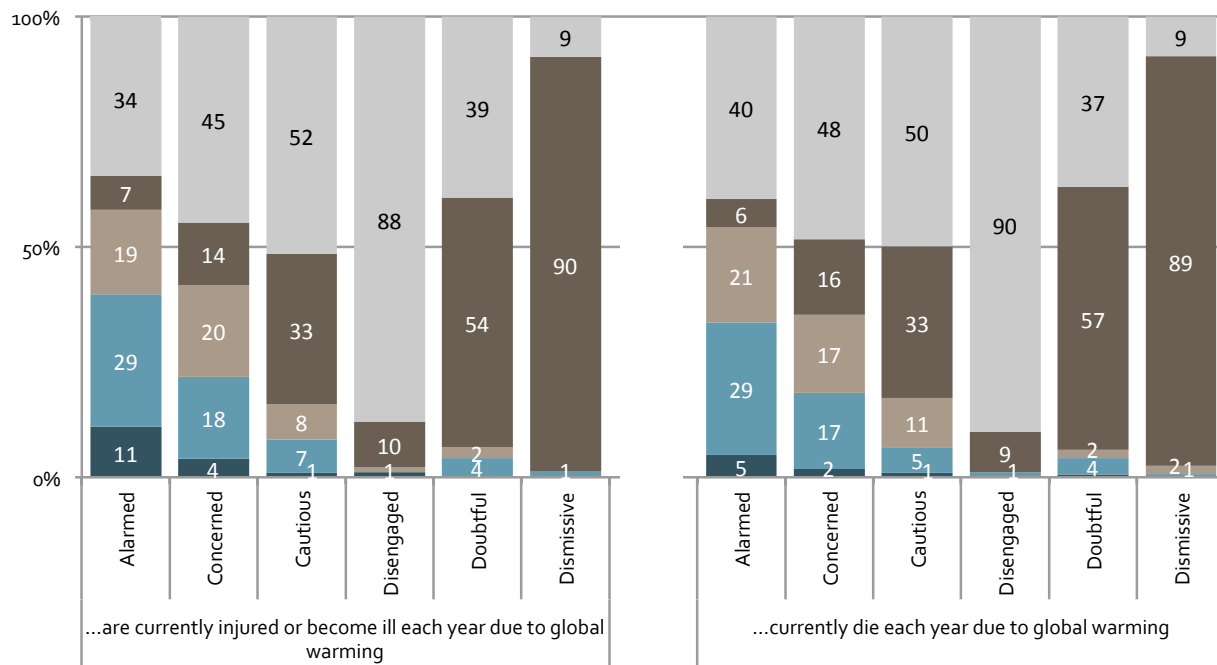
## Estimates of the Number of People Harmed by Global Warming

Climate change exacerbates existing health threats, making it difficult to accurately estimate the number of people currently being harmed. But one recent study estimates that 400,000 people around the world currently die annually due to hunger and communicable diseases aggravated by climate change, and that 4.5 million die from air pollution caused by the use of fossil fuels. Most of these deaths occur in developing nations. Without action to reduce climate change and fossil fuel use, deaths are projected to increase to 6 million annually by 2030.<sup>14</sup>

Americans are largely unaware of the magnitude of these impacts. When asked to estimate the numbers of people being harmed by global warming now, and the numbers who will be harmed in 50 years, large majorities in all segments underestimate the numbers being harmed: only 11 percent of the *Alarmed*, 4 percent of the *Concerned* and 1 percent of the *Cautious* and *Disengaged* estimate that millions are currently being injured or made ill due to global warming. Similarly, only 5 percent of the *Alarmed*, 2 percent of the *Concerned* and 1 percent of the *Cautious* estimate that millions are currently dying. Estimates of the numbers who will be harmed in 50 years are substantially higher, but still much lower than projections.

## Beliefs about Current Injuries, Illness and Death Due to Global Warming

Worldwide, how many people do you think...



■ Millions ■ Thousands ■ Hundreds ■ None ■ Don't know

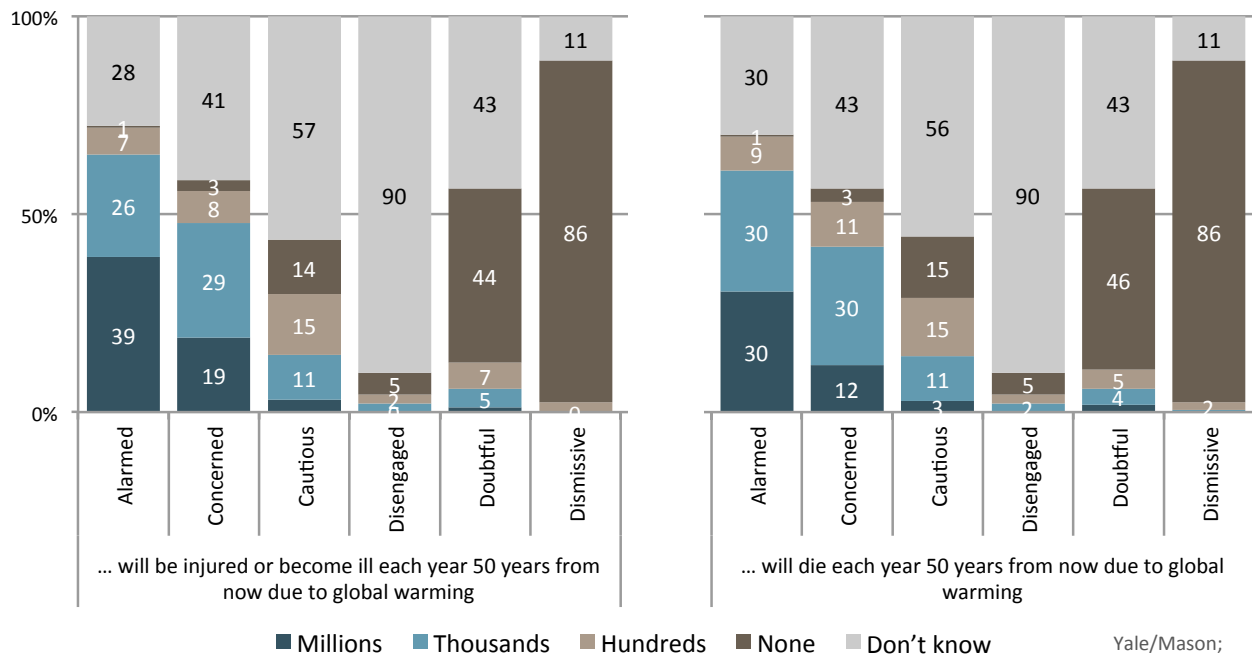
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Oct 2014;  
n=1272

<sup>14</sup>DARA (2012). Climate Vulnerability Monitor: A Guide to the Cold Calculus of a Hot Planet. Available at: <http://daraint.org/wp-content/uploads/2012/09/CVM2ndEd-FrontMatter.pdf>

The number who say they "don't know" for these four questions is also of note: 88 to 90 percent of the *Disengaged* say they don't know, as do half or more of the *Cautious*. Even among the *Alarmed*, 28 to 40 percent say they don't know; the only segment that is relatively sure is the *Dismissive*, with 86 to 90 percent saying "none" and only 9 to 11 percent that they don't know.

### Beliefs about Injuries, Illness and Death Due to Global Warming in 50 Years

Worldwide, how many people do you think...



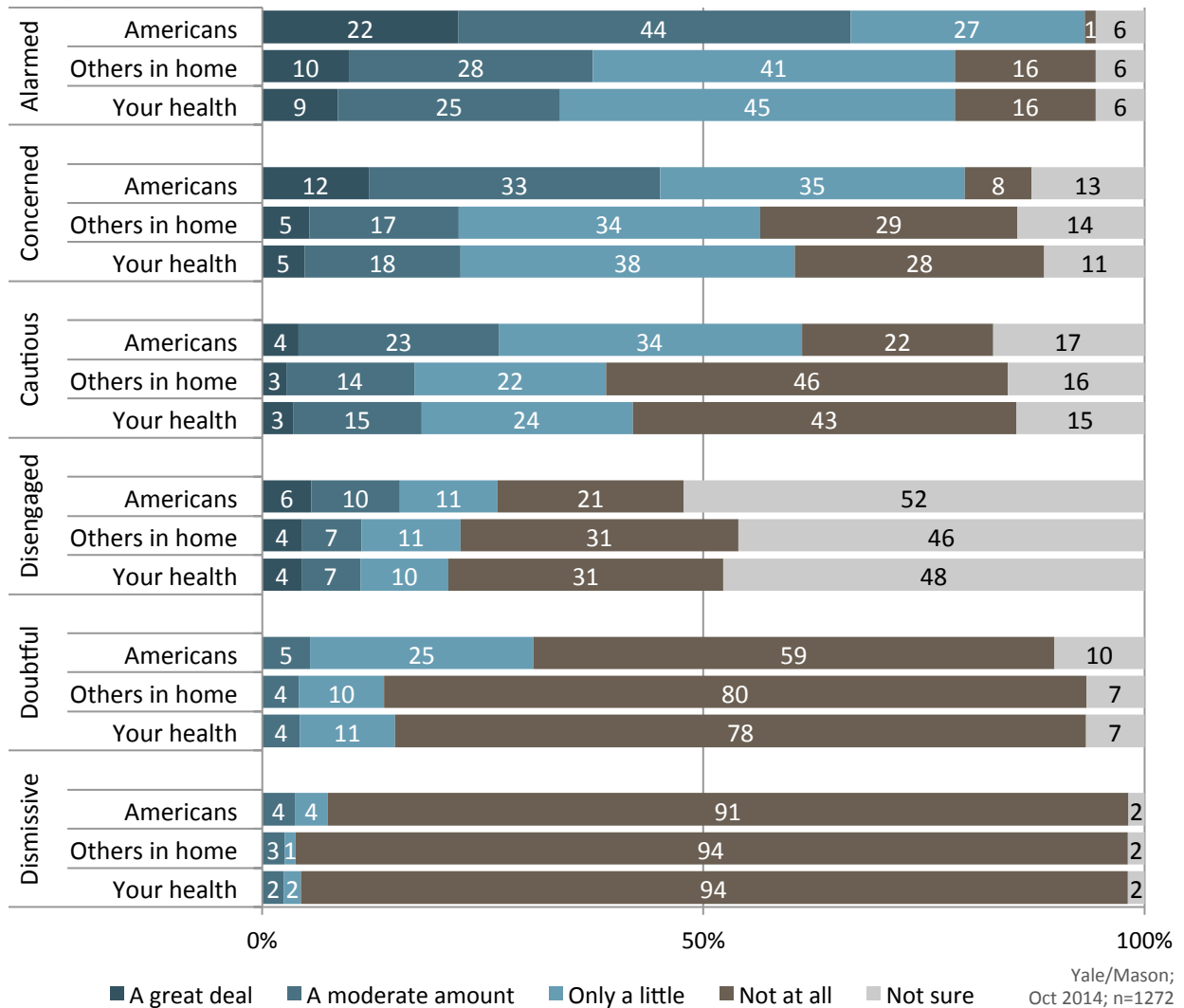
### Beliefs about the Magnitude of Harm to Self, Family and Other Americans

When asked how much global warming is harming people's health, two-thirds of the *Alarmed* (66%), nearly half of the *Concerned* (45%), and one quarter of the *Cautious* (27%) say "Americans" are currently being harmed "a moderate amount" or "a great deal." In every segment, harm to others is perceived as higher than harm to self or family. For instance, among the *Alarmed* and *Concerned*, twice as many believe Americans are being harmed "a great deal" as believe that they or others in their household are being harmed to the same degree.

As in other research, we find that almost all of the *Dismissive* believe no one is being harmed. Also of note, close to half the *Disengaged* say they are not sure if they or others in their household are being harmed.



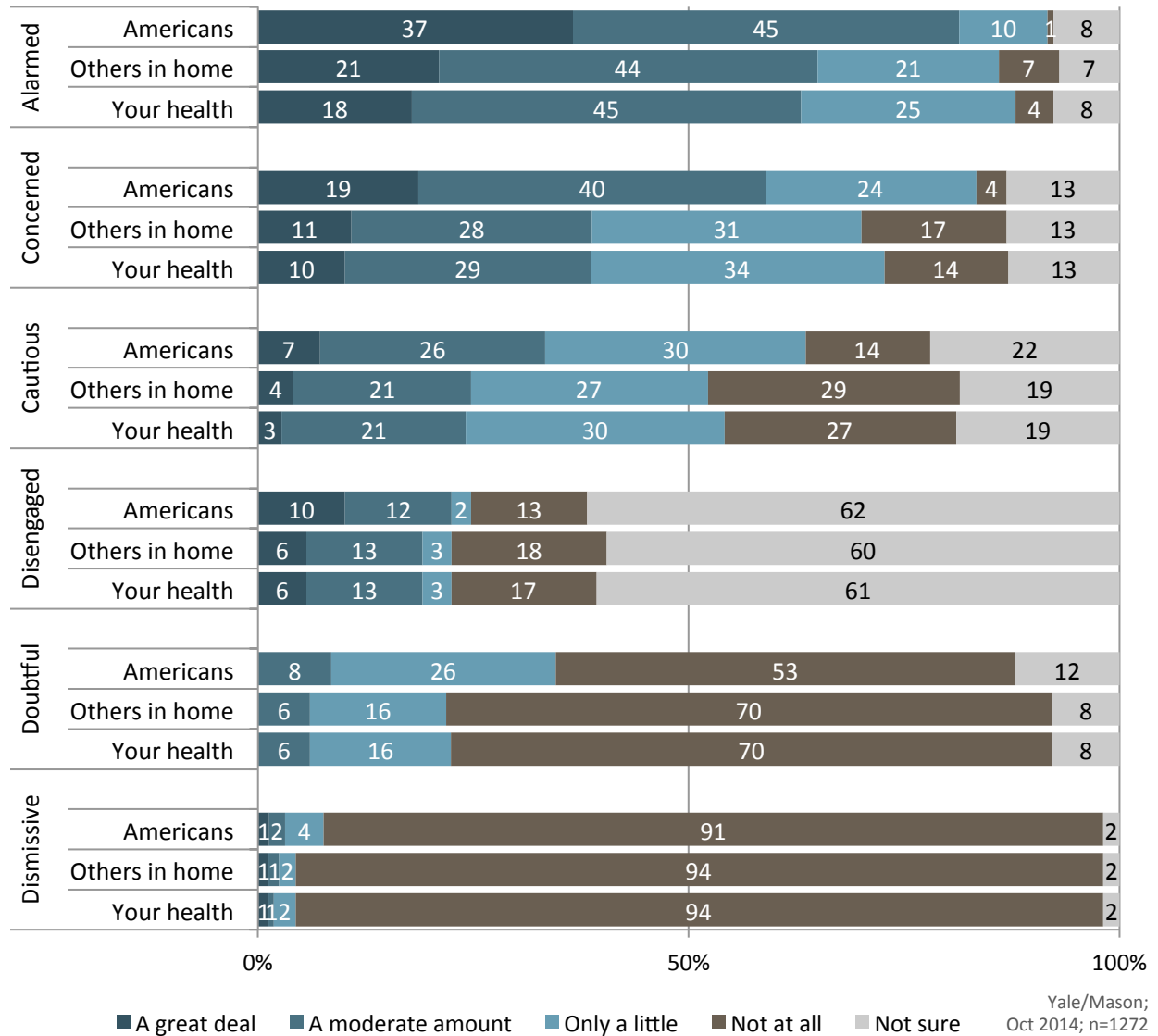
## How much, if at all, do you think global warming is currently harming...



Yale/Mason;  
Oct 2014; n=1272

More respondents in every segment except the *Dismissive* believe global warming will cause harm over the next five to 10 years than think it is currently causing harm. The increases in the number estimating "a great deal of harm" are greatest among the *Alarmed*; twice as many believe they and others in their household will be harmed a "great deal" in the coming years as believe they are being harmed currently.

### Over the next five to 10 years, how much, if at all, do you think global warming will harm...

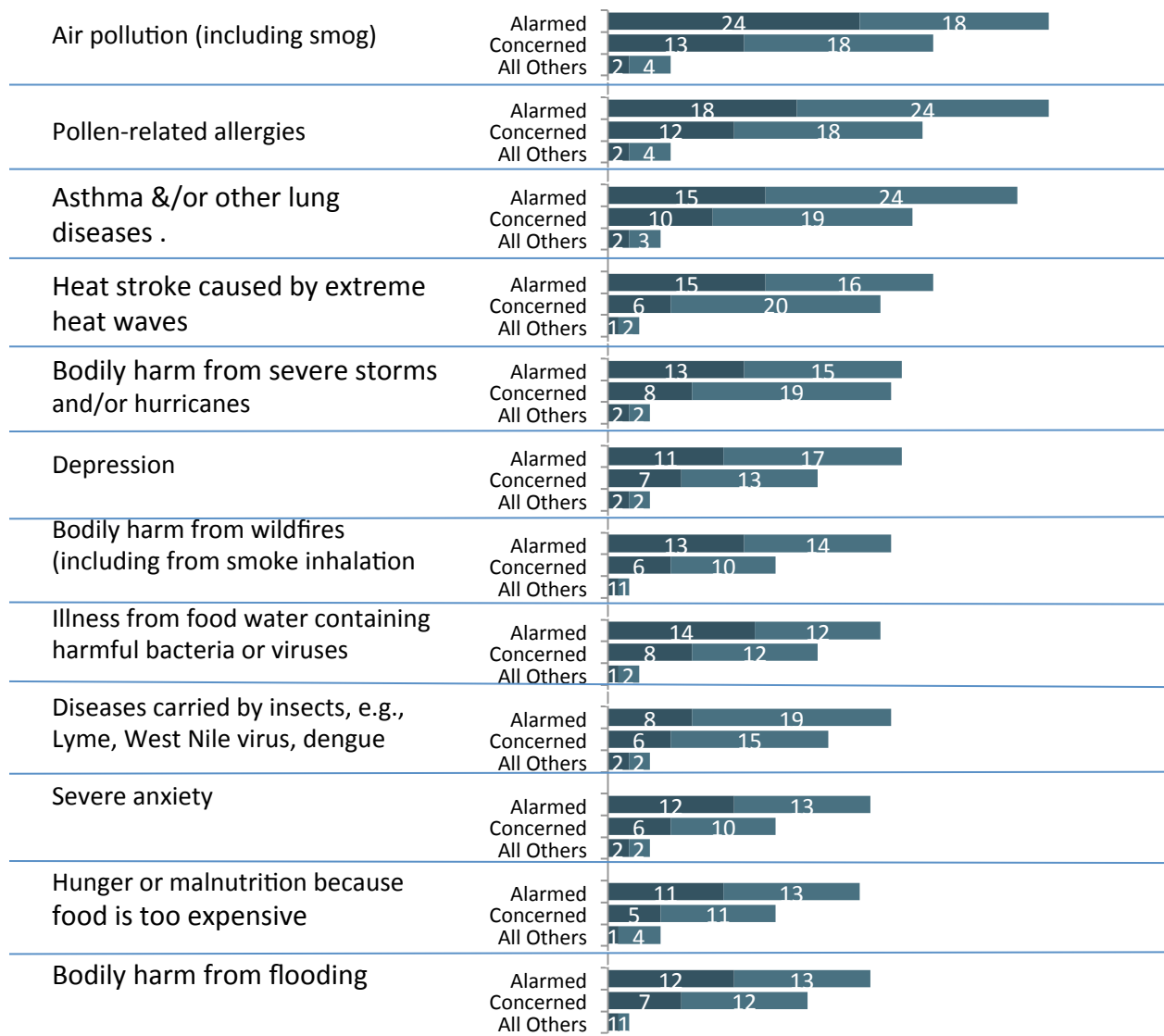


## Expected Increases in Specific Global Warming-Related Health Threats

While few respondents named specific health threats of global warming unprompted, the *Alarmed* and *Concerned* did anticipate increased prevalence of a number of global warming-related health threats. When asked to estimate changes over the coming decade in a dozen conditions and illnesses that are increasing due to global warming, one quarter or more of the *Alarmed* (24% - 32%) say each of the 12 will become "somewhat" or "much more" common, as do 16 percent or more of the *Concerned*.

### Expected Increases in Global Warming-Related Health Threats Over the Coming Decade

Do you think each of the following will become more or less common in your community over the next 10 years as a result of global warming if nothing is done to address it?



■ Much more common ■ Somewhat more common

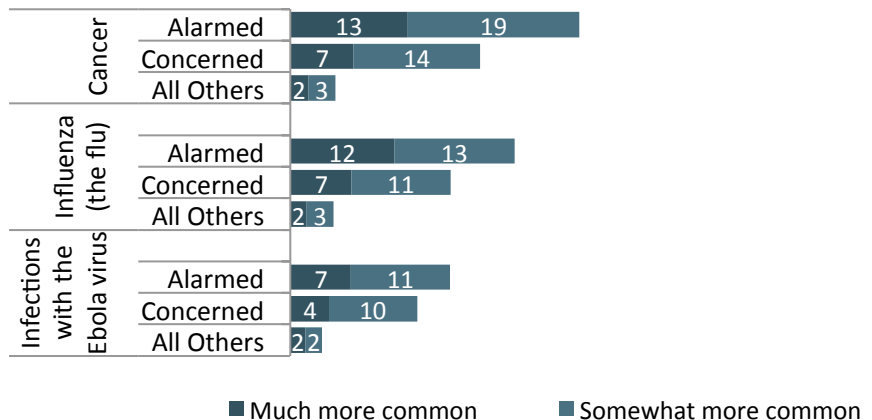
Yale/Mason;  
Oct 2014; n=1272

The health threats viewed as most likely to increase are air pollution (42% of *Alarmed* and 31% of *Concerned*), pollen-related allergies (42% and 30%); and lung diseases, including asthma (39% and 29%). The contrasts with the open-ended question are apparent for every impact: Harm from extreme weather (i.e., severe storms and/or hurricanes), which was mentioned by 6 percent of the *Alarmed* and 3 percent of the *Concerned* in the open-ended question, is estimated to increase by 28 percent of *Alarmed* and 27 percent of *Concerned*; mental health issues were cited by only 1 percent of the *Alarmed* in the open-ended question, but 28 percent anticipate increases in depression and 25 percent in severe anxiety in the closed-ended questions.

Further evidence that understanding of the health problems associated with global warming is shallow is shown below: questions about three health problems *not* related to global warming elicit response patterns similar to questions about actual threats. One third of the *Alarmed* (32%) expect cancer to become somewhat or much more common due to global warming; this proportion is comparable to the proportion that expect heat stroke to become somewhat or much more common (31%). One quarter (24%) expect influenza to become more common, comparable to the proportion expecting increases in severe anxiety and harm from flooding (25%) and from hunger and malnutrition (24%); and 18 percent expect Ebola infections to become more common. In fact, climate change is not projected to increase cancer, the flu, or Ebola.

### Expected Increases in Health Threats That Are *Not* Related to Global Warming Over the Coming Decade

*Do you think each of the following will become more or less common in your community over the next 10 years as a result of global warming if nothing is done to address it?*



Yale/Mason;  
Oct 2014; n=1272

The tendency of the two most concerned segments to identify global warming-related health threats when *prompted* by seeing them listed (as is the case here), combined with their failure to generate these consequences *unprompted* (as in the awareness results on p. 17) indicates that their familiarity with health impacts is not deep; nevertheless, they are inclined to accept them as real. Also of note, in the remaining four segments, only five or six percent, at most, expect any of the health problems to become more common due to global warming – a strong indication that they do not understand the health consequences of global warming.

## Desired Level of Response from Government

An essential component of risk communication is helping those at risk understand that steps can be taken to effectively reduce the threat they are facing. For many health problems, these are personal actions, such as breast self-exams as a method of early identification for breast cancer. For societal problems such as global warming, however, governments must also take action to protect the population as a whole.

Support for action by various levels of government to protect people from global warming-related health threats varies by segment and by branch of government, with large differences between segments, and smaller differences within each segment, regarding the amount of effort they desire from different levels of government.

Overall, among the *Alarmed* and *Concerned*, there is strong support for protective action from every level of government. Pluralities of the *Cautious* and *Doubtful* say government, at all levels, should maintain its current level of effort. A plurality of the *Disengaged* say they aren't sure, but of those who express an opinion, most wish to see current levels of effort maintained. A majority of the *Dismissive* say there should be “much less” effort from all branches.

Only the *Alarmed* make clear distinctions among the level of effort they desire from different branches of government: 80 percent support somewhat or much more effort from the U.S. Congress; 75 percent from federal agencies; 72 percent from their state government; 66 percent from President Obama; and 63 percent from their local government. Fewer than one in five *Alarmed* want the same or less effort from *any* level of government.

For all segments except the *Alarmed*, the largest increase in effort is desired from federal agencies, such as the Centers for Disease Control, the National Institutes of Health, and the Federal Emergency Management Agency.

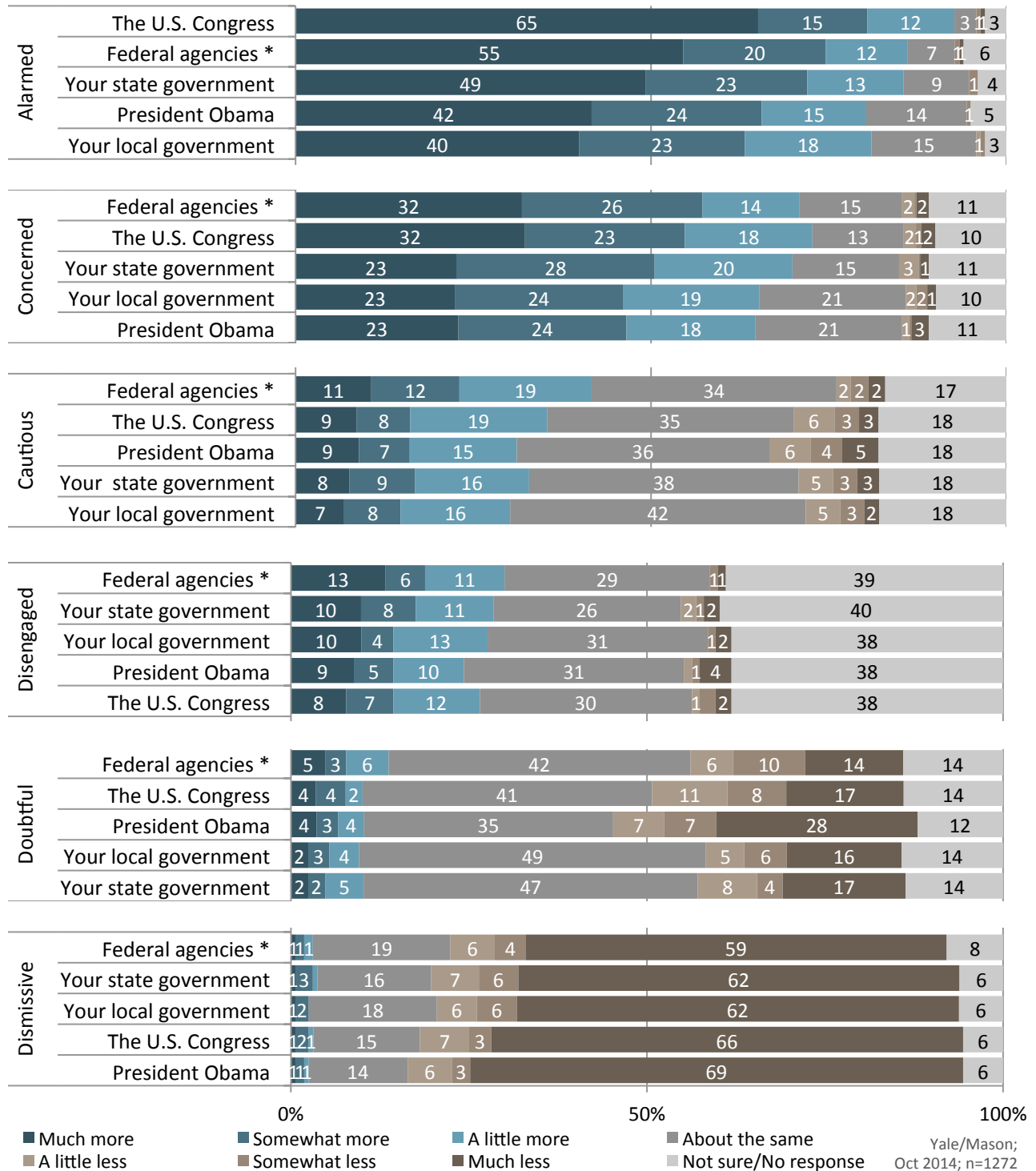
About six in ten of the *Concerned* (58%) desire somewhat or much more effort from federal agencies, and 55 percent desire this level of effort from the U.S. Congress. Their support for increased action from the remaining three actors is similar: 51 percent support somewhat or much more effort from state government, and 47 percent from local government and President Obama.

The *Dismissive* make almost no distinctions in support for more action, but they do distinguish who they'd prefer would do *less*: 69 percent say President Obama should do much less; 66 percent say the U.S. Congress should do much less; 62 percent say state and local government should do much less and 59 percent say federal agencies should.

The *Disengaged* differentiate the least among the branches of government with 14 to 19 percent supporting somewhat or much more effort from all five levels of government, and 26 to 31 percent stating that current levels of effort should be maintained. The *Cautious* and *Doubtful* also make few distinctions among the levels of government, although the *Doubtfuls'* attitudes toward President Obama's actions stand out: 28 percent say he should be doing much less, in contrast to 14 to 17 percent who say this about the other four government branches.

## Desired Level of Response from Government

*In your opinion, should each of the following be doing more, less, or about the same amount as they are doing now to protect people from health problems related to global warming?*



\*Federal agencies -- such as the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), and the Federal Emergency Management Agency (FEMA).

## Support for Increased Funding to Health Agencies to Protect People From Health Impacts of Global Warming

For governments to increase the protection of vulnerable populations, increased funding to public health departments and federal health agencies will be needed. These agencies, however, have seen substantial funding cuts since the recession that began in 2008. For example, The National Association of County and City Health Officials estimates that between 2008 and 2013, local public health departments in the U.S. lost 48,300 jobs.<sup>15</sup>

Majorities of the *Alarmed* and *Concerned* support increases in funding to local and state public health departments and to federal health agencies to protect people from global warming's health threats. The *Alarmed* are the most likely to support increases in funding to federal health agencies (78% strongly or somewhat support it). Three-quarters (76%) support increases to their state's public health department and 69 percent support increases to their local public health department. The *Concerned* are similar: 65 percent support increased funding for federal agencies, 58 percent for state health departments, and 55 percent for local health departments.

The middle segments express little opinion on funding increases; majorities of the *Cautious* and *Disengaged* either say they have no opinion or they're not sure. Of those who do hold an opinion, support is higher than opposition: About one third of the *Cautious* and *Disengaged* support increases for the federal agencies and one quarter support increases for state and local public health departments. Relatively few of the *Cautious* or *Disengaged* oppose increases.

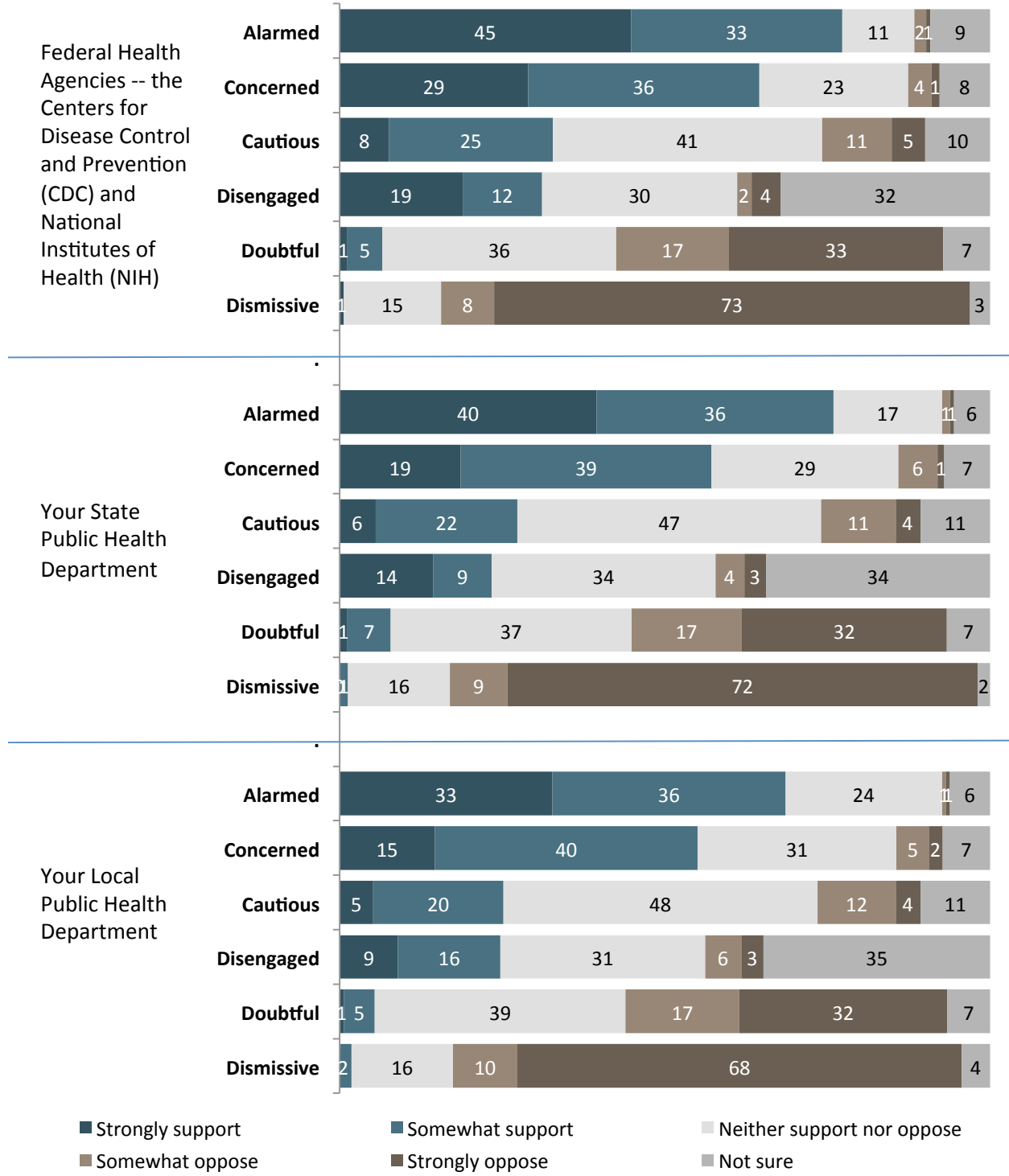
More than three-quarters of the *Dismissive* and half of the *Doubtful* oppose increases to any of the health agencies.

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<sup>15</sup> NACCHO (National Association of County and City Health Officials) (2013) Local Health 486 Department Job Losses and Program Cuts: Findings from the 2013 Profile Study. 487 Available: <http://www.naccho.org/topics/infrastructure/lhdbudget/upload/Survey-488-Findings-Brief-8-13-13-2.pdf>.

## Support for Increased Funding to Health Agencies

*How much to your support or oppose increased funding to ....  
... to protect people from health problems related to global warming?*



Yale/Mason; Oct. 2014; n=1272



## Trust in Information Sources on Global Warming-Related Health Problems

Trusted sources for information on global warming's health impacts vary considerably by segment. The source most trusted by the *Alarmed* and *Concerned* are climate scientists: 72% of the *Alarmed* and 59% of the *Concerned*, say they "strongly" or "moderately" trust them. By contrast, only one third or fewer of the members of the other segments trust climate scientists. Similarly, the U.S. Centers for Disease Control and Prevention (CDC) are strongly or moderately trusted by 68 percent of the *Alarmed* and 57 percent of the *Concerned* but only minorities of the remaining four segments. The World Health Organization is trusted by 66 percent of the *Alarmed*, but 5 percent of the *Dismissive*.

The sources the *Dismissive* and *Doubtful* segments are most likely to trust are their primary care doctors, who are strongly or moderately trusted by 35 percent of the *Dismissive* and 41 percent of the *Doubtful*; family and friends (35% of the *Dismissive* and 37% of the *Doubtful*); and religious leaders (28% and 22%, respectively). Notably, military leaders (who might be expected to be trustworthy sources for the *Doubtful* and *Dismissive* given the large proportion of conservatives in these segments) are not particularly trusted: only 22 percent of the *Dismissive* and 18 percent of the *Doubtful* strongly or moderately trust U.S. military leaders on the issue.

The *Cautious* are most likely to trust their primary care doctor (47%), the American Medical Association (38%) and the Centers for Disease Control and Prevention (36%). The *Disengaged* most trust family and friends (35%), their doctors (31%), the AMA (27%) and the CDC (27%).

Half or more of the *Alarmed* trust at least 10 of the 13 sources of information asked about in the survey, and half or more of the *Concerned* trust 6 of the sources. In none of the other four segments do at least half of the members trust *any* source.

Looking across all the segments, primary care physicians and family and friends have the highest credibility – i.e., they are trusted by larger proportions of each segment than most other sources and distrusted by fewer. Both doctors and acquaintances influence others through *interpersonal* communication, rather than *organizational, mediated* communication. Interpersonal influence has been recognized for over 60 years as more powerful than mediated influence, and these results suggest that engaging doctors as global warming opinion leaders and educators is likely to yield changes in Americans' awareness and understanding of the health problems associated with global warming. Recent surveys of medical societies have found that the majority of physicians feel they have a responsibility to alert their patients to the health effects of global warming.<sup>16</sup>

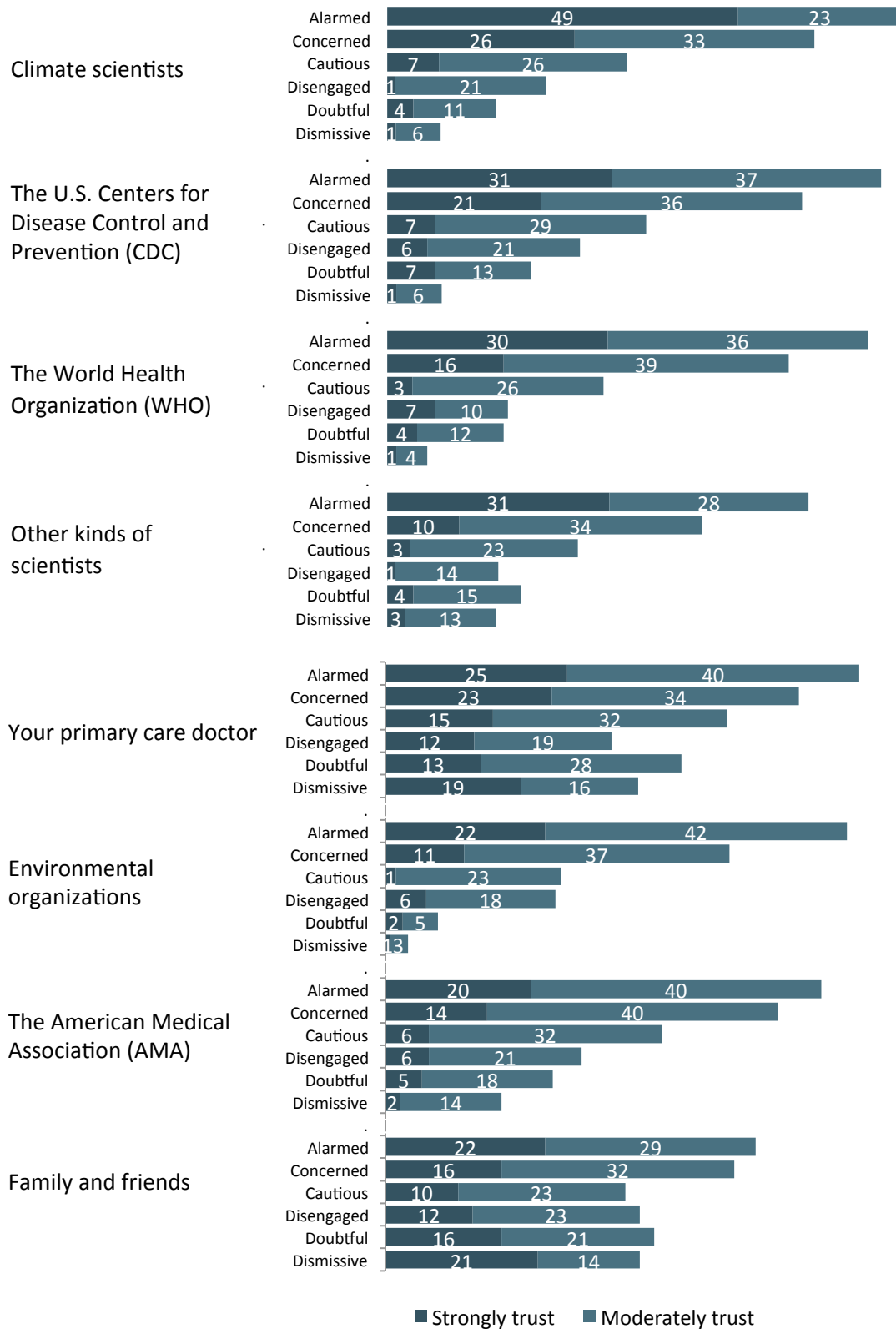
Of the organizations, the Centers for Disease Control and the American Medical Association have the highest credibility across segments. As primary sources of information and opinion leaders for the medical community, these results suggest the potential for a traditional two-step flow of information from the organizational level (i.e., the CDC and AMA), to interpersonal influencers (i.e., doctors), to patients.

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<sup>16</sup>Sarfaty M, Mitchell M, Bloodhart B, Maibach EW. A survey of African American physicians on the health effects of climate change. *International Journal of Environmental Research in Public Health*, 2014; 11(12):12473-12485.

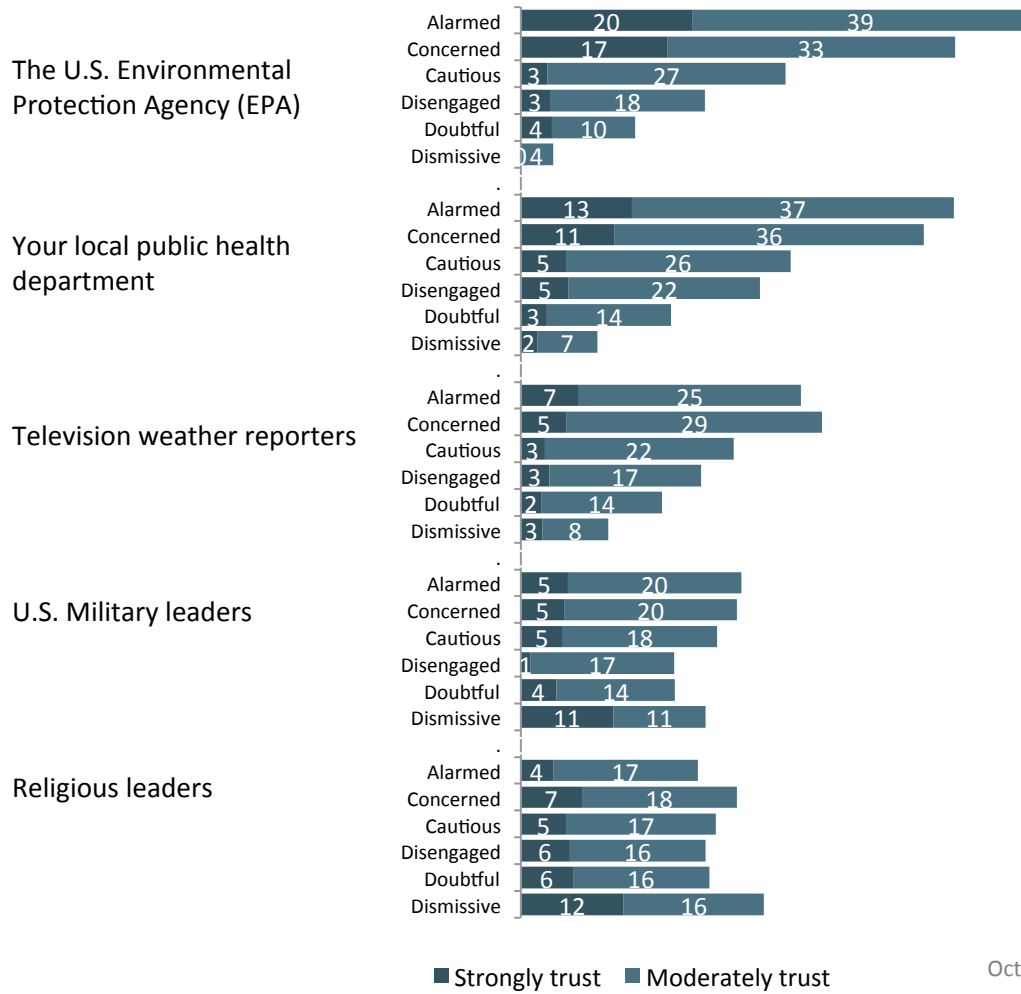
Sarfaty M, Bloodhart B, Ewart G, Thurston G, Balmes J, Guidotti T, Maibach E. American Thoracic Society member survey on climate change and health. *Annals of the American Thoracic Society*, 2014; epub ahead of print.

## Trust in Sources of Information on Global Warming-Related Health Threats



(continued on the next page)

## Trust in Information Sources on Global Warming-Related Health Threats (continued)



Yale/Mason;  
Oct. 2014; n=1272

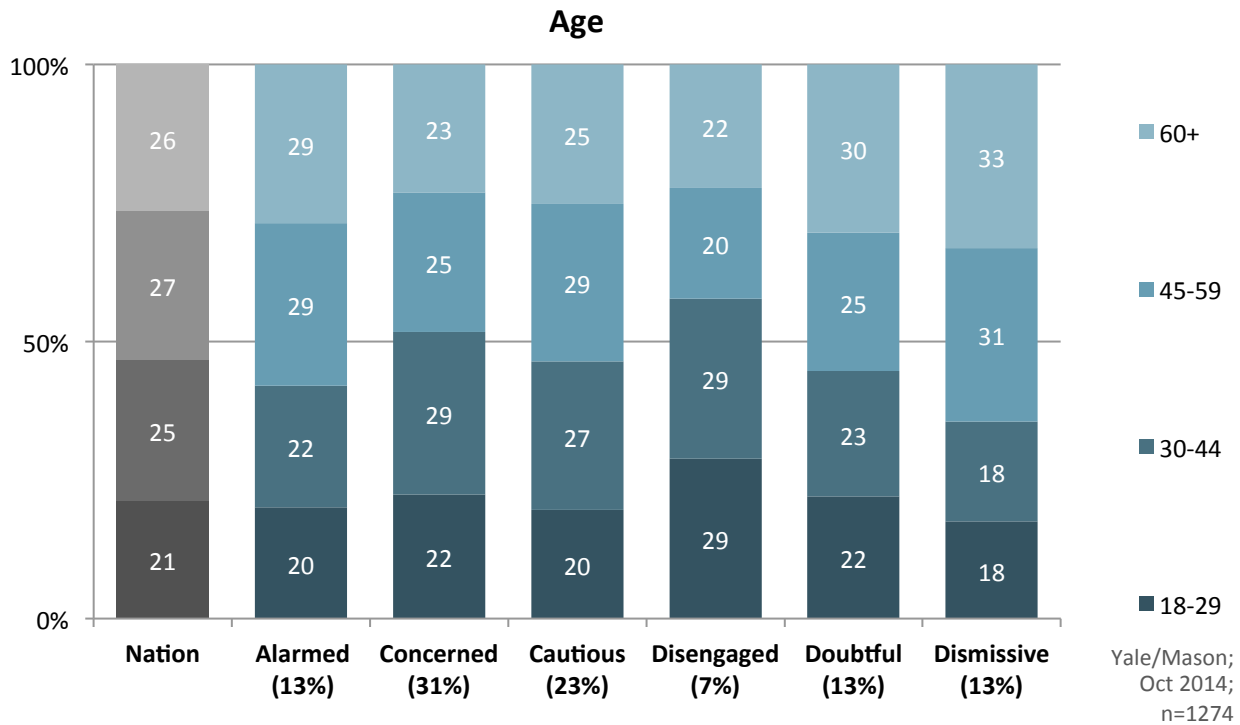
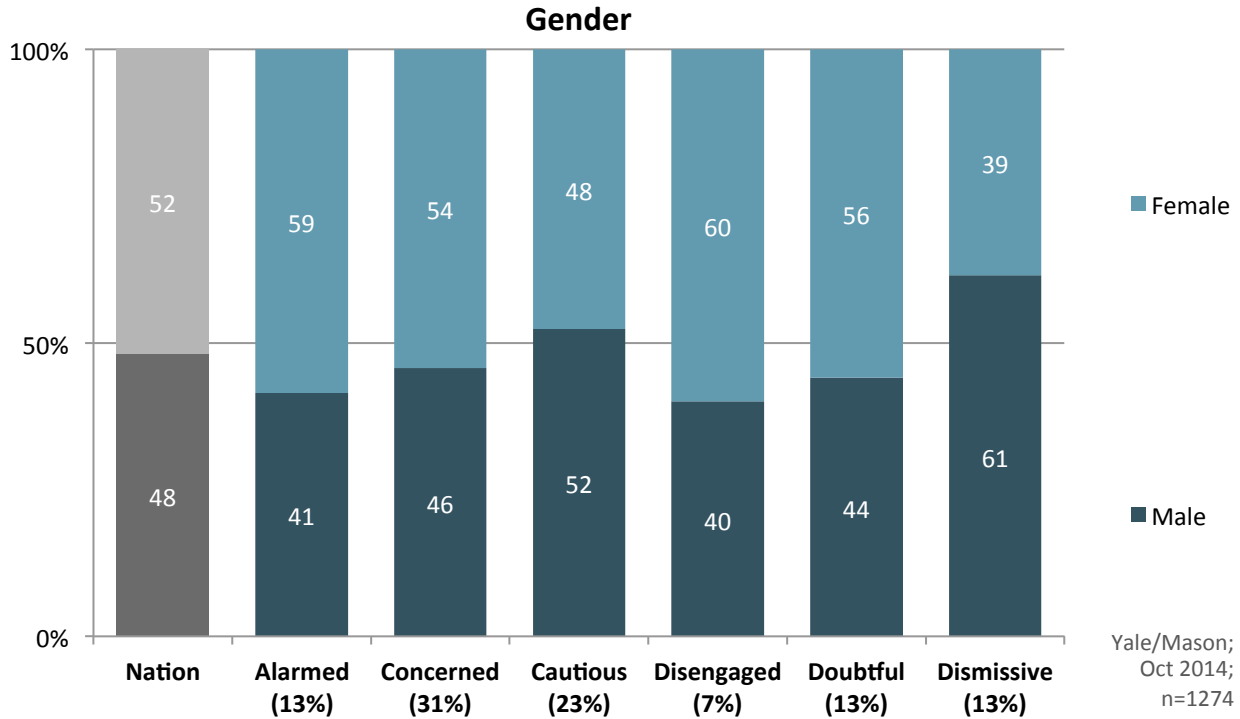
## Methods

- The data in this report are based on a nationally representative survey of 1,275 American adults, aged 18 and older, conducted from October 17-28, 2014. All questionnaires were self-administered by respondents in a web-based environment. The survey took, on average, 29 minutes to complete.
- The sample was drawn from GfK's KnowledgePanel<sup>®</sup>, an online panel of members drawn using probability sampling methods. Prospective members are recruited using a combination of random digit dial and address-based sampling techniques that cover virtually all (non-institutional) resident phone numbers and addresses in the United States. Those contacted who would choose to join the panel but do not have access to the Internet are loaned computers and given Internet access so they may participate.
- The sample therefore includes a representative cross-section of American adults – irrespective of whether they have Internet access, use only a cell phone, etc. Key demographic variables were weighted, post survey, to match US Census Bureau norms.
- The six audience segments were first identified in 2008 using Latent Class Analysis with survey data from 2,164 respondents. Respondents were segmented using 36 variables representing four distinct constructs: global warming beliefs, issue involvement, policy preferences and behaviors. Discriminant functions derived from the latent class analysis have been used since 2008 to assess changes in the sizes and attitudes of the segments, and to describe additional differences among the groups, such as the health perceptions discussed in this report.
- For a full description of the segmentation methods, please see: Maibach, Edward, Anthony Leiserowitz, Connie Roser-Renouf & C.K. Mertz. (2011). Identifying Like-Minded Audiences for Climate Change Public Engagement Campaigns: An Audience Segmentation Analysis and Tool Development. *PLoS ONE*. <http://dx.plos.org/10.1371/journal.pone.0017571>
- All prior reports on Global Warming's Six Americas are available at our websites: <http://climatechange.gmu.edu> and <http://environment.yale.edu/climate>
- This study was conducted by the *Yale Project on Climate Change Communication* and the *George Mason University Center for Climate Change Communication*, and was funded by the Surdna Foundation, the 11th Hour Project, the Grantham Foundation, and the V. K. Rasmussen Foundation. The survey instrument was designed by Anthony Leiserowitz, Geoff Feinberg, Seth Rosenthal, and Jennifer Marlon of Yale University, and Edward Maibach and Connie Roser-Renouf of George Mason University.

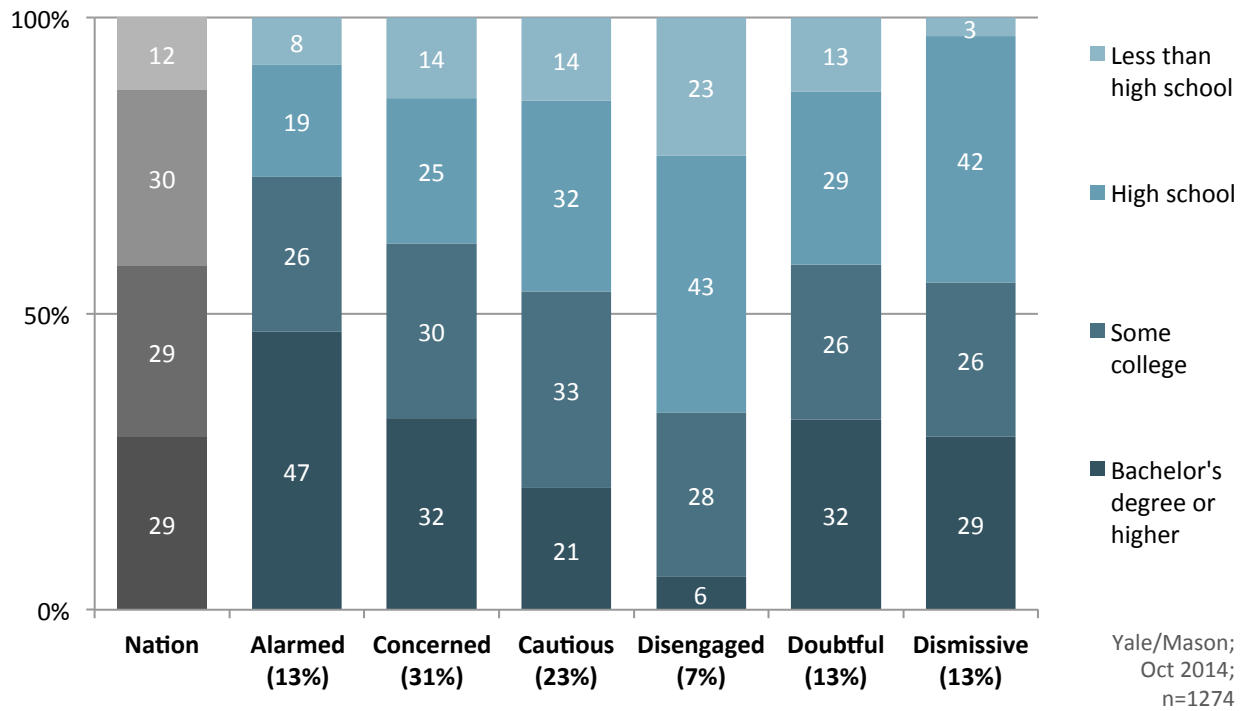
### Rounding error

- For tabulation purposes, percentage points are rounded off to the nearest whole number. As a result, percentages in a given chart may total slightly higher or lower than 100%.

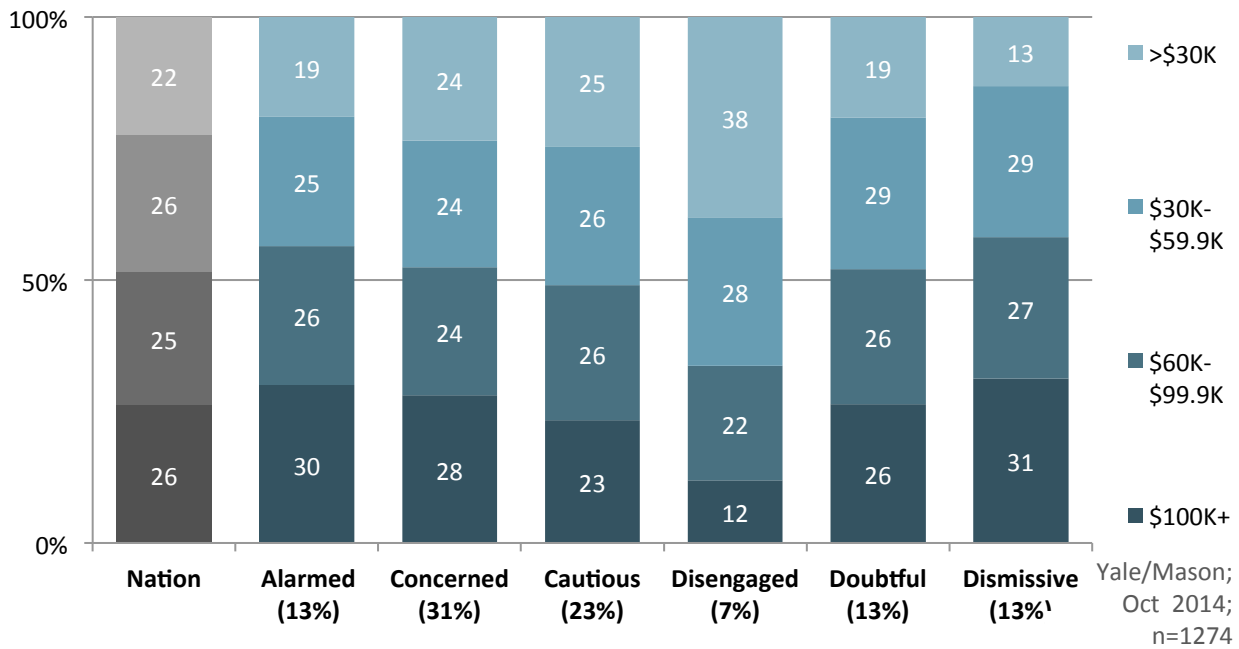
## Appendix: Demographic Characteristics of the Six Americas



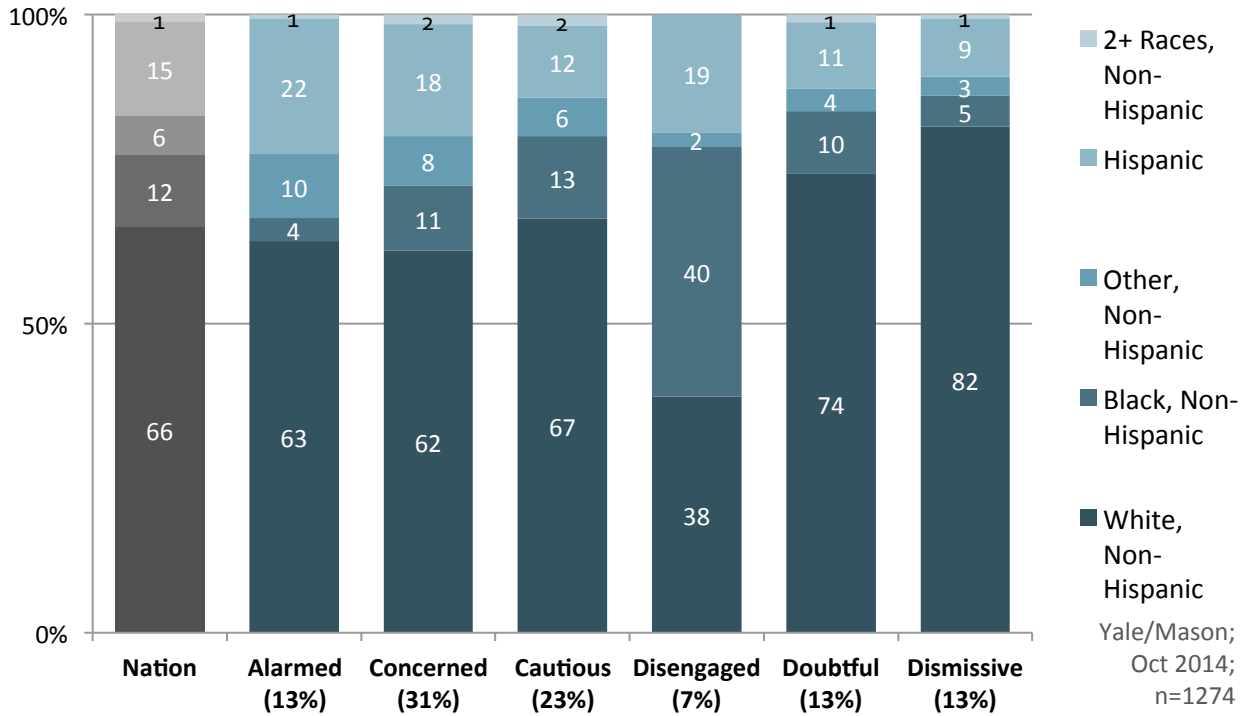
### Education



### Income



### Race/Ethnicity



### Region

