**Theme 7 — Communicating the Health Effects of Climate**

**Introduction**

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1. **Communicating the Public Health Implications of Climate Change**

*by Melinda R. Weathers, Marceleen Mosher and Edward Maibach*

Climate change is creating a global public health crisis, with myriad serious health harms already occurring worldwide and near certainty that, if left unaddressed, these harms will become dramatically worse and more pervasive. These harms include illness, injuries, and deaths from increasingly dangerous weather, the spread of infectious diseases, increases in food- and water-borne illnesses, reduced nutrition, mental health harms, and worsening air pollution. Averting a sustained global public health catastrophe will require rapid mitigation efforts as well as local and regional adaptation actions to protect human health. If taken, these actions offer profound public health and economic benefits, both short- and long-term. As a result, there is an important need for public health professionals to engage the public on this issue, using various forms of civic education that motivate and enable more effective societal decision-making. With this goal in mind, we describe how framing theory, audience segmentation, and message testing research can inform the development of communication resources and training workshops for public health professionals seeking to engage their communities in climate change.

*Keywords:* climate change, public health, framing, public engagement, audience segmentation

1. **A few points that communication on climate change could learn from the Covid-19 crisis**

*by Anneliese Depoux and François Gemenne*

Public health campaigns, as climate change awareness campaigns, are all about making people change their behavior. They also have in common that some of them have to deal with fabricated scientific controversies, such as vaccination campaigns. Public health communication has developed significantly in the last decades, and is now an important field of research in public health. In the Spring of 2020, the world had to deal with the Covid-19 pandemic and implemented radical measures to contain the spread of the virus. Many suggested that similar measures were needed against climate change. We argue the opposite, but there are many lessons from this crisis that can be applied to our communication of climate change. This paper attempts to identify which lessons from the Covid-19 crisis can be applied to climate change communication. In particular, the effects of public health communication on people’s behavior during the crisis will be analyzed, and the obstacles to translate such effects to climate change communication shall be identified.

*Keywords*: climate change, coronavirus, Covid-19, public health campaigns, behavior adaptation.

1. **Communicating the health argument for climate policy/legislation**

*by Alina Herrmann, Dorothee Amelung, Helen Fischer, Rainer Sauerborn*

Protecting our own and our children’s health is the primary motivation for individuals to act climate-friendly and for climate policy formulation. The positive connotation of health contrast to the largely negative framing of climate change impacts in the media. Of particular importance are health co-benefits: “what is good for the climate is good for your health”. Co-benefits “solve” too cognitive problems in promoting climate action: (i) the “free rider effect”, such that if I do something for the climate others who do nothing benefit as well and (ii) the “myopia effect”, caused by the long time lag between behavior/costs of mitigation policies now and positive effects of climate mitigation in the far future. Co-benefits “solve” both problems: they accrue (i) to the acting individual and (ii) immediately. The effectiveness of invoking co-benefits in fostering behavior change was recently shown by the authors in a household study in 4 European cities.

*Keywords*: Climate Change, health, health co-benefits, adaptation, mitigation, climate policy.

**Introduction : Health as a key factor of climate change communication**

Communication of climate change remains the subject of vivid debates in the academic community and environmental organizations alike. The speech of Greta Thunberg at the 2019 World Economic Forum in Davos - "I want you to panic" - has impressed many, but has also sparked virulent debates as to whether this an effective way to prompt action, or rather a paralyzing message. Her leadership has prompted tens of thousands of youth to go on school strike and take to the streets to claim stronger action on climate change.

In recent years, and largely thanks to youth activists, climate change has become a key concern for many around the world: it is no longer conceived just as an issue for ecosystems, but rather as a real individual and collective experience. An important dimension of this experience concerns the health impacts of climate change, yet these health impacts remain poorly understood and discussed in public debates. For many, the Covid-19 crisis was also a brutal occasion to realize the sanitary consequences of environmental disruptions, while the confinement imposed to two thirds of the world was an occasion to experience the impact of human activities on ecosystems.

For years, research on the communication of climate change had been pointing that framing climate change as a public health concern rather than as an environmental issue was one of the elements that would help increase the involvement of the public in engaging with climate change. For years, leading voices in public health, starting with the World Health Organization, had advocated for a radical change of strategy: rather than pointing out the ecological impacts of climate change, one should make it, first and foremost, a matter of public health. This change of strategy is currently happening, and will undoubtedly need to be accelerated in the aftermath of the Covid-19 pandemic.

At COP 21 in Paris in 2015, ‘the right to health’ was mentioned for the first time in a global agreement on climate change, and included in the Paris Agreement (Schütte et al., 2017). While the health argument is increasingly embedded in policy debates, the role of mass media in raising awareness on the health impacts of climate change is also growing (Watts et al., 2018, Depoux et al., 2017). However, research has stressed that the potential of mass media to bring about behavioral change and engagement among the public is not sufficiently tapped into (Stamm et al., 2000). According to surveys on the public understanding of climate change, there is still a great lack of a comprehensive understanding of the health dimensions of climate change among the public. Studies have shown that reorienting climate change communication with a positive public health frame may provide efficient engagement and behavioral change among the public (Maibach et al., 2010, Cardwell et al., 2013).

This section makes the point that reframing climate change as a public health issue would make the problem more personal, significant, relevant and understandable. This aspect is explored through three different angles. This first paper of the section, by Melinda Weathers, Marceleen Mosher and Edward Maibach, reviews the different health impacts brought upon by climate change, but also the many co-benefits that exist between climate action, health and economics. Many of the actions that ought to be taken to counter climate change, the authors argue, would also bring significant benefits for health, well-being and economics. On this basis, they suggest a number of communication tools that can help reframe the communication of climate change, from audience segmentation to message testing.

The second paper of the section, authored by Anneliese Depoux and François Gemenne, takes the Covid-19 crisis as a point of departure, and seeks to identify the lessons that one can draw from this crisis for the communication of climate change. For years, it had been advocated that some success in public health campaigns could serve as an inspiration for climate change campaigns. The measures implemented for the Covid-19 crisis induced radical behavioural changes, and were overall widely accepted by the population. Depoux and Gemenne ponder what this means for our communication of climate change, yet warn us against the temptation to replicate similar measures for climate action.

The third and concluding paper of this section, by Alina Herrmann, Dorothee Amelung, Helen Fischer and Rainer Sauerborn, makes the case for a more positive communication, based on the co-benefits that exist between climate action and public health. They argued that such communication can help overcome key cognitive effects in the communication of climate change, and in particular the free-rider effect and the myopia effect. On the basis of an empirical study conducted in four European cities, they show that such a strategy can yield significant behavioral changes.

Together, these three papers outline a powerful strategy to renew our communication of climate change, which would highlight not only its consequences for health, but also the numerous co-benefits of climate action for health. The Covid-19 crisis has shown that both governments and citizens were capable to implement drastic and costly changes in the face of an imminent danger. This can serve as a lesson for the way we communication about climate change.

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1. **Communicating the Public Health Implications of Climate Change**

*by Dr. Melinda R. Weathers, Marceleen Mosher and Dr. Edward Maibach*

**Climate Change and Human Health**

Climate change has created a truly unprecedented worldwide public health crisis. The 2015 Lancet Commission on Health and Climate Change concluded: “The effects of climate change are being felt today,” “(these effects) threaten to undermine the last half century of gains in development and global health,” and “future projections (of climate change) represent an unacceptably high and potentially catastrophic risk to human health” (Watts et al., 2015, p. 1861). Similarly, the most recent assessment by the Intergovernmental Panel on Climate Change concludes that human health worldwide is already being harmed by shifts in weather patterns and other aspects of climate change, and that unless there is a dramatic reduction in greenhouse gas emissions, there is likely to be major increases in the magnitude of climate change-related morbidity and mortality by 2050 (Smith et al., 2014).

However, public health action can do much to protect people and places from climate change and from the harms to health that it causes. Effective public communication can be used to alert, engage, and empower the public to respond to climate change and to participate in efforts to mitigate risks. Many of these strategies offer a variety of cobenefits, protecting people not only against the risks posed by climate change but benefiting their health and wellbeing in other ways. According to the Lancet Commission: “Tackling climate change could be the greatest global health opportunity of the 21st century…. Many mitigation and adaptation responses to climate change are ‘no regret’ options, which lead to direct reductions in the burden of ill-health, enhance community resilience, alleviate poverty, and address global inequity” (Watts et al., 2015, p. 1861).

**Direct and Indirect Threats to Human Health**

There is widespread agreement among climate scientists that the Earth is warming as a result of human activity (Cook et al., 2016; Cook, van der Linden, Maibach, & Lewandowsky, 2018), primarily due to rising levels of carbon dioxide and other heat-trapping atmospheric gases created by burning fossil fuels. It is also clear that current trends in energy use, development, and population growth will lead to continuing—and more severe—climate change over the course of this century and beyond (Smith et al., 2014; WHO, 2009).

Although a relatively new area of research, there is a rapidly increasing base of knowledge about the public health implications of climate change (Levy & Patz, 2015; Melillo, Richmond, & Yohe, 2014; Smith et al., 2014). Worldwide, climate change is harming human health by exacerbating health problems that already exist, with the worst health problems taking place in developing nations with high rates of poverty, and this is projected to increase over the next several decades (Smith et al., 2014).

Climate change harms human health, both directly and indirectly, in a variety of important ways. Direct effects can include Earth system changes, including rising temperatures, increasing climate variability, increased rainfall and snowfall in some areas and drought in others, and more frequent severe weather events, all of which have considerable potential to harm human health (CDC, 2019). Heatwaves, for example, can cause direct effects such as dehydration, heat exhaustion, heatstroke, and death (CDC, 2009).

Indirectly, climate change brings new challenges to the control of infectious diseases. Climate-related ecosystem changes can increase the range, seasonality, and infectivity of some vector-borne diseases (Smith et al., 2014). Many of the world’s most prodigious deadly infectious diseases are highly climate sensitive (via changes in temperature and rainfall) including cholera and other diarrheal diseases, and insect-borne diseases including malaria and dengue. Downpours can trigger sewage overflows, contaminating groundwater that is often used for crop irrigation and drinking water. In the United States, these consequences will be particularly severe in the roughly 770 cities and towns, including New York, Chicago, Washington, DC, Milwaukee, and Philadelphia, that have “combined sewer systems;” an older design that carries stormwater and sewage in the same pipes (IPCC, 2007).

Perhaps most seriously, the changing global climate is also affecting the basic requirements for maintaining health (i.e., clean air and water, sufficient food, and adequate shelter) and placing other pressures on the natural, economic and social systems that sustain health, which can contribute to poverty, population dislocation, and civil conflict (Smith et al., 2014; Watts et al., 2015; WHO, 2009). For example, mass environmental displacement and migration has the potential to disrupt the lives of hundreds of millions of people, intensifying the growing issues associated with urbanization and reverse successes in development; economic downturns and collapse erode both population health and societal development. Armed conflicts can result from resource scarcity and competition, and migration and clashes between host and migrant groups can lead to large scale loss of life and morbidity (Costello et al., 2009). The burden of all of these conditions is expected to increase as climate change advances.

Altogether, the direct and indirect health effects of climate change threaten to slow, halt, or in some cases reverse—dramatically so—the progress made in enhancing public health worldwide over the past several decades (Watts et al., 2015). Climate change is also expected to adversely affect the health of large numbers of Americans (TFAH, 2009; USGCRP, 2016). In fact, many communities across the United States are already experiencing the negative health effects associated with climate change (NIEHS, 2010; USGCRP, 2016).

A core principle of the practice of public health is that the public should be informed about threats to their health and wellbeing. Individuals require sufficient knowledge to understand how they are at risk, to take actions to reduce their risk, and to participate in meaningful public discourse about collective actions that can be taken to reduce public health risks (Maibach, Roser-Renouf, & Leiserowitz, 2008). Informing members of the public, and the full range of other decision makers, about climate change health risks and response options creates important opportunities to protect prior gains in public health—locally and globally—and to further advance the health of the public worldwide (Watts et al., 2015).

**Public Awareness of Health Consequences Remains Low**

While polling research has shown that local public health officials are aware that climate change threatens health in their jurisdiction in a number of serious ways, the American public is largely unaware that climate change threatens human health, much less their own health and the health of other members of their community. In surveys, without prompting, few Americans report that climate change has any connection to human health, although with prompting they are easily able to imagine such a relationship. Most members of the public, therefore, likely fail to consider the health implications of climate change when they assess climate change as an issue and make decisions about how to respond.

Relatively little research, however, has been done to assess public understanding of the human health relevance of climate change. Surveys conducted in Canada, Malta, and the United States in 2008 and 2009 found that many people answer closed-ended survey questions in ways that suggest some recognition of the health relevance of climate change, but relatively few people answer open-ended questions in a manner that suggests clear top-of-mind associations between climate change and health (Akerlof et al., 2010). Another survey found that most Americans (61%) have given little or no thought to how global warming may affect people’s health and that relatively few could, in response to open-ended questions, name a single heath harm (27%) or a group of people whose health is most at risk (25%; Maibach et al., 2015).

Similarly, little research has been done on why many in the public seem not to understand the health implications of climate change. One pair of studies found that the American news media rarely reported on this subject, and when they did, the reporting was often inaccurate

(Weathers, 2013; Weathers & Kendall, 2015). 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 nongovernmental organizations attempt to educate the public about climate change, but they typically focus on scientific aspects, harm to nonhuman forms of life (e.g., plants, penguins, and polar bears), or impacts to the environment (Nisbet, 2009). The 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.

Public health professionals have some unique opportunities to help the public and other decision-makers better understand the human implications of climate change, and the scientific consensus about it. Public health professionals are uniquely positioned to explain how the rapidly emerging threats associated with climate change are connected with individual and community health. By communicating the potential of global climate change to harm human health—locally and elsewhere—and by conveying the potential to improve human health through actions that limit climate change and prevent human harm, health professionals can enhance public understanding of the full scope of the problem and help enable appropriate responses by individuals and communities.

One way to do this is through a public health frame. When climate change is framed as a public health issue, the need to invest in adaptation efforts to protect people and their communities becomes an important and unavoidable part of the story. The specific climate-related health risks vary by region, but the risks in most communities include reduced air quality and more extreme storms, floods and storm surges, heat events, wildfires, landslides, vector-borne diseases, and allergic reactions. Unlike limiting climate change, which is inherently a global challenge, actions to protect against health risks are inherently local. Public health officials can help citizens prioritize and choose among responses to these threats. A focus on adaptation can help move the community dialogue about climate change from the realm of global abstraction to the realm of local reality.

**Framing Climate Change as a Public Health Problem May Enhance Public Engagement**

Research over the past several decades has shown that how experts, policymakers, and journalists “frame” an issue (i.e., how they mentally organize and discuss the issue’s central ideas) greatly influences how the public understands the nature of the problem, the personal relevance or societal importance of the problem, who or what they see as being responsible for the problem, and what they feel should be done to address the problem (Nisbet, 2009; Price, Nir, & Capella, 2005; Scheufele, 1999). However, the way climate change has traditionally been framed—as an environmental problem—tends not to engage members of the public, at least not adequately. When climate change is framed as an environmental problem, this interpretation likely distances many people from the issue and contributes to a lack of serious and sustained public engagement necessary to develop solutions (Maibach, Nisbet, Baldwin, Akerlof, & Diao, 2010). 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; Sarfaty & Maibach, 2015).

Framing, then, is a central process by which public health professionals can link messages and recommendations about climate change to their audience members’ deeply held values and beliefs. By defining or “framing” the relevance of climate change in ways that connect to the core values of specific audience segments—and repeatedly reinforcing that information through a variety of trusted sources and networks of recruitment—purposive communication can foster enhanced public engagement with the issue. Using a health frame may help encourage public engagement with climate change, particularly given evidence for this frame’s positive effects on public opinion and perceptions related to climate change (Feldman & Hart, 2018).

A public health frame for climate change (i.e., making the case that climate change is a major threat to people’s health and wellbeing) has potential to engage a much broader cross-section of the American public than has previously been engaged in the issue. Suggesting a frame that resonates with peoples’ broadly shared values—such as health—helps people ground their understanding of an issue in the context of their previously existing, carefully considered, and deeply held belief systems and motivations (Price & Tewksbury, 1997; Scheufele & Tewksbury, 2007). The health frame also helps connect the complex and poorly understood topic of climate change to risks that the public already understand and accept as important, such as asthma and other respiratory problems, vulnerability to extreme heat, food-borne illness, and infectious disease. The health frame also has the potential to shift the climate dialogue from one based on environmental values to public health values, which tend to cut across ideology and partisanship (Akerlof et al., 2010; Kotcher, Maibach, & Choi, 2019; Maibach, Roser-Renouf, & Leiserowitz, 2009). The public health frame also enables a new and highly respected group of voices—which includes doctors, nurses, and public health officials—to engage new segments of the public. And finally, the frame moves the location of impacts closer to home, emphasizing the risks to vulnerable people, such as children, the elderly, and the poor.

**A public health frame can convey local relevance**. To most people, the problem of climate change is distant and abstract, while human health impacts are local and concrete. About half of Americans, for example, believe that global warming will cause great harm to the natural environment (52%), and future generations of people (52%). However, fewer believe that the world’s poor (44%), people in developing countries (42%), people in the United States (30%), or they themselves (14%) will be harmed a great deal (Leiserowitz et al., 2019). In other words, people are more likely to perceive climate change impacts as a threat to plants and animals, to people in other parts of the world, and to future generations, but not as a local issue affecting themselves, their family, and their community.

Risk communication research has shown that an individual’s personal sense of risk as the most powerful motivator of behavioral change (Hale & Dillard, 1995; Witte & Allen, 2000); people are more likely to recognize and act on risks that are perceived to be close to home. Public health organizations are well-positioned to demonstrate that the health risks of climate change are indeed close to home, wherever that home may be. National public health organizations can highlight the current impacts of climate change on human health in each region of the country. State and local public health organizations, in turn, can localize this information to the greatest extent possible.

By framing climate change as a local public health issue, it is possible to replace people’s mental associations of climate change as being geographically and socially distant with more proximate and relevant mental associations such as the risks to children, the elderly, and the poor in their own communities and across the United States. Kotcher et al. (2019) sought to assess how people respond to information about the neurological health harms of air pollution from fossil fuels, which are intricately linked to climate change. Across all subgroups examined, participants were most concerned by a message about the neurological impacts of air pollution on infants and children, including all three statements that referenced neurological impacts on infants and children. Findings from this study build on the body of literature illuminating the value of climate change messages framed as a public health issue. Americans who understand that climate change is harming people here in the United States (rather than only in nations far away) and now (rather than at some time in the future, if at all), are more engaged in personal actions and more supportive of climate change policies (Roser-Renouf, Elligers, Maibach, Colon, & Li, 2012). A focus on the local health consequences of climate change is likely to enhance—and sustain—public engagement on the issue, and thereby facilitate meaningful public dialogue about the problem and opportunities for solutions. Conveying local health relevance may be particularly important in encouraging public support for adaptation measures to avoid health risks associated with climate change.

**A public health frame can convey additional benefits of taking action**. Many actions taken to address climate change create “win-win” situations in that they create important public health benefits. For example, urban reforestation helps limit the urban heat-island effect, making cities safer for vulnerable people (and more pleasant for everyone) during extreme heat events, thereby reducing heat deaths and illness. Other steps taken to address climate change also work to reduce leading causes of death and illness including obesity, physical inactivity, unhealthful diets, asthma and other chronic conditions including heart disease and cancer, transportation-related injuries, and death. Examples include programs and policies that make it easier for people to walk, cycle, and take public transportation (Maibach, Steg, & Anable, 2009).

People across the continuum of climate beliefs respond positively to the concept of health cobenefits associated with taking action to limit global warming (Maibach et al., 2010; Myers, Maibach, Roser-Renouf, Akerlof, & Leiserowitz, 2013). For example, most Americans endorse the following statements: (a) “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.” (b) “Cleaner energy sources and more efficient use of energy will lead to healthier air for children and adults to breathe.” (c) “Improving the design of our cities and towns in ways that make it easier to get around on foot, by bike and on mass transit will reduce the number of cars and help people become more physically active, lose weight.”

A focus-group based research study conducted by the CDC also found that individuals embraced information about climate change that used a health cobenefits frame (Sapru, Telfer, Luber, Price, & Ryan, 2010). Recommended behaviors were seen to benefit the individual as well as convey specific information about what the individual could do to mitigate the effects of climate change. A focus on the cobenefits of climate change prevention behaviors contained messages that convey the ways that climate change mitigation behaviors—such as driving less, eating less processed food, and using energy saving light bulbs—can have benefits like reduced stress, improved health, and cost savings.

Moreover, people tend to respond better to positive information than negative information (Monahan, 1995). Therefore, highlighting the health benefits associated with taking action against climate change—including benefits that have nothing to do with climate change per se—is a useful way of accentuating the positive, giving people important additional reasons to support helpful programs, policies, and individual actions. For example, the American Lung Association (2010) in California has documented the significant public health gains that Californians will enjoy if their state implements the Vision California “mixed growth” and “growing smart” initiatives. Their data show that the sustainable community and transportation development options proposed for the next two decades will help clean the air, reduce pollution-related illness and death, and avoid significant health costs, benefits that are broadly supported by all Californians.

**A public health frame can elicit support for mitigation and adaptation**. When asked what questions they would pose to a global warming expert, if given the chance, many Americans expressed an interest in asking what harms global warming will cause (74%) and when it will begin to harm people (71%; Leiserowitz, Maibach, Roser-Renouf, & Smith, 2011). Therefore, the public health perspective on climate change is likely to be useful to a wide range of audiences, especially audiences in the middle of the climate change belief continuum who are most interested in learning more about the potential impacts of climate change.

Maibach et al. (2010) conducted a study to systematically understand how segments across the climate belief spectrum respond to information about the health risks of climate change and the benefits to health that may result from societal action on the problem. Respondents were asked to read “a brief essay about global warming” designed to frame climate change as a human health issue. The health benefits mentioned included cleaner air to breathe and cleaner water to drink, healthier food to eat, fewer cars on the road, and more pedestrian- and bicycle-friendly communities. All audience segments responded positively to the benefits section of the essay, rating this information on average as compelling and useful.

In a randomized message test experiment, more than 1,000 nationally representative survey participants read uniquely framed news articles about climate change that emphasized either environmental, public health, or national security aspects of climate change (Myers, Nisbet, Maibach, & Leiserowitz, 2012). Across all of the audience segments, the news article about the public health implications of climate change was the most likely to elicit emotional reactions consistent with support for climate change mitigation and adaptation. Recent research, however, found that exposure to competing climate denial messages has the potential to negate the benefit of public health–framed messages (McCright Charters, Dentzman, & Dietz, 2016).

More recent research has examined how to effectively reframe the connections between climate change, human health, and ocean health. In this research involving 500 subjects recruited from among passengers on a ferry boat in Seattle, Washington, participants were randomly assigned to two frame conditions in which they read presentations that defined the impact of climate change on oceans. In the first condition, the consequences of climate change were framed in terms of their risks to marine species such as oysters. In the second condition, climate change was framed in terms of risks to humans who may eat contaminated oysters. The framing of ocean impacts in terms of risks to human health appeared to depoliticize perceptions. In this case, the human health framing condition had no discernible impact on the views of Democrats and Independents, but it did influence the outlook of Republicans; right-leaning subjects in the human health condition were significantly more likely to support various proposed regulations of the fossil fuel industry (Schuldt, McComas, & Byrne, 2016).

**Public Health Professionals as Climate Change Communicators**

A representative national survey of local public health officers conducted in 2008 found that the majority of local public health officials in the United States are aware of the growing human health risks associated with climate change (Maibach et al., 2008). Specifically, many of these health officers reported that they are already seeing the human health impacts of climate change in their jurisdiction and that they expect these impacts will get worse over the next 20 years. The most commonly reported current climate change health impacts were heat-related illnesses (56%), storm- and flood-related health impacts (47%), drought- and fire-related health impacts (47%), and vector-borne infectious diseases (42%). More than half of the health officials (56% to 73%) indicated that they anticipate these health problems will become more common in the 2020s and 2030s in their jurisdiction as a result of climate change. Overall, 60% reported that their jurisdiction would experience serious public health problems as a result of climate change over the next two decades. Relatively few of these health officials, however, had begun communicating about these risks with members of their community.

A replication of this survey showed that little had changed over 4 years: rates of health impacts from climate change remained high, while little public health programming had been developed to address the issue (Roser-Renouf et al., 2012). Specifically, public health departments have significantly fewer programs now than they did 4 years ago in the programmatic areas that are likely to be impacted by climate change. The average number of programs within the health department addressing the health issues associated with climate change impacts decreased from 7.7 programs to 5.8 programs—a 24% decrease. Mitigation efforts have also decreased: In 2008, two-thirds of public health departments offered at least one program that promoted mitigation actions, such as conserving energy, using mass or active forms of transportation, or consuming sustainable foods; in 2012, the proportion had decreased to 45%.

An unpublished survey of public health information officers (Maibach, 2010)—conducted during a plenary presentation at the 2010 annual meeting of the National Public Health Information Coalition—showed that more than three quarters of the information officers reported that they expect to see one or more serious public health problem as a result of climate change in their jurisdiction over the next 20 years (77%), and they feel that it is appropriate for their organization to communicate with external audiences about the public health implications of climate change (76%). However, fewer than one third reported having communicated with external audiences about the public health implications of climate change over the past 12 months (30%), or that the issue was likely to become a higher priority in their organization over the next 12 months (29%). Among the minority who were communicating about climate change with external audiences, the most commonly reported were other government agencies (13.6%), the general public (11.2%), elected/appointed government officials (9.6%), news media (4%), and members of the business community (1.6%).

Clearly, public health professionals understand the human health implications of climate change and, to some extent, are already engaged in addressing this problem. However, much more is needed. Public health professionals are uniquely positioned to explain how the rapidly emerging threats associated with climate change are connected with individual and community health and wellbeing. By communicating the potential of global climate change to harm human health, and by conveying the potential to improve human health through actions that limit climate change, they can enhance public understanding of the full scope of the problem, and help enable appropriate responses by individuals and communities.

**Communicating About Climate and Health**

To enhance public engagement in climate change, health professionals should be informing people about its health relevance. Understanding that climate change is harmful to people—not just to the natural environment—is strongly associated with supporting societal responses to addressing climate change, and with political (Roser-Renouf, Maibach, Leiserowitz, & Zhao, 2014) and consumer advocacy (Roser-Renouf, Atkinson, Maibach, & Leiserowitz, 2016) to encourage societal responses. In fact, people who feel they have directly experienced the consequences of climate change are more likely to hold firm convictions that it is real (Akerlof, Maibach, Fitzgerald, Cedeno, & Neuman, 2013; Myers et al., 2013). Health professionals can play an important role by communicating these key concepts through the following three simple, important messages.

**There is scientific consensus about human-caused climate change**. The majority of the public is unaware that there is a scientific consensus about human-caused climate change. While recent studies have shown that 90% to 100% of active climate scientists are convinced that the planet is warming as a result of human activity (Cook et al., 2018; Powell, 2016), only about half of American adults believe that “most scientists think global warming is happening,” and only 17% estimate the consensus at 90% or higher (Leiserowitz et al., 2019).

Although more research is needed, several studies suggest that when people are told that there is a consensus among scientists about human-caused climate change, their understanding changes (Lewandowsky, Gilles, & Vaughan, 2013; Myers, Maibach, Peters, & Leiserowitz, 2015; van der Linden, Leiserowitz, Feinberg, & Maibach, 2015). For example, a presentation of the following statement increases the proportion of people who believe there is a consensus from about 60% to about 80%: “Based on the evidence, more than 97% of climate experts are convinced that human-caused climate change is happening” (Myers et al., 2015). 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.

**Climate change is harming people’s health everywhere**. 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 may refer to the way that more-severe heat waves due to climate change are contributing to poor air quality and resulting in an increased occurrence of serious respiratory disease.

In addition, 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.

Health professionals are in a unique position to educate the public about the health relevance of climate change. In a recent study of Americans (Maibach et al., 2015), primary care physicians were found to be the most trusted sources for health information related to global warming, with 49% of respondents reporting that they “strongly” or “moderately” trusted their doctor, and the CDC was the next most-trusted source—tied with friends and family members at 41%. As trusted members of the community, health professionals can convey the ways in which climate change is already causing human health effects and how these effects are likely to worsen unless actions are taken to address climate change. They can also communicate about the cobenefits to public health resulting from actions that address climate change.

**Actions will limit climate change and make communities healthier**. Focusing on solutions can bring people together, even when the underlying ways of thinking may differ (Johnson, 2012). 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 (Roser-Renouf et al., 2014).

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. For example, encouraging people to walk or bicycle rather than drive improves their health and reduces use of fossil fuels. Buying locally grown fresh produce helps reduce both fat intake and long-distance food transportation using fossil fuels.

Public health professionals should view their work on climate change as a form of civic education and engagement, empowering, enabling, motivating, and educating the public around not just about the technical but also the political and social dimensions of climate change. Importantly, civic education and engagement are as much about informing the public as it is about also informing experts and decision-makers. Education should be viewed as a two-way process in which experts and decision-makers seek input and learn from the public about preferences, needs, insights, and ideas relative to climate change solutions and policy options. There is also a need to recruit and train opinion leaders, highlight new participatory models for gathering and disseminating climate change news, and for investment in deliberative contexts such as public meetings where citizens can learn, debate, and connect (see Nisbet, 2010). With limited budgetary resources in mind, these initiatives are best focused on states, regions, or segments of the public that have the greatest need for information about climate change, either because of their political context and/or because of their vulnerability to specific climate change impacts.

**Conclusion**

The activities described in this chapter are best considered an exploration of the premise that public health professionals should engage in climate change communication for a variety of reasons, not the least of which is that climate change represents a profound threat to human health and wellbeing. Framing theory suggests—and research supports—the value of public communication that clarifies the public health implications of climate change. Given the magnitude of the public health threat and the relative lack of action by our nation’s leaders to address it, there is a pressing need for further research and evaluation focused on how to motivate and enable public health leaders to embrace this issue in a manner commensurate with the threat, and the opportunity.

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1. **A few points that communication on climate change could learn from the Covid-19 crisis**

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The year 2019 saw the rise of climate activism across the world. Greta Thunberg was named TIME Magazine’s ‘Person of the Year’, and in pretty much all of the world’s capitals, scores of young people were demonstrating and demanding more radical action. Every week they lamented that government leaders were not listening and not taking action. Every week they insisted that emergency measures were needed to confront the ‘climate crisis’. Every week they shouted loud and clear that more attention had to be given to scientific alerts and that we should listen to scientists and unite behind science. ‘I want you to panic’, said Greta Thunberg in a famous address at the World Economic Forum in Davos in January 2019.

A bit more than a year later, world leaders and business executives eventually panicked. Not because of climate change, but because they had seen a black swan. In prospective theory, a black swan is an event whose likelihood is very low, but whose consequences are devastating (Taleb, 2007). Of course the pandemic could have been predicted, of course governments had been warned, of course Bill Gates had alerted about it in a TED talk. Still: governments were caught off-guard by the crisis. Many governments held strategic oil reserves but most didn’t have enough stocks of oil.

Climate change is not a black swan: it is actually the opposite of a black swan. We know for certain that climate change is there, we know its impacts, its costs, pretty much everything. And we have known most of this for decades: the first Assessment Report of the IPCC was approved by governments in 1990.

The year 2020 will probably stand out as a year where greenhouse gas emissions were historically low. And this is not because governments had taken radical action to curb them. This is because they were determined to stop the spread of the virus, at all costs. Thousands of flights were cancelled, schools and shops were closed, industrial production was slashed, two third of the world’s population were confined at home. The whole economy came to a standstill.

Most of these measures resulted in very significant cuts in greenhouse gas emissions and atmospheric pollution. Estimates by Carbon Brief reckon that greenhouse gas emissions in China were down 25% in February 2020, while fine particles levels were down 20%-30% across the country (Myllyvirta, 2020). Global air traffic was down by two thirds in March, with many airlines on the verge of bankruptcy. In Europe, greenhouse gas emissions were down 60% in March 2020 – nowhere in recent history had such a decline been achieved. Some economists posited that the crisis might have induced a sustained decline of emissions, and that 2019 could go down in history as the year when world’s greenhouse gas emissions reached their peak (De Perthuis, 2020; Liebreich, 2020). The year 2020 will outperform the most ambitious objectives of the Paris Agreement, which require a yearly reduction of greenhouse gas emissions between 2.7% (to achieve an objective of a maximum temperature rise of 2°C by 2100) and 7.6% (to achieve an objective of 1.5°C). Public health measures had a much more significant effect on global emissions than climate policies.

Perhaps surprisingly, some of these measures even induced co-benefits for human health, unrelated to the coronavirus. Marshall Burke, from the Earth System Science Department at Stanford University, calculated that ‘reductions in air pollution in China caused by this economic disruption likely saved twenty times more lives in China than have currently been lost due to infection with the virus in that country’ (Burke, 2020). In other countries, it is likely that reduced road traffic will save many lives that would have been claimed by car accidents. In March 2020 in France, the number of people killed in car accidents was down 40%.

Though the global impact of the pandemics on climate change will be difficult to assess, given the far-reaching economic, political and social implications of some of the containment measures, one thing is certain: it is possible for world leaders to take urgent and radical measures in the face of an imminent threat, and for the populations to accept them. Yet we haven’t been able, so far, to take similar measures to confront climate change. Until the pandemics outbreak, and despite many calls from activists and scientists alike to declare a state of ‘climate emergency’, emissions were keeping on rising on a pace of a 1% yearly increase.

While we were ready to treat the Covid-19 as a major emergency, obviously we were not ready, or not willing, to do the same for climate change. Covid-19 was – and rightly so – treated as a major emergency, with immediate application of radical measures, following scientific advice, to contain it. The threat of climate change has not induced such radical measures so far. To put simply: we are much more afraid of the Covid-19 than we are of climate change. And this raises a series of questions regarding the way we communicate about climate change.

In no way are we saying here that we shouldn’t be afraid of Covid-19, or that it is a minor threat. On the contrary: the radical responses implemented by many governments are impressive – albeit sometimes too tardy – and we believe this holds lessons for our communication on climate change. In the midst of the sanitary crisis, many were prompt to point out the similarities between climate change and the pandemics. Both were global crises, requiring urgent responses on the basis of scientific advice. Therefore, many activists were quick to suggest that the measures implemented to fight against the spread of the pandemics had to be replicated to slow down climate change: ‘we must respond to climate change like we’re responding to coronavirus’, argued Zero Hour founder Jamie Margolin in *Teen Vogue* magazine[[1]](#footnote-1). Others went a step further and claimed the pandemics was an ‘ultimatum of nature’, a ‘revenge of the Earth’ or even ‘good news for the environment’. #WeAreTheProblem was a popular hashtag on social media as many countries were in lockdown, as if the pandemics were eventually a way for nature to reclaim its rights.

In this chapter, we argue that climate change and the Covid-19 pandemics are not similar crises, even though they present some striking similarities. This has important consequences for the response measures to be deployed, but also for the way we communicate about climate change. Here we try to outline some early lessons from the sanitary crisis to improve our communication on climate change.

***Why are we more worried about the virus than about climate change?***

First, if we are we so much more afraid of Covid-19 than we are of climate change, this is probably because we’re afraid of getting sick ourselves. A central element of the response lies in the proximity and immediateness of the threat. We are all afraid (or should be afraid) of contracting the virus personally, while climate change still seems perceived as a concern for others – for the next generation, or far-away countries. Celebrities and heads of states were sick because of Covid-19: if they were affected, then no one was safe, irrelevant of how wealthy and powerful you were.

We are well aware that Covid-19 is a threat for ourselves, while climate change remains perceived as a threat that will mostly affect others, in future generations or in far-away countries. We are afraid of getting contaminated with the virus, while we don’t see climate change as contagious. Psychological research has shown that contagion – or the threat of contagion – was a powerful driver of new social norms, which we adopt to protect ourselves (Sperber, 1996). With climate change, we maintain a form of psychological distance (Trope and Liberman, 2010). In that regard, the experience of public health campaigns against HIV-AIDS is enlightening. Public health campaigns to promote safe sex where only really effective once the virus had reached heterosexual couples in industrialised countries, and that people were afraid of contracting the virus themselves (Green and Witte, 2006).

Here it is important to ponder as to why we maintain such psychological distance with climate change, and the responsibility we hold as researchers. Climate models are calibrated on the long-run, and policy objectives target 2050 or 2100. Rather than putting forward a short-term objective, the Paris Agreement insists on a long-term objective, a maximum temperature by 2100, a date that far exceeds the lifetime of much of those who are reading the present text – and certainly of all those who signed the Paris Agreement itself. On the contrary, we were presented with daily curves of the Covid-19 spread: how many had died, how many were in intensive care in hospitals, etc. We had daily figures for the Covid-19; we have curves that stretch until the end of the century for climate change.

Similarly, while industrialised countries are badly hit by the pandemics, research has consistently stressed that countries most vulnerable to climate change impacts were developing countries, or that the poorest, most marginalised populations would be disproportionately affected by climate impacts. While these facts are indisputable, they also create a social distance between climate change and those who should act to contain it. We can expect an immediate benefit for ourselves of the measures we take against the coronavirus; we can’t expect the same for climate change. The effect of the measures we take against climate change will materialise only in the future, and first in developing countries.

This suggests that we should insist more on the immediate consequences of climate change, and less on the long-term objectives. In an op-ed published in The Guardian in late January 2020, George Monbiot suggested dropping these long-term objectives – which he found to be counter-productive – to adopt instead a maximalist approach (Monbiot, 2020). This maximalist approach is the one adopted by most governments in the face of the Covid-19 crisis: they don’t seek to reduce the infection rate by a certain percentage, but rather to ‘flatten the curve’ as much as possible. They don’t seek to achieve a maximum number of deaths, but rather to reduce the death rate as much as possible. It would seem shocking to do otherwise; yet this is what we do re climate change.

And this is how the radical measures of containment are justified – without these, there’s a fear that the crisis would become unmanageable for hospitals and health services.

***Climate change as a health issue***

Covid-19 is a zoonosis, meaning a disease transmitted to humans by wild animals. UN Environment reckons that about three quarters of emerging infectious diseases are zoonoses (UNEP, 2016), which hints at the massive health impacts of biodiversity loss. Furthermore, recent research shows that the propagation of the virus could have been accelerated by atmospheric pollution (Ogen, 2020). In that sense, the coronavirus had a strong pedagogical virtue: ordinary people could realise that environmental issues had very direct consequences on the everyday lives.

The impacts of climate change on health are no less important: the spread of infectious diseases like malaria or dengue depends heavily on heat and humidity, which are both deeply affected by climate change. In the worst case scenario, the melting of the permafrost could release scores of unknown viruses and bacteria (Gemenne, Rankovic et al., 2019).

Yet environmental disruptions, be they related to biodiversity or climate change, remain mostly perceived as environmental issues, affecting primarily ecosystems. Until the outbreak of the coronavirus crisis, the impacts of climate change on public health remain little emphasized in public debates. Yet there is ample scientific evidence that climate change bears some significant health impacts. Every year, the annual report of *The Lancet Countdown Initiative* reviews these impacts, which range from cardio-vascular troubles to allergies and infectious diseases, such as dengue or malaria (Watts et al., 2019). The World Health Organization reckons that climate change could claim 250 000 additional lives per year between 2030 and 2050[[2]](#footnote-2). The frequency of studies on the health impacts of climate change published in peer-reviewed scientific journals has also increased consistently over the past 25 years (Verner et al., 1016).

The same can be said for the media, which play a central role in the public understanding and perceptions of climate change. The framing of the issue by the media has a critical influence on the perception of urgency and willingness to respond (Myers et al., 2012). Research has consistently shown that the arguments about the public health impacts of climate change were amongst the most persuasive, and most likely to induce behavioural changes (Maibach et al., 2018). Obviously the Covid-19 crisis provides empirical evidence of this: people were ready to drastically change their behaviour and stay at home to protect their health. And they were doing so because they felt this could provide immediate benefits for their health: it could prevent them from getting infected with the virus.

An in-depth analysis of newspaper coverage on health and climate change from 2009 to 2017, based on a quantitative and qualitative analysis provided by the Lancet Countdown, allows for the observation of a significant and constant increase of newspaper articles covering the health - climate change nexus. Despite the fact that articles are mostly clustered around international political events, great attention is also garnered around the release of scientific reports or publications, as well as various other events. This means that the ‘media window’ for coverage of the climate-health nexus has expanded considerably in the last few years. We expect that this window will broaden even more after the Covid-19 crisis.

It will be crucial that such arguments are given more emphasis in public debates on climate change: they allow for the reduction of the psychological distance highlighted above (Depoux et al., 2017).

***An important caveat: climate change is no crisis***

A great lesson of the crisis is that governments can implement urgent, radical and costly measures in the face of an imminent danger. Therefore, it would be tempting to assume that similar measures could be replicated against climate change, as they provide exactly the emission reductions that would be needed under the Paris Agreement. Yet this would be an important mistake: the reason why confinement measures are widely accepted – though not always perfectly applied – is also because they are temporary. If radical confinement measures, such as curfew or limitation of air travel, were permanent, then it is likely they would be less accepted by the population. In that sense, we should be very careful about treating climate change as a ‘crisis’: a crisis is temporary, and suggests a return to normality at the end of the day. Global warming is an irreversible transformation of the Earth climate. There will be no return to ‘normal’: temperature will not decrease, sea-level will not go down – at least not before a really long time – and there will be no vaccine against climate change.

Thus the measures that need to be taken to address climate change cannot be temporary: they need to become permanent features of our economy, politics and way of life. Therefore, one should not make the mistake to assume that radical measures taken against Covid-19 could easily be replicated against climate change: the former were only accepted because they were of a temporary nature. This is a clear limitation in the inspiration that can be drawn from these sanitary measures for climate policy. There will probably be, however, some behavioural change that will persist beyond the crisis: washing hands more frequently is perhaps the most obvious example of such change. The limitation of unnecessary travel, or a more frequent use of teleworking, might be other examples.

But the idea that we should consider the pandemics as a ‘general rehearsal’ before climate change can be deeply counter-productive: if people are under the impression that the fight against climate change requires the economy to be on standstill, they are likely to reject any measure taken against climate change in the future. Surely one will not look back fondly on the confinement period as the golden age of the fight against climate change.

Quite on the contrary, we should be looking here at communication campaigns that managed to induce permanent behavioural changes: here the campaigns against HIV-AIDS are probably the most obvious candidate (Noar et al., 2009), but many other public health campaigns have also managed to achieve long-term or permanent behavioural changes (Hornik, 2002). In an important article, psychologists  [Kaitlin Raimi](http://www-personal.umich.edu/~kraimi/), [Paul Stern](https://www.wilsoncenter.org/person/paul-c-stern) and [Alexander Maki](http://www.vanderbilt.edu/viee/profiles/Alex-Maki.php) suggest that it is helpful to compare climate change to medical diseases (Raimi et al., 2017)

***Don’t bet too much on individual action though***

Individual knowledge is often assumed to be a key factor in the mobilisation against climate change – education, for example, is often presented as a crucial weapon in the fight against climate change (Anderson, 2012), as if action would only be taken once everyone would be knowledgeable about climate change and its impacts. Yet measures against the coronavirus pandemics were imposed on a top-down basis, not on a bottom-up basis: people didn’t decide to confine themselves spontaneously. People had little medical knowledge about the virus, and yet accepted the measures in the face of an imminent danger. This holds an important lesson for climate change: if we count on every individual to do one’s part, then radical action might just never materialise. Top-down measures will be needed: despite the many actions and measures taken spontaneously by civil society, legal frameworks will need to be implemented by governments.

Here we find a crucial element emerging: communication on climate change needs to address not just populations, but also governments. While we used to consider that the health arguments was mostly persuasive for populations, we realise that it is also extremely persuasive for governments: they created an economic crisis to spare lives.

***By way of conclusion: many lessons to draw***

Climate change and the Covid-19 pandemics share many characteristics: both are of global nature, requiring radical responses on the basis of scientific assessments. In both cases, these responses are required first and foremost to protect the most vulnerable. In that regard, the confinement measures taken against Covid-19 represent a remarkable display of solidarity: whole countries were in complete lockdown to protect the elderly and those with a fragile health.

There are important lessons to take away from the Covid-19 crisis for the communication of climate change. Let’s not assume however that the measures deployed against the pandemic can be replicated as such to fight climate change. Despite their similarities, climate change will require different solutions. But the coronavirus crisis tells us it is possible to take urgent, costly and radical measures, and gives some hints as to how these can be accepted by the population. In that regard, one would well advised to look at how health information campaigns managed to induce long-term behavioural changes. But what is new, here, is the realisation that health concerns could also induce radical changes from governments. Their role will be crucial to achieve the objectives of the Paris Agreement.

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1. **Communicating the health co-benefits of climate change mitigation to households and policy-makers**

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**Introduction**

Under the Paris Agreement 186 parties, meaning the vast majority of the world’s nations, have agreed to limit global warming to well below 2°C and possibly 1.5°C above pre-industrial levels to avoid the most damaging impacts of climate change (UNFCCC, 2015). Current Nationally Determined Contributions (NDCs) to climate change mitigation under the Paris Agreement would likely limit warming below 3.2°C (Climate Action Tracker, 2019). For global warming not to surpass the 1.5 °C, society would need to cut emissions by about half by 2030 and be carbon neutral by 2050 (IPCC, 2018). Thus, far more than currently promised by the world’s nations needs to be done to mitigate climate change in line with the targets set by the Paris Agreement.

Climate change mitigation policies often focus on the sectors which generate emissions: air travel, cars, housing, industry, agriculture etc. This is politically understandable, but leaves a key driver of emissions out: individual households. They control up to 70% of emissions through their consumption behaviour and lifestyles (Stern et al. 2016, Aall and Hille, 2010; Hertwich and Peters, 2009). As an example, the emissions of a large SUV can be attributed to the company who produces the car. Yet, looking at it from the demand side, it is the individual through her/his decision to buy such a car with a large carbon footprint. It is also the individual through his/her usage of this car, e.g. for short distances or driving at high speed which determine the emissions further.

This chapter proposes to put the individual as an important player squarely in the centre of climate policy and communication. First, it examines several specific psychological barriers in communicating individual climate change mitigation behaviour and related policies. Second, it describes how health co-benefits can help to overcome these barriers conceptually. Third, it reviews the scientific evidence on whether communicating health co-benefits to promote climate change mitigation is actually effective. Finally, it reflects on conclusions for both households and policy makers.

**Why is it difficult to communicate climate policies in the public?**

The psychological problem which needs to be addressed by any climate communication strategy is multifaceted, and includes our inherent tendencies (i) to be loss averse and climate change mitigation is often framed around losses (“framing effect”), (ii) to discount positive as well as negative effects in the far future (“myopia effect”), and (iii) to free-ride in classic commons dilemmas (“free-ride-effect”) (cf. Gifford, 2011; Rachlinski, 2000).

1. **The Framing Effect**: Climate policies usually go along with the idea of giving up or significantly cutting down benefits western society has grown accustomed to such as long-distance holiday flights, emission-intensive cars or the regular consumption of red meat. Telling people that they will need to accept the loss of something they already owned, however, is difficult: people generally are loss averse, meaning they place higher value on avoiding the loss of 5 € than on gaining the equivalent amount of 5 € (Kahneman & Tversky, 1979). Similarly, a message framed around losses (e.g., “With option A, 400 people (out of 600) will die.”) will be much less acceptable to most people than the same message with identical content framed around gains (“With option A, 200 lives (out of 600) could be saved.”; Tversky & Kahnemann, 1981). This so-called framing effect, one of the most well-researched psychological phenomena, is the reason why some climate communication strategists have warned against framing climate policies around losses, arguing for gain-frames instead (e.g., technological innovation; Van der Linden, Maibach, & Leiserowitz, 2015), with some experimental support for such strategies. For example, Spence and Pidgeon (2010) found that gain frames around climate change messages led to higher increase in positive attitude towards climate change mitigation than loss frames. Gifford and Comeau (2011) report an increased willingness to engage in mitigation action in a large Canadian community sample with a message framed around motivation as opposed to sacrifice. Similarly, a study from Australia demonstrated the effectiveness of framing emission cuts around a “foregone gain” – a smaller rise in future income – rather than a loss (Hurlstone, Lewandowsky, Newell, & Sewell, 2014).
2. **The Myopia-Effect**: Most people are – under many circumstances - more interested in immediate gains than future ones (“discounting of delayed rewards”; Kirby, & Herrnstein,1995). At the same time, losses in the far future are psychologically distant and are equally “discounted” in comparison to immediate losses (Green, Myerson, Oliveira, & Chang, 2014). This means people are not very far-sighted, but rather myopic. This is further complicated by the fact that with climate change, the ones affected by today’s actions may not be the ones taking these actions (“social” or “intergenerational discounting”; Jones & Rachlin, 2006) as well as the inherent uncertainty in the future effects of today’s actions (“discounting of probabilistic rewards”; Myerson, Green, Hanson, Holt, & Estle, 2003). The global youth movement inspired and led by Greta Thunberg highlights that climate change essentially is an intergenerational dilemma. Today’s adult generation needs to take action to ensure the habitability of the planet for future generations.
3. **The Free-Ride-Effect**: Climate change is a classic commons dilemma - everyone’s contribution is important. Yet, action by only a few will hardly suffice to counteract the worst climate change outcomes. Therefore, an individual’s actions may appear insignificant. So larger amounts of people may become demotivated, if some are tempted to free-ride on the contributions of others. In this sense, every individual’s contribution is highly significant, as it creates a ripple effect. Such a demotivation effect is well described in situations in which the shared outcome for a larger group of people depends on each member’s contribution, especially if contributions are made anonymously. Contributions may either consist of creating a resource, or taking from a limited resource without overusing it. For climate change, the right to emit carbon into the atmosphere could be seen as a limited resource (Ostrom, Dietz, Dolšak, Stern, Stonich, & Weber, 2002). Climate change is highly complicated in this sense, as the relevant players are not a select few, but humanity as a whole with all of their differing viewpoints and agendas. A higher likelihood for most people to contribute to a common’s dilemma can be observed if they know or trust that others will contribute as well (e.g., Aitken, Chapman, & McClure, 2011). This highlights the importance of trust and cooperation for climate change strategies to be effective.

**How can health help to communicate climate change mitigation?**

Many individual and policy measures, which are crucial to mitigate climate change, also confer substantial health benefits on individual and population level, so called health co-benefits. A common example for a mitigation measure with an indirect health co-benefits on population level is the decarbonization of the energy and transport sector. As a health effect, this leads to the reduction of morbidity and mortality in the population, because the population is less exposed to health-damaging air-pollution (Markandya et al., 2009). Markandya et al. even modelled, that in countries like China and India saved costs through air-pollution mediated health co-benefits of climate change mitigation measures would outweigh the costs of these measures (Markandya et al., 2018). We call these air-pollution related health co-benefits *indirect*, because the reduction of air pollution on a scale significant to health is not directly accessible for an acting individual. These *indirect* health co-benefits are only achievable through policy measures targeted at energy production or at changing behavior of the majority of a population.

Yet, there are also *direct* health co-benefits, which are accessible at the individual level. For instance, health co-benefits of active modes of transport such as biking and walking instead of using the car or health co-benefits of a healthy, mostly vegetarian diet can be experienced by the individual itself. In the following, we want to focus on such *direct* health co-benefits, because they are especially suitable to solve the psychological barriers to mitigating climate change, described under points i-iii: When communicating the health co-benefits of climate action, a gain frame and not a loss frame is adopted (i). Many health co-benefits can be experienced in relatively short term, such as better cardiovascular fitness, weight loss and better mental health. Thus, the psychological problem of discounting positive (or negative) effects in the future can partially be addressed (ii). Health co-benefits of individual action, even the ones which might occur long-term such as prevention of cardiovascular events, dementia or some cancers, pertain to the individual which has implemented that action. That means that individuals, who want to profit from the health benefits of climate-friendly must engage in the action, and cannot rely on others to do so. Thus, the free-ride effect can be avoided (iii).

As *direct* health co-benefits seem to offer a promising way to communicate climate change mitigation measures we will elaborate on well-established and significant direct health co-benefits, which mainly occur in the transport, housing and food sector.

Transport: A recent review on the health co-benefits of lifestyle-related climate change mitigation strategies in the transport sector has shown, that physical activity from active transport such as walking and biking had the biggest positive effect on health outcomes (Quam, Rocklov, Quam, & Lucas, 2017). By now, the positive effect of physical activity on all-cause mortality is well established (Nocon et al., 2008). Even any kind of regularly accomplished moderate short-term physical activity kept up for about 10 minutes is beneficial (WHO, 2010). For the climate sector this means that active transport in everyday life offers substantial health opportunities. For instance, Maizlish et al. modelled that increasing daily median cycling and walking from 4 to 22 minutes by replacing some care use, could reduce the burden of diabetes and cardiovascular disease by 14% and at the same time save 14% of greenhouse gas emissions in the San Francisco Bay Area (Maizlish et al., 2013). Jarrett et al. modelled that replacing only about a fifth of the daily car use in urban England and Wales by walking and biking would lead to averting health care costs of 17 billion UK £ within the next 20 years due to reduction of prevalence of type 2 diabetes, dementia, cerebrovascular disease, breast cancer, colorectal cancer, depression, and ischaemic heart disease (James Jarrett, 2012). Even the use of public transport is beneficial for health due to the short distances to stations which are usually overcome by walking (Rissel, Curac, Greenaway, & Bauman, 2012). At the same time commuting by other means than the car generally seems to be a predictor for well-being, even when controlling for other e.g. economic predictors (Cloutier et al., 2017). There are conflicting findings concerning traffic injuries, especially cyclist fatalities, depending on the assumptions made (Macmillan et al., 2014; Woodcock, Givoni, & Morgan, 2013). It mainly seems to depend on whether safe and cycling-friendly infrastructure will be provided or if cyclists have to use todays mainly car-friendly streets (Quam et al., 2017).

Food: The dietary transition towards modern diets goes along with higher rates of animal products, higher proportions of refined sugars fats and oils and a higher calorie intake. This leads to an increase in chronic diseases such as obesity, diabetes and cardiovascular diseases as well as some cancers. It also leads to a higher carbon footprint due to livestock-related greenhouse gas emissions, increased processing and packaging of food as well as potentially longer transportation routes (Tilman & Clark, 2014). Livestock is responsible for about 18% of total annual global greenhouse gas emissions. This is about 80% of agricultural emissions (Steinfeld et al., 2006). While productivity improvements and technical innovations can help to keep absolute livestock emissions stay stable under a growing world populations, reduced consumption of ruminant meat and dairy products globally is inevitable for limiting global warming to below 2°C, let alone 1.5°C (Hedenus, Wirsenius, & Johansson, 2014). At the same time, reduced consumption of processed meat and saturated fatty acids from animal products carries substantial health co-benefits. For reduced consumption of processed (and with less evidence) red meat this is in particular a decreasing risk for colorectal cancer (Behrens et al., 2018; Boada, Henríquez-Hernández, & Luzardo, 2016; WHO, 2015). Furthermore, substituting animal-based saturated by plant-based polyunsaturated fatty acids reduces the risk for cardiovascular diseases (Siri-Tarino, Chiu, Bergeron, & Krauss, 2015). Milner et al. found that pertaining to current dietary guidelines in the UK could not only reduce emissions of the food sector by 17 %, but also lead to an increase in life expectancy of 8 months in the UK population over the next 30 years (Milner et al., 2015).

Housing: Main health co-benefits of climate change mitigation measures in the area of housing pertain to insolation measures, which save energy and promote health (Wilkinson et al., 2009). Rodgers et al showed that renovation measures, such as replacement of windows and doors and insulation of walls, lead to a reduction of hospitalization rates in an elderly population over 60 years in the United Kingdom(Rodgers et al., 2018). Positive health outcomes of such housing measures in temperate regions are often associated with improvements of cold-related mortality (Team, 2011; Wilkinson et al., 2009). However, with respect to warmer regions and increasing incidence of heat-waves impacts on heat-related health outcomes are equally important (Loughnan, Carroll, & Tapper, 2015).

Figure 1: Solutions for communicating climate change mitigation provided by *direct* health co-benefits



As Figure 1 shows that *direct* health co-benefits overcome all three of the mentioned psychological barriers to action. Thus, the human health frame to communicating climate change mitigation might be particularly effective to spark individual and collective action. Still, an important question remains.

**What is the** **empirical evidence that communicating health co-benefits can help to promote climate change mitigation?**

Despite compelling reasons to communicate mitigation policy around their health co-benefits, so far there is little research centered around this approach. The little research there is mostly focuses on the “Framing-Effect” (i). This means that researchers look at the effectiveness of a positive health framing. This health framing applied often is about avoiding negative health impacts of climate change (such as avoiding deaths from heatwaves or malnutrition from drought) or looks at *indirect* health co-benefits from air-pollution.

Such existing studies investigating the impacts of framing climate mitigation around health, have yielded mixed results. Among climate change deniers, framing climate change action around the avoidance of health risks proved less successful in increasing intentions to engage in pro-environmental action than a frame around how climate change action would increase interpersonal warmth in society, or a frame promoting economic and scientific development (Bain, Hornsey, Bongiorno, & Jeffries, 2012). Neither health, nor economic co-benefits frames increased policy support, or own behavioral intentions among the US population (Bernauer & McGrath, 2016). On the other hand, a public health frame (compared to risks to the environment, or national security) was most likely to elicit hopeful emotions consistent with support for climate change mitigation, and this was the case across the spectrum of climate change beliefs (Myers, Nisbet, Maibach, & Leiserowitz, 2012). Other studies suggested that the effect of health co-benefit frames might depend on partisanship. Among US citizens, a health frame proved more effective for conservatives to agree that air pollution has harmful effects, while a climate change frame proved more effective for liberals to agree that air pollution has harmful effects, and, likewise, conservatives were more likely to support pollution reduction when in a health frame, while liberals were more likely to support pollution reduction when in a climate frame (Petrovic, Madrigano, & Zaval, 2014).

In sum, in the existing literature, the effectiveness of a health framing appear variable and to be dependent on the specifics of the wording, or potentially also the political background of the respondents. However, most of our knowledge on the effects of a health-framing stems from samples from the United States. Furthermore, most studies use the health framing in a way, that the other two psychological barriers described earlier still remain: Both, avoiding negative health impacts of climate change in the future and benefitting from indirect health co-benefits such as air-pollution, underly the “Myopia-” and the “Free-Ride-Effect”. This might potentially reduce the positive effects of health frames since the motivation to act might arguably be stronger for direct health co-benefits, which can be experienced relatively short-term and accrue to the acting individual only.

Therefore, we tested this proposition in an experimental study within the research project HOPE (Household Preference for reducing greenhouse gas emissions in four European high-income contries). We confronted 308 households from four European countries with strictly direct health co-benefits (Herrmann et al., 2017). Specifically, we showed that additional information about direct health co-benefits provided to half of the sample’s participants from France, Germany, Norway, and Sweden increased household members’ willingness to adopt climate change mitigation action, as well as their simulated carbon emission cuts. Mitigation actions as well as associated emission cuts were individually tailored to the participants’ actual situation and comprised actions within the sectors food, housing, and transport. For options within the sectors food and housing information on health co-benefits yielded a motivational effect: Households receiving the health information reported a higher mean willingness to adopt mitigation actions and a higher percentage of households receiving health information reported the highest level of willingness (very willing) to implement health-related mitigation actions. None of these effects was observed in the transport sector. Providing households with the information on direct health co-benefits resulted in an overall reduction for the simulated overall carbon footprint of -2.70% that was mainly driven by the sector food (-4.45%) (Amelung, Fischer et al., 2019).

In qualitative interviews with a carefully selected sub-sample of households we investigated motivators and barriers for households to change their behavior and especially investigated the differences in between sectors (Herrmann, de Jong, Kowalski, & Sauerborn, 2019). We found many people were aware of health co-benefits. In the food sector, perceptions somewhat differed from literature. For instance, people rather seldomly associated reduced meat consumption to be healthy. Some rather deemed reduced meat consumption and especially vegetarian diets to be unhealthy. Thus, informing half of the participants about the positive health effect of reduced meat consumption, as happened in our study, might be part of the explanation for the differences between the groups. Similarly, in the housing sector some people perceived increased insulation to provoke mold and worse indoor air quality, so that informing about the mostly positive impacts might have made a difference. In the transport sector, health perceptions matched findings in literature, which means that households mostly perceived active modes of transport to be healthier while some individuals also mentioned the negative aspects of traffic accidents or violations. Thus, while the prior knowledge of health co-benefits in both groups could be one explanation, why additional health information did not make a difference in the transport sector, we also made another important finding in both quantitative and qualitative data in the study: In general, the transport sector was the one where people were least willing to change their behavior (Sköld et al., 2018). The qualitative interviews showed, that in this sector people encountered many barriers for behavior change such as time constraints, infrastructural short-comings and needing to change habits (Herrmann et al., 2019). In contrast to that, the food sector was generally the sector, where people were most willing to change their behavior (Bothner, Dorner, Herrmann, Fischer, & Sauerborn, 2019), partly because buying less carbon-intensive food was seen to be rather easy to accomplish.

Thus, results from the HOPE project suggest that for European households, providing information on direct health co-benefits might be an effective strategy to foster climate change mitigation action, especially in the sector food. In comparison to former inconclusive evidence on health framing, the framing around direct health co-benefits might make a difference, because it overcomes not only the usual negative loss-framing of communicating climate change mitigation, but also the “Myopia-“ and “Free-Ride-Effect”. Yet results also show, that in order to achieve transformational change in all sectors mere communication to households will not be sufficient. Policies which support households in changing their behavior, for instance by providing infrastructural conditions which favor healthy and climate friendly behavior are needed as well.

**Conclusions for households and policy makers**

The empirical evidence of the effectiveness of using health co-benefits for stimulating climate friendly individual behavior is scarce and needs to be strengthened. Studies from non-US settings, including middle income countries should be carried out to further prove the effectiveness of invoking direct health co-benefits to promote climate-friendly behavior of individuals. If direct health co-benefits actually motivate households to act climate-friendly and at the same time households need more support from policy makers to actually do so on a large scale, this should provoke policy makers to dare implementing more stringent household-oriented climate policies while ensuring acceptance of such policies by emphasizing their health co-benefits. This reflection is corroborated by the lessons learned from other public health campaigns. The World Health Organization’s tobacco control program can be taken as an especially successful example (Nilsson, Beaglehole & Sauerborn, 2009). It targets both the individual and the policy framework in a multi-faceted approach, reaching from advertising bans and taxation over smoke free environments to cessation programs and mass media campaigns as well as a strict monitoring of progress of these policies (WHO FCTC, 2005). It shows that addressing individuals can only unfold its effects in a strong regulatory and legislative framework. Climate policy, too, should be as multi-faceted and put the household into the heart of a consistent societal mitigation strategy. To gain acceptance among households for such more stringent mitigation strategies, communicating direct health co-benefits seem to be a promising way.

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1. #  Jamie Margolin, “Coronavirus Shows Us Rapid Global Response To Climate Change Is Possible”, <https://www.teenvogue.com/story/coronavirus-response-climate-crisis>

 [↑](#footnote-ref-1)
2. <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health> [↑](#footnote-ref-2)