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COMMUNICATION

Mona Sarfaty and Edward Maibach

Although current and future threats of climate change to public health are increasingly documented, these threats are not well known or understood by the general public. This chapter reviews the public's understanding of the health implications of climate change and how health professionals, environmental scientists, and others can effectively communicate about the relevance of climate change to public health.

The public's understanding of climate change and its relevance to health varies greatly among countries. For example, among the five countries with the most greenhouse gas (GHG) emissions, the percentage of people who were familiar with climate change in 2010 varied dramatically:

- In Japan, 98 percent
- In the United States, 96 percent
- In Russia, 83 percent
- In China, 62 percent
- In India, 37 percent.¹

The proportion of people who were completely unaware of global warming also varied greatly:

- In developed countries in Asia, Canada, and the United States, 4 percent
- In developing countries in Asia, 48 percent
- In countries in the Middle East and North Africa, 49 percent
- In countries in sub-Saharan Africa, 54 percent.²

A public opinion poll in 15 countries in 2009 found similar disparities.³ In all countries, most people familiar with climate change perceived it as a “very serious” or “somewhat serious” problem. However, the proportion who saw it as a “very serious” problem ranged from 90 percent in Mexico to 31 percent in the United States, 30 percent in Russia, and 28 percent in China.

In 2013, a poll conducted in 39 countries found that climate change was perceived as a major national threat by 54 percent of people in Canada, Europe, and Africa; 56 percent in Asia and the Pacific; 65 percent in Latin America; but only 40 percent in the United States.⁴ Therefore, U.S. residents are highly aware of climate change but less concerned about it than residents of other countries—in part due to a decades-long disinformation campaign intended to undermine concern.⁵

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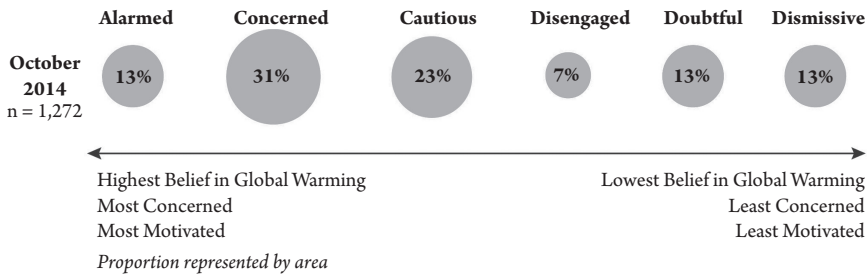


Figure 12-1 Pictorial representation of the six segments of the U.S. population, based on their level of concern about global warming. (Source: Yale University and George Mason University.)

The U.S. public’s understanding of climate change has been studied extensively. For example, in 2008, the Center for Climate Change Communication at George Mason University in partnership with the Yale Project on Climate Change Communication began a biannual representative national survey of American adults—the Climate Change in the American Mind Project. One of the important findings from this project was the identification of six distinct segments of the U.S. population—or audiences—defined by their perception of “global warming,” the major aspect of climate change as perceived by Americans. People in each of these segments—*Global Warming’s Six Americas*—have a distinct pattern of climate change beliefs, behaviors, policy preferences, and levels of issue engagement.⁶ These segments, with their percentages in the U.S. population in 2013, are described below (Figure 12-1).

The Alarmed (13 percent): Members of this segment are highly engaged in global warming. They know that it is occurring, that it is caused by human activity, and that it is a very real threat. They are changing their behaviors and strongly support vigorous national policies to address global warming.

The Concerned (31 percent): Members of this segment are similar to members of the Alarmed, except they are less certain of their conclusions, less personally engaged, less likely to be changing their behaviors, and slightly less supportive of policies to address climate change.

The Cautious (23 percent): Members of this segment tend to believe that global warming is happening, but they are less certain that human activity is the cause and less certain that the consequences will be serious. They do not perceive global warming as a personal threat. They tend not to be considering personal behavior changes. However, they show moderate support for policies to address climate change.

The Disengaged (7 percent): Members of this segment have not thought much about global warming. Their defining characteristic is that they respond “Don’t know” to most survey questions about global warming. They are inclined to believe that if global warming is real, it is likely to be harmful. They show moderate support for climate change policies. And they acknowledge that they could easily change their minds about global warming.

The Doubtful (13 percent): About one-third of the members of this segment think that global warming is happening but that it is not caused by people. Another

one-third say they do not know if it is happening. And the remaining one-third think it is not happening. None of these people recognize global warming as a threat in the foreseeable future. And almost all of them believe that the United States is already doing enough to address global warming.

The Dismissive (13 percent): Members of this segment are relatively highly engaged in global warming as an issue. They consider themselves to be very well informed about it, and they have concluded that it is not happening and therefore it is not a threat. As a result, they feel strongly that policies to address global warming are misguided at best.

While there are only modest differences among the members of these segments in demographic characteristics, such as age and gender, there are large differences among them in political ideology and party affiliation. The Alarmed and the Concerned segments are overwhelmingly liberal Democrats; in contrast, the Doubtful and the Dismissive segments are overwhelmingly conservative Republicans. Therefore, political perceptions present a major challenge for public engagement in climate change.⁷ Despite these challenges, *segmentation analysis* enables communication specialists to develop, test, and evaluate different communications approaches for different groups.⁸

Few of the people in *any* of the six segments are more than vaguely aware of the health threats posed by climate change, and none think primarily about the human health consequences of climate change. Since 2008, as part of the Climate Change in the American Mind Project, over 13,000 randomly selected American adults have answered the question: When you think of “global warming,” what is the first word or phrase that comes to your mind? None of the many respondents perceived it as a risk to human health. In 2014, survey participants were asked how many people become injured or ill or die each year as a result of global warming. Approximately 40 percent responded “Don’t know”; about 40 percent responded “None” or “Hundreds”; 16 percent responded “Thousands”; and the remainder responded “Millions.”⁹ Almost all of the people who responded “Thousands” or “Millions” were members of the Alarmed or the Concerned segments.

Little research has been done on why the U.S. public does not yet understand the health implications of climate change. One study found that the American news media rarely reported on this subject, and when they did, the reporting was often inaccurate.¹⁰ When news stories mention impacts on human health, they are typically reported in an episodic context, embedded in a story about a specific heat wave, storm, flood, or fire—rather than in a broader context that explains the long-term consequences of climate change. Many government agencies and non-governmental organizations attempt to educate the public about climate change, but they typically focus on scientific aspects, harm to non-human forms of life (such as plants, penguins, and polar bears), or impacts to aspects of the environment (such as glaciers).¹¹

The U.S. public’s lack of understanding about the health implications of climate change creates an opportunity—and a responsibility—for health professionals and others to provide this information. The opportunity is facilitated by people’s concerns about health threats in general and actions that they can take to benefit their health.

MENTAL MODELS, FRAMING, AND EFFECTIVE COMMUNICATION

People organize their experience and understanding of the world with *mental models*—interconnected sets of associated ideas, beliefs, and feelings that are likely encoded in neural networks in the brain and are largely based on the stimulation of repeated exposures and activations. Few Americans have mental models of climate change that include associations with health. Rather, the most common concepts in Americans' mental models about climate change are as follows:

- *Naysayer concepts*, including conspiracy theories, doubting the science, believing the science is hyped, and believing that climate change is part of a natural cycle
- *Alarmed concepts*, including apocalyptic concepts (such as “the end of everything”) and general concepts (such as “bad for the planet”)
- Melting ice
- Heat.¹²

In contrast to mental models, which are attributes of people, *frames* are attributes of communication. Any given issue has many different facets and can be viewed from many different perspectives—or through many different frames. When choosing which facet of an issue to discuss with others, a communicator is choosing a frame, or perspective, for the audience to focus on the issue. For example, communicators who tell stories about the harm of climate change to wildlife, such as polar bears, have chosen an environmental frame.

The choice of frames has consequences. For example, when media coverage of an issue uses primarily one frame, that frame will tend to strongly influence public understanding of that issue—people will not likely consider other equally valid frames of the issue. These *framing effects* can be subtle and gradually adopted, or they can be powerful and rapidly adopted—especially for issues for which the public's mental models are not yet well defined. Either way, they are likely to be pervasive.

Based on people's pre-existing values and interests, any given frame is likely to engage specific types of people, have little impact on others, and may even antagonize some people. For example, information about climate change that is framed as an environmental problem is likely to engage people who see themselves as environmentalists (about one-third of Americans) but it is likely to be totally dismissed by people who believe that environmentalists are misguided (another one-third of Americans).

The U.S. experience with environmental tobacco smoke (ETS) illustrates the impact that frames can have on attempts to change public policy and behavior. Prior to the mid-1980s, cigarette smoking was largely defined as a personal choice, with adverse health effects limited to *individual* smokers. Evidence of the adverse health effects of ETS on other people emerged and created an opportunity for health professionals to change the frame to one in which tobacco smoke was a threat to *everyone* exposed, especially people in enclosed spaces, such as airplanes and buildings. Over time, the new frame contributed to a change in mental models about smoking, which eventually heightened public acceptance of the need for public policies that protect non-smokers from ETS.

The frames that have dominated U.S. public discourse on climate change have included *an environmental frame*, *a political frame*, and *an economic frame*—all of which have been highly polarizing—as well as *a scientific frame*, which most resonates with few people. In addition, other frames of climate change that have recently been introduced in U.S. public discourse include the following:

- *A national security frame*, as illustrated by military strategists who inform the public that climate change can lead to global instability, which will threaten U.S. national security
- *An energy frame*, as illustrated by entrepreneurs who highlight the benefits of clean renewable forms of energy—in contrast to the costs of fossil fuels
- *A moral frame*, as illustrated by leaders in civic society and the faith community who assert that some (mostly high-income) countries are harming people in other (mostly low-income) countries—and harming future generations in all countries
- *A stewardship frame*, as illustrated by leaders of the faith community who assert that people have responsibility to protect God’s creation
- *A human health frame*, as illustrated by health professionals who point to increased morbidity and mortality due to heat-related disorders, respiratory disorders, and vector-borne diseases.

Frames tend to be most influential in shaping public understanding when there is congruence between the message (the frame) and the messenger. People are more likely to accept information if they perceive its source as trustworthy. Different people trust different sources of information.¹³ The most effective messengers are trusted authorities on the frame being presented. For example, the national security implications of climate change should be explained by national security experts, not health professionals.

THE HEALTH FRAME

Most Americans place great value on health. Health is an integral part of the founding documents of the United States. The Preamble to the U.S. Constitution states that a principal purpose of government is to “promote the general welfare.” The Declaration of Independence states that “life, liberty, and the pursuit of happiness” are national goals.

Public health—what, we as a society, do collectively to assure the conditions in which people can be healthy¹⁴—also resonates with most people. Assuring the conditions in which people can be healthy includes preventing health threats related to climate change and protecting people from these threats.

A health frame is an effective means of helping most Americans better understand, consider, and respond to climate change.¹⁵ Information about climate change framed around health elicits a more productive set of responses than information framed around the environment or national security—especially so for people who otherwise would be unlikely to consider information about climate change.¹⁶

Extreme weather and public health threats resonate with many Americans. When they are specifically asked about potential consequences of climate change,

75 percent of *voters* say that people’s health is an “extremely” or “very important” concern regarding climate change.¹⁷ However, since most people are not aware of the specific health impacts caused by climate change, there is a need to provide them with information on the direct association between climate change and increased risk of specific illnesses and death.

People in all six segments of the U.S. population that were described earlier respond positively to the concept of *co-benefits* associated with taking action to limit global warming.¹⁶ (See Box 1-3 in Chapter 1.) For example, most people endorse the following statement: “Taking actions to limit global warming—by making our energy sources cleaner and our cars and appliances more efficient, by making our cities and towns friendly to trains, buses, and bikers and walkers, and by improving the quality and safety of our food—will improve the health of almost every American.”

FIVE KEY CONCEPTS, THREE SIMPLE MESSAGES

How can health professionals—and others—inform people about the health relevance of climate change, thereby enhancing public engagement in responding to it? People who know and accept the following five key concepts about climate change are significantly more likely to support a societal response to climate change and to personally take actions that encourage a societal response:

- Climate change is real.
- Climate change is the result of human activity.
- There is consensus among climate scientists that human-caused climate change is happening.
- Climate change is harmful to people.
- People can take actions that will limit climate change.^{18,19}

In addition, people who feel they have directly experienced the consequences of climate change are more likely to hold firm convictions that it is real.^{16,20}

Health professionals can play an important role by communicating these key concepts through the following three simple, important messages.

1. There is a scientific consensus about human-caused climate change

Most Americans are either unaware or do not accept that climate scientists have reached a consensus about the reality of human-caused climate change. As a result of a disinformation campaign,⁵ many people believe there is disagreement among experts about human-caused climate change. These people are less likely to be convinced that climate change is real, human-caused, and serious, and that it can be halted or reversed.²¹

When people *are* told that there is a consensus among scientists about human-caused climate change, their understanding changes.^{22,23} For example, a presentation of the following statement increases from about 60 to about 80 percent the proportion of people who believe there is a consensus: “Based on the evidence,

more than 97 percent of climate experts are convinced that human-caused climate change is happening.”²⁴ By presenting information about this consensus, rather than explaining the facts of human-caused climate change, health professionals can avoid conversations about areas of climate science with which they themselves may not be familiar.

2. Climate change is harming people’s health everywhere

Health professionals are in a unique position to educate the public about the health relevance of climate change. They are trusted members of every community. Health is their area of expertise. They can convey the ways in which climate change is already causing health effects and how these effects are likely to worsen unless actions are taken to address climate change. They can communicate about the co-benefits to health resulting from actions that address climate change.

People process threat information more easily when it is explained in a way that reflects their own experience or that of others in their community. Since personal and community experience varies, specific content of messages needs to be tailored for specific communities. For example, in communities where air quality is poor, relevant stories might refer to the way that more-severe heat waves due to climate change are contributing to poor air quality and resulting in increased occurrence of serious respiratory disease.

3. People and communities can take actions that will limit climate change, protecting their health from the consequences of climate change, and making their communities healthier places to live

Focusing on solutions can bring people together, even when the underlying ways of thinking may differ.²⁵ The belief that taking action will make a difference can bolster individual self-efficacy and collective efficacy and motivate people to act. Absence of belief in the efficacy of action—a barrier to action to address climate change—is associated with a sense of helplessness, denial, and avoidance.²⁶

Invoking the value of protecting people from harm can help to engage people in responding to climate change. Most people feel that protective behavior is worthwhile and sensible. When people learn about potential harm, they are more likely to take effective action to reduce the risk of that harm.

The actions people take to protect themselves from health risks can result in healthier communities. For example, encouraging people to walk or bicycle rather than drive improves their health and reduces use of fossil fuels. (See Box 13C-1 in Chapter 13C.) Buying locally grown fresh produce helps reduce both fat intake and long-distance food transportation using fossil fuels. (See Chapter 14.)

GETTING THE MESSAGE OUT

In communicating about climate change, such as by conveying these three messages, health professionals and others should follow basic principles of climate

Box 12-1 Principles of Climate Change Communication*Howard Frumkin and Edward Maibach*

1. People's prior beliefs and cultural frames shape their knowledge, attitudes, and behaviors, so effective communication should be tailored accordingly.
2. Engaging people by listening is more effective than talking at them.
3. Simply providing scientific information is unlikely to engage people.
4. People who do not believe in climate change may support energy efficiency, conservation, and similar measures for other reasons, such as clean air, economic benefit, or health.
5. People value immediate benefits more than long-term benefits.
6. Simple, clear messages tend to be more effective than complex or abstract ones.
7. Trusted messengers, especially if they are known to people, are most effective.
8. Repetition is an important element in effective communication.
9. Communication that arouses fear is unlikely to be effective. However, a fear-based message in combination with an empowering ("what you can do") message may be effective.
10. More people will adopt behaviors that are easy, fun, and popular.
11. Communication is most effective when reinforced by policies, environmental changes, and products or services that make it easy to perform recommended actions. The default should be the healthy option.

change communication (Box 12-1). In addition, health professionals can convey these messages utilizing three key elements: contacting, convening, and collaborating.

Contacting

Health professionals can contact those who should be conveying information about the health consequences of climate change: government officials, leaders in public health and safety organizations, representatives of non-governmental organizations, news reporters, members of newspaper editorial boards, radio and TV weather forecasters, and policymakers. They can strengthen the knowledge base in professional organizations and networks. They can engage colleagues through presentations, meetings, and discussion groups. And they can engage those in distant locations via websites, webinars, and teleconferences.

Convening

Since protection of health requires cross-sectoral approaches, health professionals can convene stakeholders from multiple sectors to plan adaptation and mitigation measures. Stakeholders include (a) traditional partners, such as government agencies, hospitals and clinics, healthcare providers, and non-governmental organizations; and (b) nontraditional partners, such as agencies and organizations involved in land use, environmental protection, education, transportation, economic development, and social justice and the faith community.

Collaborating

Health professionals can build partnerships and coalitions to facilitate communication about climate change such as by increasing media coverage. They can work with others to train health professionals and journalists, organize hearings about public policy, and advocate for specific measures.

Health professionals and others can utilize many different venues for communicating and educating about climate change. These opportunities range from one-on-one conversations to massive open online courses (Box 12-2).

Box 12-2 Presenting a Massive Open Online Course (MOOC) on Human Health and Global Environmental Change

Aaron Bernstein

New educational technologies can help raise awareness of and stimulate action to address climate change. In 2013, I co-directed a massive open online course (MOOC) entitled “Human Health and Global Environmental Change.” More than 50,000 students enrolled in this free course, which was financially supported by Harvard University and the Harvard School of Public Health.

Students were from 100 countries, including the United States (26 percent) and India (10 percent). They represented more than 12 professions, most frequently educator and healthcare provider. About 5 percent held a doctorate degree, 30 percent a master’s degree, and 40 percent a bachelor’s degree. Men and women were nearly equally represented. About one-half of the students were 20 to 29 years old, and about one-fourth were 30 to 39.

The course’s main objectives were for students to (a) learn the connections between global environmental changes, such as climate change and the loss of biological diversity, and human health, and (b) with this knowledge, rigorously assess strategies to prevent or remedy harms resulting from global environmental change.

The course was divided into three sections. The first two sections presented the latest scientific understandings of climate change and biodiversity and the ways in which an unstable climate and biodiversity loss threaten human health. Material was delivered in 5- to 15-minute video lectures (in English, but frequently translated by students), supplemented with readings and online discussion. Assessment was done mainly by quizzes with multiple-choice or fill-in-the-blank questions.

Running a MOOC poses unique challenges, including managing communications with thousands of students and finding ways to meaningfully assess their performance. In this course, the exceptional diversity of students posed a significant challenge to providing content in a way that engaged most of them.

The final section of the course was designed to get students thinking about solutions to the problems they had learned about earlier in the course. After watching lectures from experts who spoke about how they had sought solutions to global environmental problems in their own fields, ranging from tourism to biofuel development, each student participated in one of 43 discussion groups. Each group was assigned a specific sector, such

as agriculture, coffee retailing, and the wood, pulp, and paper industry. Over 3 weeks, students nominated, debated, and selected criteria to determine the “best-in-class” enterprises in their group’s sector.

In this process, students discovered that a shared understanding of the causes and consequences of climate change is difficult to achieve. Students advocated for different criteria and nominated different enterprises. For example, in the student group evaluating the apparel industry, students from high-income countries placed a greater emphasis on the sustainability activities that enterprises described to their customers, while students from low-income countries placed greater emphasis on how an enterprise’s manufacturing process affected the local population.

Students came to recognize that their personal views about climate change may depend on religious beliefs, attitudes about the appropriate role of government, trust in information sources, culture, and individual experience. Debates among students represented a microcosm of ongoing debates between high-income and low-income countries concerning who is responsible for mitigation of and adaptation to climate change.

Because of their scale, MOOCs offer unique educational opportunities. For example, each student was assigned to go to a local store and choose 10 different light bulbs for possible use at home and then to calculate the average cost per lumen and the average watt per lumen of light generated. Student’s choices were heavily shaped by local policies on lighting efficiency. Through this assignment, students came to better appreciate the relationship between individual actions and policy decisions.

This course created a global conversation among people who would have otherwise never interacted with each other. The course enriched their perspectives and encouraged them to maintain interest in addressing climate change.

Other MOOCs on climate change have been presented by the University of Melbourne, the University of Exeter, the University of British Columbia, NextGen University, and other educational institutions. The University of Wisconsin will be presenting a MOOC entitled “Climate Change Policy and Public Health” in 2015. (More information concerning this course can be found at: <https://www.coursera.org/course/ccandph>.)

PUTTING A HUMAN FACE ON CLIMATE CHANGE

People tend to understand life through the stories of individuals and families rather than through statistics. Stories of people who have experienced the health consequences of climate change can powerfully influence people’s beliefs and actions—stories about old people who have died during heat waves, children with asthma that has been exacerbated by air pollution, people with increased allergy symptoms because of longer pollen seasons, and children who have become malnourished because of drought induced by climate change.

CONCLUSION

Communication about the health consequences of climate change—and the health co-benefits of responding to climate change—can help people and communities better understand climate change and its consequences. And this communication

can also increase public engagement in determining what should be done to minimize the health consequences of climate change and to mitigate greenhouse gas emissions.

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This toolkit focuses on how to communicate effectively about the risks of extreme heat events.

