MENTAL HEALTH AND OUR CHANGING CLIMATE:

IMPACTS, IMPLICATIONS, AND GUIDANCE

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WHY WE OFFER THIS REPORT

When you think about climate change, mental health might not be the first thing that comes to mind. Americans are beginning to grow familiar with climate change and its health impacts: worsening asthma and allergies; heat-related stress; foodborne, waterborne, and vector-borne diseases; illness and injury related to storms; and floods and droughts. However, the connections with mental health are not often part of the discussion.

It is time to expand information and action on climate and health, including mental health. The health, economic, political, and environmental implications of climate change affect all of us. The tolls on our mental health are far reaching. They induce stress, depression, and anxiety; strain social and community relationships; and have been linked to increases in aggression, violence, and crime. Children and communities with few resources to deal with the impacts of climate change are those most impacted.

To compound the issue, the psychological responses to climate change, such as conflict avoidance, fatalism, fear, helplessness, and resignation are growing. These responses are keeping us, and our nation, from properly addressing the core causes of and solutions for our changing climate, and from building and supporting psychological resiliency.

To help increase awareness of these challenges and to address them, the American Psychological Association and ecoAmerica sponsored this report, *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. This is an updated and expanded version of our *2014 report, Beyond Storms & Droughts: The Psychological Impacts of Climate Change*, which explored how climate change can impact mental health and provided guidance to engage the public. This updated report is intended to further inform and empower health and medical professionals, community and elected leaders, and the public. Our websites offer webinars and other resources to supplement this report.

On behalf of the authors, the many professionals who contributed directly and indirectly to this work, and all those involved in expanding awareness of and action on climate and mental health, thank you for taking the time to review and share this important resource. We invite your feedback, and as the field continues to grow, we'll continue to update this work.

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A CLOSER LOOK:

A Clinical Psychologist's Take on Climate Change
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Climate change is a human-caused problem, which is more difficult to cope with than disasters that are beyond human control. Mental health professionals can help give people a sense of power over how they respond.

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The Inuit are a prime example of communities that have experienced the mental distress and loss of cultural identity brought on by a changing landscape and environmental conditions.

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Resilience in the Face of Climate Change
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Research with a diverse sample of youth students, age 11–15, in Boulder, Colorado, showed that youth views of resilience stem from complex social and environmental supports.

Finding a Place for Psychology in Climate Change Deliberations
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New England is an example of vital infrastructure that is at risk from rising sea levels and of opportunities for psychologists to work with professionals in various fields to prepare for the effects.

Our Moral Obligation: The Duty to Warn and Act
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Growing numbers of climate Cassandras are being debilitated by anxiety about future harm to the planet. Where is the collective health effort to address this issue? The time is now for mental health professionals to act.

Throughout the report are six essays from mental health professionals that dive into particular topics of expertise on mental health and climate change.

EXECUTIVE SUMMARY

Thus far, most research and communications on the impacts of climate change have emphasized the physical health effects, while mental health has been secondary. Building upon *Beyond Storms and Droughts: The Psychological Impacts of Climate Change,* the goal of this updated report is to increase awareness of the psychological impacts of climate change on human mental health and well-being. The report provides climate communicators, planners, policymakers, public health professionals, and other leaders the tools and tips needed to respond to these impacts and bolster public engagement on climate solutions.

The impacts of climate change on people's physical, mental, and community health arise directly and indirectly. Some human health effects stem directly from natural disasters exacerbated by climate change, like floods, storms, wildfires, and heatwaves. Other effects surface more gradually from changing temperatures and rising sea levels that cause forced migration. Weakened infrastructure and less secure food systems are examples of indirect climate impacts on society's physical and mental health.

Some communities and populations are more vulnerable to the health-related impacts of climate change. Factors that may increase sensitivity to the mental health impacts include geographic location, presence of pre-existing disabilities or chronic illnesses, and socioeconomic and demographic inequalities, such as education level, income, and age. In particular, stress from climate impacts can cause children to experience changes in behavior, development, memory, executive function, decision-making, and scholastic achievement.

The connection between changes in the climate and impacts on a person can be difficult to grasp. Although people's understanding and knowledge of climate change can increase by experiencing the effects directly, perception, politics, and uncertainty can complicate this link. Psychological factors (like ***psychological distance***), a political divide, uncertainty, helplessness, and denial influence the way people comprehend information and form their beliefs on climate change. Research on the impacts of climate change on human well-being is particularly important given the relationship among understanding, experiencing, and comprehending climate change. People's willingness to support and engage in climate solutions is likely to increase if they can relate them to local experiences or if they see the relevance to their own health and well-being. Additionally, individuals who have higher perceived environmental self-efficacy, or the sense of being able to positively contribute, are more motivated to act on climate solutions (Sawitri, Hadiyanto, & Hadi, 2015).

Climate solutions are available now, are widespread, and support psychological health. Increasing adoption of active commuting, public transportation, green spaces, and clean energy are all solutions that people can choose to support and integrate into their daily lives. These climate solutions, among others, can help to curb the stress, anxiety, and other mental illnesses incurred from the decline of economies, infrastructure, and social identity that comes from damage to the climate.

Major acute mental health impacts include increases in trauma and shock, post-traumatic stress disorder (PTSD), compounded stress, anxiety, substance abuse, and depression. Climate change–induced extreme weather, changing weather patterns, damaged food and water resources, and polluted air impact human mental health. Increased levels of stress and distress from these factors can also put strains on social relationships and even have impacts on physical health, such as memory loss, sleep disorders, immune suppression, and changes in digestion.

Major chronic mental health impacts include higher rates of aggression and violence, more mental health emergencies, an increased sense of helplessness, hopelessness, or fatalism, and intense feelings of loss. These feelings of loss may be due to profound changes in a personally important place (such as one's home) and/or a sense that one has lost control over events in one's life due to disturbances from climate change. Additionally, a sense of loss regarding one's personal or occupational identity can arise when treasured objects are destroyed by a disaster or place-based occupations are disrupted by climate change.

Personal relationships and the ways in which people interact in communities and with each other are affected by a changing climate. Compounded stress from a changing environment, ecomigration, and/or ecoanxiety can affect community mental well-being

through the loss of social identity and cohesion, hostility, violence, and interpersonal and intergroup aggression.

Psychological well-being includes positive emotions, a sense of meaning and purpose, and strong social connections. Although the psychological impacts of climate change may not be obvious, they are no less serious because they can lead to disorders, such as depression, antisocial behavior, and suicide. Therefore, these disorders must be considered impacts of climate change as are disease, hunger, and other physical health consequences.

Building resilience is essential to address the physical and mental health impacts of climate change. Many local governments within the United States and in other countries have created plans to protect and enhance infrastructure, but these plans tend to overlook the support needed to ensure thriving psychological well-being. There is an opportunity to include the resilience capacity of individuals and communities in the development of preparedness plans.

RECOMMENDATIONS

This report concludes with four sets of recommendations designed to help readers put these research findings into action.

Tips to support individuals. This section provides strategies for practitioners, policymakers, and communicators to build personal attributes and social support that will help to prepare for and recover from climate change–related mental trauma. The following are a few of the top recommendations:

1. Build belief in one's own resilience.
2. Foster optimism.
3. Cultivate active coping and self-regulation skills.
4. Maintain practices that help to provide a sense of meaning.
5. Promote connectedness to family, place, culture, and community.

Tips to support communities. This section is for people, organizations, and mental and public health professionals who are at the forefront of and/or are interested in strengthening communities' responses to acute events and confronting gradual changes in the climate, in order to alleviate adverse mental health outcomes. The following are several of the topline recommended strategies for protecting well-being and alleviating adverse mental health outcomes:

1. Assess and expand community mental health infrastructure.
2. Reduce disparities and pay attention to populations of concern.
3. Engage and train community members on how to respond.
4. Ensure distribution of resources and augment with external supplies.
5. Have clear and frequent climate–mental health communication.

What individuals can do. At home and in the community, people can take actions in their everyday lives to buffer against some of the projected impacts, and these actions can also provide a greater sense of individual security and control. The following are several of the topline actions individuals can take:

1. Make and practice household emergency plans.
2. Participate in mindset training to prepare for adversity and adaptation through increased awareness of our emotions.
3. Care for oneself through healthy habits.
4. Connect with family, friends, neighbors, and other groups to build strong social networks.

What mental health and other professional leaders can do. Health professionals and fellow leaders are uniquely positioned to foster new levels of support for climate solutions. Considered the nation's most highly trusted and accessible messengers, health professionals reach a breadth and diversity of Americans. The following are several of the topline opportunities for health leaders:

1. Become a mental health–related climate-literate professional.
2. Engage fellow public and mental health professionals.
3. Be vocal, model leaders within your communities.
4. Support national and international climate–mental health solutions.

I. CONTEXT

OUR CHANGING CLIMATE: A PRIMER

Our climate is changing at an accelerated rate and continues to have profound impacts on human health. This change jeopardizes not only physical health but also mental health. This section provides a primer on the geophysical impacts of climate change.[a]

ACCELERATION
From wildfires and drought in California to severe flooding in Maryland to Alaskan communities threatened by rising seas, we are clearly living through some of the most severe weather events in U.S. history as a result of damage to our climate. These impacts on our environment will, in turn, affect human health and community well-being (Melillo, Richmond, & Yohe, 2014).

CHANGES WORLDWIDE
Climate change is creating visible impacts worldwide, including many here in America. As seen in the tripling of heat waves between 2011 and 2012, weather patterns introduce lasting impacts, such as **food insecurity** (Duffy & Tebaldi, 2012; Hatfield et al., 2014). Similarly, rising sea-surface temperatures have been connected to increasing rates of disease for marine life and humans (Doney et al., 2014). Sea levels are estimated to increase anywhere from 8 inches to 6.6 feet due to warmer temperatures by 2100, putting 8 million Americans living in coastal areas at risk for flooding (Parris et al., 2012). In terms of our economy, Hurricane Sandy cost the United States around $68 billion in total (National Oceanic and Atmospheric Administration, 2016). Droughts caused by increases in temperature and changing weather patterns cost California $2.7 billion in 2015 and Texas $7.62 billion in 2011 (Howitt, MacEwan, Medellín-Azuara, Lund, & Sumner, 2015; Guerrero, 2011). As these climate disturbances become more dramatic and persistent, we must prepare for these climate conditions.

COMMUNITIES ARE IMPACTED
Our communities' health, infrastructure, and economy are directly connected to our climate (Krygsman, Speiser, Wood, & Barry, 2016). As temperatures increase, we experience higher levels of pollution, allergens, and diseases (Krygsman, Speiser, Merse, Marx, & Tabola, 2016). Severe weather events threaten our businesses and vulnerable communities. Pollution and drought undermine our food and water supplies, and the latter increases the prevalence of wildfires that can destroy homes and communities (Ziska et al., 2016). Although all Americans are affected, certain populations of concern will feel the impacts more severely (U.S. Global Change Research Program [US-GCRP], 2016). Together, communities can build **resilience** to a changing climate.

HEALTH IS IMPACTED
As severe weather events, poorer air quality, degraded food and water systems, and physical illnesses increase, the direct and indirect impacts on health must be understood (USGCRP, 2016). The next section highlights the physical health impacts of climate change, and the following sections delve deeper into the mental health impacts, and what can be done to protect human well-being.

a. For more information on climate change, the causes, and the role of human activity, view the National Climate Assessment report

THE CLIMATE AND HEALTH IMPACTS ON HUMANS

Health is more than the absence of disease. Health includes mental health, as well as physical well-being, and communities that fail to provide basic services and social support challenge both. As we think about the impacts of climate change on our communities, we need to recognize not only the direct effects but also the indirect consequences for human health based on damage to the physical and social community infrastructure. Regardless of how these impacts surface, whether they occur within a matter of hours or over several decades, the outcomes of climate change are interconnected to all facets of our health.

This section reviews the primary ways in which geophysical changes affect human health, in the short and long term.

ACUTE IMPACTS: DISASTER-RELATED EFFECTS
Recent increases in natural disasters illustrate the relationship between the acceleration of climate change and severe weather.

Areas that endure a natural disaster face a number of risks and difficulties. Direct physical impacts range from brute physical trauma to more pernicious effects, like increased incidence of infectious disease, asthma, heart disease, and lung problems. These physical health impacts interact with mental health impacts, which is why they are detailed in this report on page 39.

In this section, we use floods, the most common form of natural disasters (EM-DAT, 2011, as reported in Alderman, Turner, & Tong, 2012), as an example to illustrate the ways in which direct health impacts of disasters come about.

Major and minor acute physical injury
Natural disasters lead to increased rates of death and injury. The most common causes of mortality during floods are drowning and acute physical trauma (e.g., being struck by debris; Alderman et al., 2012). This past year alone, deaths from flash floods have more than doubled the 10-year average (National Weather Service, 2016). During and after a flood, many people sustain non-fatal injuries, such as cuts and broken bones. Among other impacts, more frequent rainfall can lead to an increase in traffic accidents (Leard & Roth, 2016).
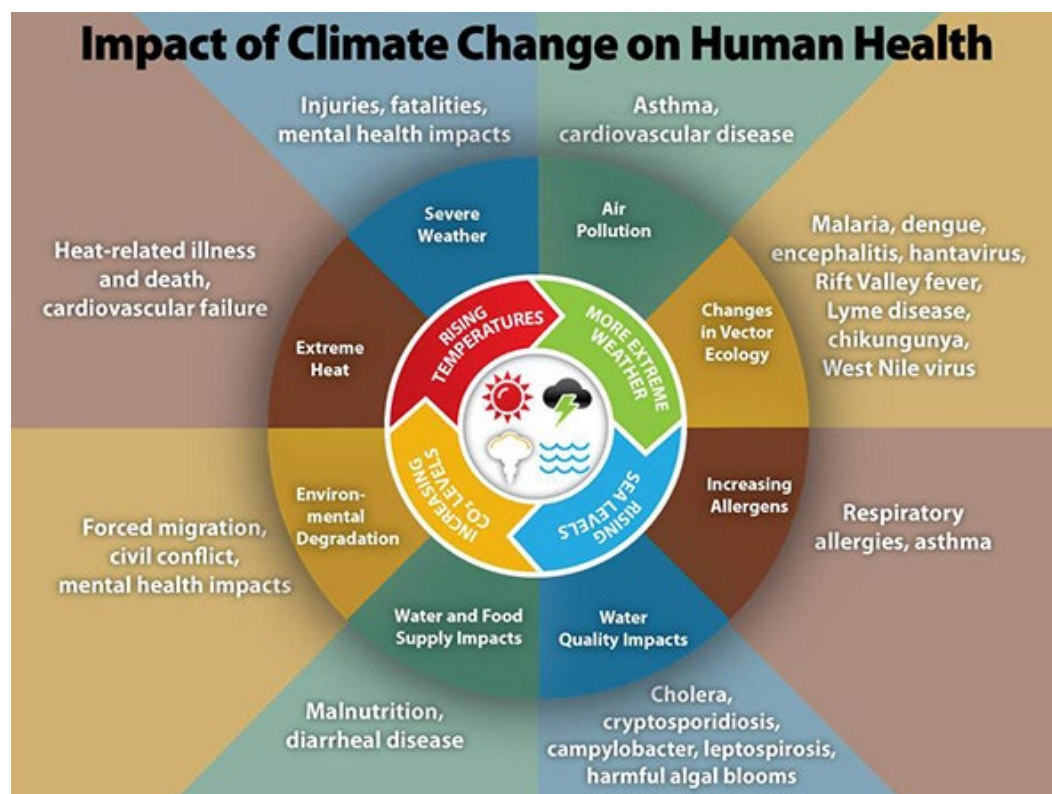
Figure 1. Depicts the many different ways climate change impacts human health (Centers for Disease Control and Prevention [CDC], 2014).

THE CLIMATE AND HEALTH IMPACTS ON HUMANS

Infrastructure, food, and water

The direct effect of a natural disaster is often exacerbated by a cascade of indirect consequences that follow. Natural disasters can lead to technological disasters (such as power outages), breakdowns in the water, sewer, and other infrastructure, or urban fires. For instance, the risk of carbon monoxide poisoning related to power outages increases as a result of climate change–induced disasters (Bell et al., 2016). Disruptions to medical infrastructure, including the provision of medical supplies, can transform minor issues into major and even fatal problems. In addition, disruptions in other types of services (e.g., cell phone communication, transportation, or waste management) add stress and difficulty during the aftermath of a disaster. These disruptions may impact people's physical health by making it more difficult to access health care or by potentially increasing exposure to pests or hazardous substances (e.g., when there is no garbage pick-up; Bell et al., 2016). Loss of income while businesses are closed due to natural disasters can be a major threat to food security, especially for non-professionals or small business owners.

After effects

Additional health threats follow in the wake of a disaster. Floodwater has been shown to introduce toxic materials, water-borne diseases (e.g., respiratory illnesses, skin infections, and neurologic and gastrointestinal illness where there are poor hygiene resources), and vector-borne illnesses (e.g., West Nile; Trtanj et al., 2016). Other after effects of flooding include heart attack, heat stroke, dehydration, and stroke, particularly when the affected areas lack the necessary medical supplies (Jonkman, Maaskant, Boyd, & Levitan, 2009, p. 687 as reported in Alderman et al., 2012). In addition, post-flood mold due to fungal growth inside houses can worsen allergy or asthma symptoms.

MORE GRADUAL HEALTH EFFECTS

Ongoing effects of climate change include rising sea levels, increases in temperature, and changes in precipitation that will affect agricultural conditions. The impacts on human health are less dramatic in the short term but in the long run can affect more people and have a fundamental impact on society.

Severe and changing weather

Periods of higher-than-normal heat result in higher rates of heat exhaustion, heat cramps, heat stroke, hospital admission for heart-related illnesses, and death (Sarofim et al., 2016). It's estimated that the average American citizen will experience between 4 and 8 times as many days above 95 degrees

Fahrenheit each year as he or she does now by the end of the century (Houser, Hsiang, Kopp, & Larsen, 2015). This increase will likely push Arizona's above-95-degree days from 116 today to as many as 205 by 2099 (Gordon, 2014). In contrast, extreme winter storms can expose people to hypothermia and frostbite (Bell et al., 2016). Altered growing seasons and ocean temperatures change the timing and occurrence of diarrhea, fever, and abdominal cramps from pathogen transmissions in raw food (like Salmonella; Ziska et al., 2016). Additionally, changing weather patterns influence the expansion of the migration patterns of animals and insects. This expansion has already begun to result in the spread of vector-borne illness, such as Lyme disease, malaria, dengue fever, plague, and Zika virus to new U.S. geographic areas (Beard et al., 2016; Shuman, 2010). For example, vector-borne illnesses carried by mosquitoes can capitalize on receding floodwater for mosquito breeding.

Respiratory issues and allergens
People exposed to ozone air pollution, which is emitted mostly by cars and industrial facilities and is intensified by warmer temperatures, are more likely to visit the hospital for respiratory issues, suffer from asthma, and die prematurely of strokes or heart attacks (Fann et al., 2016). Hotter and drier summers increase the frequency and intensity of large wildfires that contribute to smoke inhalation (Bell et al., 2016). Pollution contributes to higher levels of pollen and translates into longer and more prevalent allergy seasons (Fann et al., 2016; Seeley, 2012).

Fetal and child development
Climate-driven physical stress on mothers can cause adverse birth outcomes, such as preterm birth and low birth weight (Bell et al., 2016). Scientific research shows that children and developing fetuses are at particular risk from air pollution, heat, malnutrition, infectious diseases, allergies,

and mental illnesses, which have detrimental impacts on development (Perera, 2016).

Water and food supply
Nutrition and **food safety** can be affected because climate change can lower crop yields, reduce the nutritional quality of food, interrupt distribution chains, and reduce access to food because families lose income. For example, higher CO_2 concentrations lower the levels of protein and essential minerals of widely consumed crops such as wheat, rice, and potatoes (Ziska et al., 2016). Barriers to food transport, such as damage to infrastructure and displacement of employees, affect food markets by increasing food costs (Lal et al., 2012). Droughts, floods, and changes in the availability of fertile land lead to hunger and malnutrition, though these changes are less likely in wealthy countries, such as the United States (Friel, Butler, & McMichael, 2011; McMichael, 2013). Nevertheless, there will be an increased likelihood of a global food market crisis as climate change accelerates (Paloviita,Järvelä, Jokinen, Mononen, & Sairien, 2016). A two-degree Celsius increase in temperature places 100–400 million people at risk of hunger, according to the World Bank (Friel et al., 2011; McMichael, 2013).

General fitness
Increased average temperatures and decreased air quality also lead to changes in the type of activities that people engage in, particularly outdoor activities and recreation. These changes, in turn, may be associated with increased rates of obesity and cardiovascular disease. Although people may compensate by exercising in indoor environments, reduced access to the restorative potential of outdoor environments may indirectly increase stress and bypass the long-term emotional benefits of taking physical activity outdoors (Hartig & Catalano, 2013; Pasanen, Tyrvainen, & Korpela, 2014).

LINKING PHYSICAL IMPACTS, MENTAL HEALTH, AND COMMUNITY WELL-BEING

This section is an overview of the interrelation among physical health, mental health, and community well-being. We will expand on each topic later in this report.

MENTAL HEALTH

The ability to process information and make decisions without being disabled by extreme emotional responses is threatened by climate change. Some emotional response is normal, and even negative emotions are a necessary part of a fulfilling life. In the extreme case, however, they can interfere with our ability to think rationally, plan our behavior, and consider alternative actions. An extreme weather event can be a source of trauma, and the experience can cause disabling emotions. More subtle and indirect effects of climate change can add stress to people's lives in varying degrees. Whether experienced indirectly or directly, stressors to our climate translate into impaired mental health that can result in depression and anxiety (USGCRP, 2016). Although everyone is able to cope with a certain amount of stress, the accumulated effects of compound stress can tip a person from mentally healthy to mentally ill. Even uncertainty can be a source of stress and a risk factor for psychological distress (Greco & Roger, 2003). People can be negatively affected by hearing about the negative experiences of others, and by fears—founded or unfounded—about their own potential vulnerability.

PHYSICAL HEALTH AND MENTAL HEALTH

Compromised physical health can be a source of stress that threatens psychological well-being. Conversely, mental health problems can also threaten physical health, for example, by changing patterns of sleep, eating, or exercise and by reducing immune system function.

COMMUNITY HEALTH

Although residents' mental and physical health affect communities, the impacts of climate on community health can have a particularly strong effect on community fabric and interpersonal relationships. Altered environmental conditions due to climate change can shift the opportunities people have for social interaction, the ways in which they relate to each other, and their connections to the natural world.

PHYSICAL HEALTH

ACUTE
- Injuries/fatalities
- Vector-borne disease
- Heat stroke
- Asthma
- Allergies

GRADUAL
- Chronic lung disease
- Cardiovascular disease
- Malnutrition
- Reduce fitness

MENTAL HEALTH
- Depression, stress, and anxiety
- Strains on social relationships
- Complicated grief
- Substance abuse
- Post-traumatic stress disorder
- Loss of personal identity
- Helplessness and fatalism

SOCIAL
economic inequality
availability of healthcare
social cohesion

INDIVIDUAL
age, ethnicity

PHYSICAL
infrastructure

Geophysical impacts

VULNERABILITIES

COMMUNITY HEALTH
- Increased personal aggression
- Disrupted sense of belonging
- Loss of community cohesion
- Increased violence and crime
- Social instability

COMPREHENDING CLIMATE CHANGE

Witnessing the visible impacts of climate change may help people overcome barriers to grasping the problem; however, comprehension has many facets. This section provides an overview of the attitudes people have about climate change, to better understand how awareness of the health impacts may help motivate action.

PERCEPTION IS DIFFICULT

Although most people are generally aware that climate change is occurring, it continues to seem distant: something that will happen to others, in another place, at some unspecified future date (McDonald, Chai, & Newell, 2016). Psychologists refer to this idea as ***psychological distance***. Terms such as "climate change" and "global warming" draw attention to the global scale rather than the personal impacts (Rudiak-Gould, 2013). Additionally, the signal of climate change is obscured by the noise of daily and seasonal weather variation (Hulme, 2009; Swim et al., 2009; Weber & Stern, 2011). All this makes the issue easier for people to push aside, particularly when faced with other pressing life issues.

When people learn about and experience local climate impacts, their understanding increases. Local effects of climate change are often more personally relevant than the general phenomenon of a warming climate, and particularly when knowledge of direct effects is combined with news stories of the imminent risks of climate change (Akerlof, Maibach, Fitzgerald, Cedeno, & Neuman, 2013). Perceived experience of impacts is associated with increased concern and awareness about climate change (Reser, Bradley, & Ellul, 2014). Direct experience also increases people's understanding of climate change (Borick & Rabe, 2012, p. 796). However, direct experience does not necessarily lead to behavior change. For example, experiencing water shortages may increase behavior changes in water use but not encourage other sustainable behavior. Similarly, research suggests experiencing temperature change has no impact on water-use behavior (Haden, Niles, Lubell, Perlman, & Jackson, 2012).

A PARTISAN ISSUE

Politically polarized in the United States, climate change is perceived as an issue that belongs with the political left (Dunlap, McCright, & Yarosh, 2016), which can suppress belief and concern and discussions about solutions. For example, of the 36% of Americans who are personally concerned a great deal about climate issues, 72% are Democrats, and 27% are Republicans (Pew Research Center, 2016). Political orientation can make open conversations about climate impacts and solutions difficult, and make those who are concerned about climate change feel isolated or paranoid in some circles (Geiger & Swim, 2016).

Concerns about health impacts provide common ground for discussion with both ends of the political spectrum (Maibach, Nisbet, Baldwin, Akerlof, & Diao, 2010; Petrovic, Madrigano, & Zaval, 2014). Describing the health-related

impacts of climate change and the relevant benefits of taking action to address the impacts can inspire hope among those who dismiss climate change (Myers, Nisbet, Maibach, & Leiserowitz, 2012). For instance, conservatives showed decreased support for climate action when the negative health effects were described as affecting people in a faraway country as opposed to people who live in the United States (Hart & Nisbet, 2012). Listing several health impacts is overwhelming, causing fatalism and diminished engagement (Krygsman, Speiser, Merse, et al., 2016).

UNCERTAINTY AND DENIAL

People feel uncertain about the threat of climate change and how to minimize the damage. The media have been criticized for promoting an inaccurate perception of climate change (Antilla, 2005): for example, that there is more scientific controversy about climate change than actually exists. In some cases, information that increases perceptions of the reality of climate change may feel so frightening that it leads to denial and thus a reduction in concern and support for action (McDonald et al., 2015). In addition, communicating scientific information is not easy; this complexity itself may be a problem. One study showed that people who received more complex information on environmental problems 1) felt more helpless and more inclined to leave the problem to the government; and 2) those who felt ignorant

about the topic were more likely to want to avoid hearing about more negative information (Shepherd & Kay, 2012).

Worldviews and ideologies act as filters to help increase or decrease concern about climate change and motivate action toward solutions. People do not perceive the world neutrally. Instead, through directionally *motivated cognition*, individuals strive to maintain a world consistent with the ideology and values of their social groups (Kahan, 2012). Because of this, individuals whose worldviews conflict with climate change realities actually may not perceive certain climate effects (Hamilton & Stompone, 2013; Howe & Leiserowitz, 2013). Myers, Maibach, Roser-Renouf, Akerlof, and Leiserowitz (2012) found that individuals who were 1) either very concerned about or skeptical of climate change tended to report personal experience with climate change (or lack thereof) based on their pre-existing beliefs about its existence; and 2) individuals less engaged with the issue of climate change changed their beliefs about the existence of climate change based on perceived personal experience with its impacts. Ideologies of climate change and action may also contribute to widespread psychological denial. The distress of climate change can manifest in negative reactions to climate activism. These reactions are reflected in outlets such as social media, and researchers believe this behavior shifts others to denial. (Davenport, 2017).

Key Takeaways: Comprehending Climate Change	
Barriers	Solutions
Climate change is often perceived as global, distant, and difficult to understand.	Learning and experiencing the local effects of climate change make the problem more tangible and a reality.
Political affiliation drives a wedge in the public's awareness of and beliefs about climate change.	Talking about the health impacts of climate change resonates across the political spectrum.
The complexity and a fear of climate change drive people to feel uncertain and in denial.	Connecting climate impacts to practical solutions encourages action while building emotional resiliency.

CLIMATE SOLUTIONS BENEFIT MENTAL HEALTH

This section outlines how climate solutions and lifestyle choices can curtail the mental health impacts incurred when our economies, physical and social infrastructures, and social identities are eroded by climate change. These solutions are available now, and the co-benefits support healthy cognitive function and emotional resiliency.

Physical commuting enhances a sense of well-being. Choosing to bike and/or walk (assuming it is safe and practical to do so) is one individual step that can help reduce the use of climate change–driving fossil fuels. Physical commuting also directly impacts depression, anxiety, PTSD, and other mental illnesses (California Department of Public Health, 2016). People who bike and walk to work, school, appointments, and other activities not only reduce emissions and improve their physical health but also experience lower stress levels than car commuters (Martin, Goryakin, & Suhrcke, 2014). For instance, individuals who utilized the Washington, D.C. bikeshare program reported reduced stress levels and weight loss (Alberts, Palumbo, & Pierce, 2012). Similarly, adolescents who actively commute to school show not only lower levels of perceived stress but also increased cardiovascular fitness, improved cognitive performance, and higher academic achievement (Lambiase, Barry, & Roemmich, 2010; Van Dijk, De Groot, Van Acker, Savelberg, & Kirschner, 2014).

Public transportation invigorates community mental health. Moving people from individual cars to public transit also results in lower greenhouse gas emissions. In addition, several studies have shown that using public transportation leads to an increase in community cohesion, recreational activities, neighborhood walkability, and reduced symptoms of depression and stress associated with less driving and more exercise (Allen, 2008; Appleyard, 1981; Bell & Cohen, 2009; Berke, Gottlieb, Vernez Moudon, & Larson, 2007; Wener & Evans, 2007 as cited in Litman, 2010). Meanwhile, traffic driving worsens air quality and contributes to reduced productivity and increased healthcare costs (American Public Transportation Authority, n.d.). Sound transportation systems and urban planning should be expanded as they lead to beneficial mental health and climate outcomes.

Green spaces diminish stress. Parks and green corridors have been connected to improved air quality and can increase mental well-being. For example, trees sequester carbon, and green spaces absorb less heat than paved surfaces and buildings. More time spent interacting with nature has been shown to significantly lower stress levels and reduce stress-related illness. Interestingly, this evidence is supported across socioeconomic status, age, and gender (Grahn & Stigsdotter, 2003). Likewise, individuals who move to areas with access to more green space showed sustained mental health improvements, while individuals who moved to areas with

less access to green space experienced substantial negative mental health impacts (Alcock, White, Wheeler, Fleming, & Depledge, 2014). However, although a person's physical and mental health is determined to a large degree by the neighborhood in which he or she lives, relocating to a greener neighborhood isn't always an option. As planners and policymakers make decisions that will reshape the landscapes of our cities and communities, it is important to recognize the significance and role green areas have in improving air quality, reducing stress, and ensuring a healthy living environment for everyone.

Clean energy reduces health burdens.
Wind, solar, hydro, and other clean energy as well as energy efficiency are not only climate-friendly; they also reduce particulates and pollution in the air. Studies on air quality and children's lung development have shown that as air pollution is reduced, children display significant lung function improvements (Gauderman et al., 2015). Further research revealed that children exposed to higher levels of urban pollution are more likely to develop attention problems and symptoms of anxiety and depression, as well as lower academic performance and brain function (Perera et al., 2012; Wang et al., 2009). Clean energy provides an opportunity to protect populations of concern, such as children, who experience these impacts more severely.

Although the co-benefits are clear, more comprehensive research on the positive mental health outcomes of climate solutions is needed to bolster support.
Research can further promote dynamic solutions as opportunities to improve our health. It is important to increase awareness of the daily choices we make, from how to get to work to the sources of energy to use. As we discuss later in this report, the more climate-friendly behaviors become mainstreamed, the more they help populations of concern: children, elderly, sick, low income, etc. Fortunately, tangible and effective climate solutions are available today to implement and build upon.

KEY TAKEAWAYS:
Comprehending Climate Change

Climate solutions not only improve the quality of our air and food but also enhance our cognitive abilities and strengthen our mental health.

- **Physical commuting**, such as biking or walking, can reduce stress and other mental illnesses, as well as improve cognitive function and academic performance.

- **Public transportation** invigorates community mental health by creating opportunities and networks to increase community cohesion.

- **Green spaces** reduce people's stress levels and promote positive social interactions.

- **Clean energy** benefits lung function in children and can help prevent symptoms of anxiety and depression that are brought on by pollution.

II. MENTAL HEALTH AND CLIMATE CHANGE

MENTAL HEALTH IMPACTS

The mental health effects of climate change are gaining public attention. A 2016 government report (U.S. Global Change Research Program) reviewed a large body of research to summarize the current state of knowledge. This report builds on that knowledge, and considers the direct and indirect effects of climate change on mental health.

*We start by describing the mental health effects on individuals, both short and long term, acute and chronic, the stressors that accumulate in the aftermath of a disaster, and the impacts that natural disasters have on social relationships, with consequences for health and well-being. We move on to discussing the individual-level impacts of more gradual changes in climate, including impacts on aggression and violence, identity, and the long-term emotional impacts of climate change. Next, we discuss the impacts of climate change on communities and on **intergroup** and international relationships. Finally, we address the problem of inequity—the fact that certain populations are relatively more vulnerable to these mental health impacts compared to others.*

IMPACTS ON INDIVIDUALS

*This section discusses how climate change has **acute** and **chronic** impacts, **directly** and **indirectly**, on individual well-being. Acute impacts result from natural disasters or extreme weather events. Chronic impacts result from longer-term changes in climate. This discussion emphasizes the impacts experienced directly by individuals; however, it also touches on indirect impacts (witnessing others being impacted), which have profound implications for mental health.*

ACUTE IMPACTS

Trauma and shock
Climate change–induced disasters have a high potential for immediate and severe psychological trauma from personal injury, injury or death of a loved one, damage to or loss of personal property (e.g., home) and pets, and disruption in or loss of livelihood (Neria & Schultz, 2012; Simpson, Weissbecker, & Sephton, 2011; Terpstra, 2011). An early ***meta-analysis*** of studies on the relationship between disasters and mental health impacts found that between 7% and 40% of all subjects in 36 studies showed some form of ***psychopathology***. General ***anxiety*** was the type of psychopathology with the highest prevalence rate, followed by ***phobic***, ***somatic***, and alcohol impairment, and then depression and drug impairment, which were all elevated relative to prevalence in the general population (Rubonis & Bickman, 1991). More recent reviews concluded that acute traumatic stress is the most common mental health problem after a disaster (Fritze, Blashki, Burke, & Wiseman, 2008). Terror, anger, shock, and other intense negative emotions are likely to dominate people's initial response (Raphael, 2007). Interview participants in a study about flooding conducted by Carroll, Morbey, Balogh, and Araoz (2009) used words such as "horrifying," "panic stricken," and "petrified" to describe their experience during the flood (p. 542; see also Tapsell & Tunstall, 2008).

Post-traumatic stress disorder (PTSD)
For most people, acute symptoms of trauma and shock are reduced after conditions of security have been restored. However, many continue to experience problems as PTSD manifests as a chronic disorder. PTSD, depression, general anxiety, and suicide all tend to increase after a disaster. For example, among a sample of people living in areas affected by Hurricane Katrina, suicide and ***suicidal ideation*** more than doubled, one in six people met the diagnostic criteria for PTSD, and 49% of people living in an affected area developed an anxiety or mood disorder such as depression (Kessler et al., 2008; Lowe, Manove, & Rhodes, 2013). Similarly, 14.5% showed symptoms of PTSD from Hurricane Sandy (Boscarino, Hoffman, Adams, Figley, & Solhkhah, 2014), and 15.6% of a highly affected community showed symptoms of PTSD several years after experiencing extreme bushfires (Bryant et al., 2014). PTSD is often linked to a host of other mental health problems, including higher levels of suicide, substance abuse, depression, anxiety,

violence, aggression, interpersonal difficulties, and job-related difficulties (Simpson et al., 2011).

Incidence of PTSD is more likely among those who have lost close family members or property (Wasini, West, Mills, & Usher, 2014). Individuals who experience multiple or long-lasting acute events—such as more than one disaster or multiple years of drought—are likely to experience more severe trauma and may be even more susceptible to PTSD and the other types of psychiatric symptoms described above (e.g., Edwards & Wiseman, 2011; Hobfoll, 2007). For example, a study showed that refugees exposed to multiple traumatic events experienced a higher rate of immediate and lifetime PTSD and had a lower probability of remission than refugees who had experienced few traumatic events (Kolassa et al., 2010). The likelihood of suicide is higher among those who have been exposed to more severe disasters (Norris, Friedman, & Watson, 2002).

Compounded stress
In general, climate change can be considered an additional source of stress to our everyday concerns, which may be tolerable for someone with many sources of support but can be enough to serve as a tipping point for those who have fewer resources or who are already experiencing other stressors. Stress manifests as a subjective feeling and a physiological response that occur when a person feels that he or she does not have the capacity to respond and adapt to a given situation. Thus, climate-related stress is likely to lead to increases in stress-related problems, such as substance abuse, anxiety disorders, and depression (Neria & Shultz, 2012). These problems often carry economic costs incurred by lost work days, increased use of medical services, etc., which, in turn, create additional stress for individuals and society and have their own impacts on

mental and physical health. Stress can also be accompanied by worry about future disasters and feelings of vulnerability, helplessness, mourning, grief, and despair (Neria & Schultz, 2012). Following disasters, increased stress can also make people more likely to engage in behavior that has a negative impact on their health (e.g., smoking, *risky behavior*, and unhealthy eating habits; e.g., Beaudoin, 2011; Bryant et al., 2014; Flory, Hankin, Kloos, Cheely, & Turecki, 2009).

Stain et al. (2011) found that people living in a drought-affected area who had also recently experienced some other adverse life event were more likely to express a high degree of worry about the ongoing drought conditions. Although not as dramatic and acute a disaster as a hurricane, drought is associated with psychological distress (O'Brien, Kerry, Coleman, & Hanigan, 2014; Stanke, Kerac, Prudhomme, Medlock, & Murray, 2013), and one study found increased rates of suicide among male farmers in Australia during periods of prolonged drought (Hanigan, Butlera, Kokicc, & Hutchinson, 2012). Several studies have found that many victims of a flood disaster express psychological distress even years after the flood (Alderman et al., 2012; Crabtree, 2012; Simpson et al., 2011).

Impacts of stress on physical health
High levels of stress and anxiety also appear to be linked to physical health effects. For example, chronic distress results in a lowered immune system response, leaving people more vulnerable to pathogens in the air and water and at greater risk for a number of physical ailments (Alderman et al., 2012; Simpson et al., 2011). Sleep disorders also increase in response to chronic distress (Han, Kim, & Shim, 2012). Doppelt (2016) has described potential physiological responses to the stress of climate change, such as increased levels of the stress hormone cortisol, which, if prolonged, can affect

Disasters precipitate a set of stressors that can strain interpersonal interactions

digestion, lead to memory loss, and suppress the immune system. The World Heart Federation (2016) lists stress as a serious risk factor in developing cardiovascular disease.

Strains on social relationships

Particularly in home environments, disasters precipitate a set of stressors that can strain interpersonal interactions (Simpson et al., 2011). A review of research on the impacts of natural disasters identified problems with family and interpersonal relations, as well as social disruption, concerns about the wider community, and feelings of obligation to provide support to others (Norris, Byrne, Diaz, & Kaniasty, 2001). Families whose homes are damaged by a flood, storm, or wildfire may need to be relocated, sometimes multiple times, before settling permanently. Family relationships may suffer. Separation from one another and from their systems of social support may occur. Children may have to attend a new school or miss school altogether; parents may find themselves less able to be effective caregivers. In addition, even those who are able to remain in their own home may still lose a sense of their home as a safe and secure environment (Tapsell & Tunstall, 2008). This has implications for interpersonal connections, as a home provides the context for social relationships (Carroll et al., 2009). When the physical home is damaged, it changes the dynamic of the social relationships, often negatively. Domestic abuse, for example, including child abuse, often increases among families who have experienced disasters, such as Hurricane Katrina or the Exxon Valdez oil spill (Fritze et al., 2008; Harville, Taylor, Tesfai, Xiong, & Buekens, 2011; Keenan, Marshall, Nocera, & Runyan, 2004; Yun, Lurie, & Hyde, 2010).

CHRONIC IMPACTS

Aggression and violence

The psychological impacts of warmer weather on aggression and violence have been extensively studied. Lab-based experiments and field-based surveys have demonstrated a causal relationship between heat and aggression (Anderson, 2001; Simister & Cooper, 2005). In other words, as the temperature goes up, so does aggression. This influenced researcher Craig Anderson (2012) to predict a demonstrable increase in violence associated with increased average temperatures. The relationship between heat and violence may be due to the impacts of heat on ***arousal***, which results in decreases in attention and ***self-regulation***, as well as an increase in the availability of negative and hostile thoughts

(Anderson, 2001; Anderson, Deuser, & DeNeve, 1995). In addition, heat can have a negative effect on cognitive function, which may reduce the ability to resolve a conflict without violence (Pilcher, Nadler, & Busch, 2002). Although this impact can manifest as an acute impact (e.g., as a result of a heat wave), due to the pervasive warming trends, and the shifting of climate zones, it is listed under chronic impacts.

Mental health emergencies

There is evidence that increases in mean temperature are associated with increased use of emergency mental health services. This is true not only in hot countries, like Israel and Australia, and in parts of the United States but also in relatively cooler countries, such as France and Canada (Vida, Durocher, Ouarda, & Gosselin, 2012). Higher temperatures have been linked to increased levels of suicide (Lee et al., 2006). It appears that the distress of feeling too hot can overwhelm coping ability for people who are already psychologically fragile. Climate emergencies can also exacerbate preexisting symptoms and lead to more serious mental health problems.

Loss of personally important places

Perhaps one of the best ways to characterize the impacts of climate change on perceptions is the sense of loss. Loss of relationship to place is a substantial part of this. As climate change irrevocably changes people's lived landscapes, large numbers are likely to experience a feeling that they are losing a place that is important to them—a phenomenon called *solastalgia*. This psychological phenomenon is characterized by a sense of desolation and loss similar to that experienced by people forced to migrate from their home environment. Solastalgia may have a more gradual beginning due to the slow onset of changes in one's local environment. Silver and Grek-Martin (2015) described the emotional pain and

disorientation associated with changes in the physical environment that were expressed by residents of a town damaged by tornadoes, even by residents who had not experienced personal loss (Cunsolo Willox et al., 2012).

Loss of place is not a trivial experience. Many people form a strong attachment to the place where they live, finding it to provide a sense of stability, security, and personal identity. People who are strongly attached to their local communities report greater happiness, life satisfaction, and optimism (Brehm, Eisenhauer, & Krannich, 2004); whereas work performance, interpersonal relationships, and physical health can all be negatively affected by disruption to place attachment (Fullilove, 2013). For instance, Scannell and Gifford (2016) found that people who visualized a place to which they were attached showed improved self-esteem and sense of belonging relative to those who visualized a place to which they were not attached.

Climate change is likely to have a significant effect on human well-being by increasing migration. When people lose their home to rising sea levels, or when a home becomes unsuitable for human habitation due to its inability to support food crops, they must find another place to live. Although it is difficult to identify climate change as the causal factor in a complex sequence of events affecting migration, a common prediction is that 200 million people will be displaced due to climate change by 2050 (Fritze et al., 2008). Migration in and of itself constitutes a health risk. Immigrants are vulnerable to mental health problems, probably due to the accumulated stressors associated with the move, as well as with the condition of being in exile (Kirmayer et al., 2011). Adger, Barnett, Brown, Marshall, and O'Brien (2013) found being forced to leave one's home territory can threaten

one's sense of continuity and belonging. Because of the importance of connection to place in personal identity (e.g., Scannell & Gifford, 2016), such displacement can leave people literally alienated, with a diminished sense of self and increased vulnerability to stress. Although empirical research on the psychological impacts of migration is rare, Tschakert, Tutu, and Alcaro (2013) studied the emotional experience among residents of Ghana who were forced to move from the northern region of the country to the capital, Accra, because local conditions no longer supported their farming practices. Also, respondents expressed nostalgia and sadness for the home left behind and helplessness due to changes in their environments, such as deforestation, that were described as sad and scary.

Loss of autonomy and control

Climate change will intensify certain daily life inconveniences, which can have psychological impacts on individuals' sense of autonomy and control. The desire to be able to accomplish basic tasks independently is a core psychological need, central to human well-being (Deci & Ryan, 2011), and basic services may be threatened due to dangerous conditions. This may make mobility a challenge—particularly for the elderly and those with disabilities. Exposure to unwanted change in one's environment can also reduce one's sense of control over one's life (Fresque-Baxter & Armitage, 2012; Silver & Grek-Martin, 2015), which, in turn, has negative impacts on mental health (Schönfeld, Brailovskaia, Bieda, Zhang, & Margraf, 2016).

Loss of personal and occupational identity

A more fundamental loss is the loss of personal identity tied to mundane aspects of daily life. Losing treasured objects when a home is damaged or destroyed is one way in which climate change can significantly impair an individual's sense of self and identity. This is because objects help provide a continuing sense of who we are, particularly objects that represent important moments in life (e.g., journals), relationships (e.g., gifts or photographs), or personal/family history (e.g., family heirlooms; Dittmar, 2011). Interviewees in a study conducted by Carroll et al. (2009) indicated that flood victims were particularly troubled by the loss of personal possessions, such as things they had made themselves or special things they had spent time and effort to procure or maintain. Although this may seem acute, the losses are permanent; the impacts are persistent and therefore become chronic.

A loss of identity associated with climate change is also sometimes attributable to its effect on place-bound occupations. This is likely due to the close relationship between identity and place-based occupations, like farming and fishing (Devine-Wright, 2013). Because severe storms and high temperatures disrupt economic activity (Hsiang, 2010), climate change may have an effect on occupational identity in general. Loss of occupation has been associated with increased risk of depression following natural disasters (Wasini et al., 2014).

Helplessness, depression, fear, fatalism, resignation, and ecoanxiety

Gradual, long-term changes in climate can also surface a number of different emotions, including fear, anger, feelings of powerlessness, or exhaustion (Moser, 2007). A review by Coyle and Van Susteren (2011) described cases in which fear of extreme weather approaches the level of phobia and the "unrelenting day-by-day despair" (p. viii) that can be experienced during a drought (p. viii). Watching the slow and seemingly irrevocable impacts of climate change unfold, and worrying about the future for oneself, children, and later generations, may be an additional source of stress (Searle & Gow, 2010). Albrecht (2011) and others have termed this anxiety *ecoanxiety*. Qualitative research provides evidence that some people are deeply affected by feelings of loss, helplessness, and frustration due to their inability to feel like they are making a difference in stopping climate change (Moser, 2013). Some writers stress the possible detrimental impact of guilt, as people contemplate the impact of their own behavior on future generations. Although the impacts of climate change are not always visible, they perpetuate a delayed destruction that, like the damage to climate, are incremental and can be just as damaging as acute climate impacts (Nixon, 2011).

KEY TAKEAWAYS: Impacts on Individuals

Following disasters, damage to social or community infrastructural components, such as food systems and medical services, results in many *acute* consequences for psychological well-being.

In contrast, gradual impacts of climate change, like changes in weather patterns and rising sea levels, will cause some of the most resounding *chronic* psychological consequences.

Acute and chronic mental health effects include the following:

- Trauma and shock
- Post-traumatic stress disorder
- Compounded stress
- Strains on social relationships
- Depression
- Anxiety
- Suicide
- Substance abuse
- Aggression and violence
- Loss of personally important places
- Loss of autonomy and control
- Loss of personal and occupational identity
- Feelings of helplessness, fear, fatalism, solastalgia, and ecoanxiety

A CLOSER LOOK
A Clinical Psychologist's Take on Climate Change, *Thomas Doherty, PsyD*

Research on the mental health impacts of disasters typically distinguishes between events that are considered natural or technological (Doherty & Clayton, 2011). Because natural disasters may seem part of the natural order, and are considered to be beyond human control, they are relatively easier to cope with in psychological terms. These calamities tend to bring people together to help those impacted. Technological disasters, meanwhile, are typically caused by human accident or negligence and often involve long-term, mysterious risks. These disasters tend to divide communities over how to compensate those affected and hold accountable those who were responsible. Poorer areas tend to be at higher risk for these incidents, and community divisions often come down to privilege, class, and race.

Climate change combines natural and technological elements. Human technologies are driving vast changes in global climate and weather, increasing the risks for a range of natural disasters. Climate change is an emergency that affects and divides the global community.

I have counseled many people experiencing varying crises of meaning and responsibility about climate change: a scientist who has sailed in the "Pacific garbage patch," distressed by neighbors' consumer habits; an environmental engineer who has "run the numbers" and doesn't see a way to effectively address carbon emissions; a ranger in Glacier National Park, trying to remain positive while educating visitors about these receding landmarks; and a person shocked by a news story about the dire consequences of rising ocean temperatures.

An unexpected benefit for me of confronting these complex, troubling issues is that I regularly interact with people who take climate change as seriously as I do, such as public health officials from around the United States using the Centers for Disease Control and Preventions' Building Resilience Against Climate Effects (BRACE) framework. Such interactions allow me to maintain my creativity and motivation, avoid isolation, and find a sense of shared purpose with others. As a psychologist, I know that engaging with climate change leads to consciousness-raising about one's environmental identity and ethics.

Any of the interlinked problems within climate change—poverty, inequality, loss of treasured places, species extinction, threats to our well-being or livelihood—can hook us emotionally and intellectually. These issues lead to feelings of curiosity and insight, as well as fatigue and despair. Clinicians can help individuals to thrive in the face of climate change by identifying which specific issues activate their unique vulnerabilities or personal worries and developing a specific plan or activity to give them a sense of control about how they respond.

Similarly, the BRACE model can help communities seeking to become more resilient by anticipating local health or economic impacts, identifying vulnerable groups that need protection, and proactively implementing a community-wide adaptation plan that can be reevaluated as more becomes known about changing local conditions. Coping with climate change requires insight and perseverance. Cooperation among professionals can help people adapt and thrive.

IMPACTS ON COMMUNITY AND SOCIETY

SOCIAL COHESION AND COMMUNITY CONTINUITY

Compounded stress from climate change has been observed among various communities. For example, Cunsolo Willox et al. (2013) examined the impacts of climate change on a small Inuit community.[b] Members of the community, who all reported a strong attachment to the land, said they had noticed changes in the local climate and that these changes contributed to negative effects on themselves. As a result of altered interactions with the environment, community members reported food insecurity, sadness, anger, increased family stress, and a belief that their sense of self-worth and community cohesion had decreased. Elders expressed specific concern for the preservation of Inuit language and culture as they directly influence mental well-being and social cohesion (Ostapchuk, Harpers, Cunsolo Willox, Edge, & Rigolet Inuit Community Government, 2015).

Social cohesion and **social capital** can protect communities against mental and physical health impacts during a climate-related disaster. Regardless of socioeconomic or cultural backgrounds, communities with high levels of social capital and community leadership experience the quickest recoveries after a disaster and the highest satisfaction with community rebuilding (Aldrich & Meyer, 2014).

When local conditions become practically uninhabitable, **ecomigration**, leading to **environmental refugees**, can result. Such migrations erode social networks, as communities disperse in different directions. Because social networks provide important practical and emotional resources that are associated with health and well-being, the loss of such networks places people's sense of continuity and belonging at risk. The current Syrian conflict, which has resulted in mass migration, may partially stem from climate change–driven precipitation changes, rising mean sea levels, and a decrease in soil moisture. These climate impacts were exacerbated during the drought from 2007 to 2010 due to human disruptions within natural systems, leading to crop failure and large-scale conflict, hunger, and desperation. Although such civil unrest cannot be attributed to a single cause, recent evidence suggests climate-caused drought may have played a significant role in the unraveling of an already vulnerable political and ecological climate (Kelley, Mohtadi, Cane, Seager, & Kushnir, 2015).

AGGRESSION

Heightened anxiety and uncertainty about one's own future can reduce the ability to focus on the needs of others—negatively impacting social relationships with friends and

*In addition to the effects on individual health and well-being, climate change affects how individuals interact in communities and relate to each other. For example, natural disasters can have a negative impact on community bonds. A changing climate will likely affect aspects of community well-being, including **social cohesion**, aggression, and social relationships.*

co-workers (Palinkas, Downs, Petterson, & Russell, 1993), as well as attitudes toward other people in general.

Interpersonal violence

High temperatures associated with climate change may increase people's aggressive tendencies. Aggression can also be exacerbated by decreased access to stress-reducing green spaces and supportive social networks. Rising levels of frustration in society consequently lead to interpersonal aggression (such as domestic violence, assault, and rape). Ranson (2012) calculated that between 2010 and 2099, climate change would cause an estimated additional 30,000 murders, 200,000 cases of rape, and 3.2 million burglaries due to increased average temperatures.

Intergroup aggression

Climate change may increase conflict through several mechanisms. Violence may increase when competition for scarce natural resources increases or when *ecomigration* brings formerly separate communities into contact and they compete for resources, like jobs and land. In a recent meta- analysis, Hsiang, Burke, and Miguel (2013) found evidence that climate change can contribute to the frequency of intergroup violence (i.e., political conflict and war). For example, in Houston, Texas, crime rates increased significantly following Hurricane Katrina, although Katrina migrants have not been definitively sourced as the cause (Anderson & Delisi, 2011). Meanwhile, restraints on crime weaken when existing social institutions are disrupted, thus increasing the probability of criminal behavior. For example, when government resources are devoted to damaged infrastructure from natural disasters, those resources may be diverted away from criminal justice systems, mental health agencies, and educational institutions, all of which tend to help mitigate crime (Agnew, 2012). Agnew (2012) further pointed out that the effects of climate change are

likely to promote crime by "increasing strain, reducing social control, [and] weakening social support."

Intergroup attitudes can also be negatively impacted by climate change. In a recent study, survey respondents displayed more negative attitudes toward policies to support minorities and immigrants when temperatures were high (Cohen & Krueger, 2016). An experimental study showed that people who were thinking about climate change became more hostile to individuals outside their social group (that is, people they consider to be unlike them) and more likely to support the status quo and its accompanying social inequities (Fritsche, Cohrs, Kessler, & Bauer, 2012). Hostility toward individuals outside one's social group can be a way of affirming one's own *group identity* in the face of a perceived threat. In a vicious cycle, lower levels of social cohesion and connectedness, greater social inequalities, lack of trust between community members and for institutions, and other factors that inhibit community members from working together are associated with intergroup aggression (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008).

KEY TAKEAWAYS:
Impacts on Community and Society

- Decreased sense of cohesion

- Disrupted sense of continuity and belonging

- Increased interpersonal aggression, such as domestic abuse and crime

- Increased intergroup aggression, such as political conflict and war

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b. A small native Inuit community of 259 members is located in Rigolet, Nunatsiavut, within the Canadian province of Newfoundland and Labrador.

THE PROBLEM OF INEQUITY

RISK-PRONE AREAS

Communities in which people's livelihoods are directly tied to the natural environment, through agriculture, fishing, or tourism, are at greater risk. Some parts of the world are geologically more vulnerable to storms, rising seas, wildfires, or drought. There are detailed reports of farmers in Australia who have been negatively affected by prolonged periods of drought caused by changing weather patterns (Hanigan et al., 2012). Additionally, communities in low-lying areas, such as coastal Louisiana and islands in the Chesapeake Bay, are losing their land to erosion and rising seas (Davenport & Robertson, 2016). This past year, residents of Isle de Jean Charles, Louisiana, became the first climate refugees in the United States; a $48 million budget was allocated to relocate residents to a less flood-prone area (Margolin, 2016). Inhabitants of indigenous communities often depend on natural resources for their livelihoods and are located in geographically vulnerable regions (e.g., Cunsolo Willox et al., 2013, 2014; Maldonado, Colombi, & Pandya, 2013).

Communities that lack resources, both physical and financial, can experience climate impacts more severely. This can be demonstrated by higher incidents of extreme weather within impoverished communities. In disasters, socioeconomically disadvantaged communities often suffer the most. For example, following Hurricane Sandy, lower-income residents reported weak or absent social support networks and had the greatest percentages of severe mental distress and diagnosis of depression or anxiety after the hurricane. Furthermore, 35% of children living in a household that earns less than $20,000 annually experienced feelings of sadness, depression, fear, or nervousness following the hurricane (Abramson et al., 2015).

INDIGENOUS COMMUNITIES

Indigenous communities are at risk of losing their cultural heritage, as well as their homes. Imperiled indigenous communities are found around the world, including the United States. In Alaska, for example, some native Alaskans have seen their villages literally vanish due to the thawing permafrost, and others are facing a similar outcome in the near future (Chapin et al., 2014). For indigenous communities, climate change may threaten not only their physical home but also their lifestyle, including access to traditional food and culturally meaningful practices (Cochran et al., 2013;

The impacts of climate change are not distributed equally. Some people will experience natural disasters firsthand, some will be affected more gradually over time, and some will experience only indirect impacts. This section describes some of the populations that are more vulnerable to the mental health impacts of climate change, including people who live in risk-prone areas, indigenous communities, low-income groups, certain communities of color, women, children, older adults, and people with disabilities or chronic illnesses. A thorough review of demographic differences in vulnerability to climate change can be found in Dodgen et al. (2016).

Durkalec, Furgal, Skinner, & Sheldon, 2015; Rigby, Rosen, Berry, & Hart, 2011; Voggesser, Lynn, Daigle, Lake, & Ranco, 2013). Chief Albert Naquin of a Louisiana tribal community threatened by climate change stated, "We're going to lose all our heritage, all our culture" (quoted in Davenport & Robertson, 2016). Cunsolo, Willox et al. (2013) reviewed case studies of several Inuit communities and reported weakening social networks, increased levels of conflict, and significant stress associated with relocation or even thinking about relocation. In evocative language, Inuit community members interviewed by Durkalec et al. (2015) reported that an inability to go out on the sea ice (due to a changing climate) would make them feel like they "have no health" and "can't breathe," and they would "be very sad," "be lost," or "go crazy" (p. 21).

The loss of any community is tragic, but the impact on native communities is particularly notable because it diminishes the cultural heritage and because indigenous communities are often defined by a special connection to the natural environment (Cunsolo Willox et al., 2012, 2013, 2014; Durkalec et al., 2015). This connection includes traditional patterns of behavior and environmental knowledge about the specific local ecosystem—knowledge that is disappearing (Ford, Pearce, Duerden, Furgal, & Smit, 2010)—and about how to adapt to changing environments that could help us as a broader society as we adapt to the consequences of climate change (Wildcat, 2013).

"We are people of the sea ice. If there's no more sea ice, how can we be people of the sea ice?"

- one *member of the inuit communities, Canada*

A CLOSER LOOK
Inuit Mental Health and Climate Change, *Ashlee Cunsolo, PhD*

"We are people of the sea ice. If there's no more sea ice, how can we be people of the sea ice?" The circumpolar north is warming at more than twice the rate of the global average. As a result, local indigenous peoples are at the frontlines in experiencing climate change effects. Inuit in Canada still carry out active traditions of hunting, trapping, fishing, foraging, and harvesting, and as a result, even a subtle alteration in the climate and environment can impact their mental well-being.

For the Inuit, the land is everything.

- It is family, the source of cultural continuity. A local leader stated, **"We feel part of the land. It's me. It's us. It's my people. I always feel that sense of belonging, and that attachment."**

- It is a place of solace and healing, foundational for all well-being. **"I think for the Inuit, going out on the land is just as much a part of our life as breathing...So if we don't get out, then, for our mental well-being, it's like you are not fulfilled."**

Five Inuit communities in Nunatsiavut, Newfoundland and Labrador, Canada have been working together to proactively study the relationships between climate change and mental health in the North. This research discovered wide-ranging consequences for individual and community well-being:

1. **Strong emotional reactions** Emotional responses to the climatic and environmental changes included "sadness," "fear," "anxiety," "stress," "distress," and "frustration." People called the changes "devastating," "scary," and "depressing." A young hunter explained, **"People like to go out on the land to feel good. If they**

can't go out on the land, they don't feel like people."

2. **Increased drug and alcohol usage** Many mental health professionals expressed serious concern about increases in drug and alcohol use, which interviewees described as a way to fill the newly "empty" time from decreased opportunities for land-based activities.

3. **Reduced self-efficacy and self-regulation** As previously mentioned, many expressed concern over losing control of their traditions and livelihoods, which, in turn, leads to a loss of cultural identity and self-worth. One hunter explained, **"If a way of life is taken away because of circumstances that you have no control over, then you lose control of a part of your life."**

4. **Amplification of existing stressors** Finally, climate change compounded other mental health threats by removing a source of healing, cultural strength, food security, and autonomy. A counselor stated, **"When people are unable to spend time on the land, they have more time to dwell on the negative, to remember things like residential school experiences when they felt really trapped and unable to leave."**

It is clear that climate change is no longer abstract or theoretical. People globally, such as the Inuit in the North, are experiencing a range of psycho-social responses. Climate change impacts on mental health must be further understood and considered in policy and decision-making for mitigation, adaptation, and health responses.

CHILDREN AND INFANTS

Climate change has a big impact on young people. Children are more vulnerable to many of the effects due to their small size, developing organs and nervous systems, and rapid metabolisms (Bartlett, 2008). Children are more sensitive to temperature, because their physiological regulatory systems may be less effective (e.g., they sweat less) and because they are more likely to depend on others to help them regulate their behavior (Zivin & Shrader, 2016). Their small size makes very young children more susceptible to dehydration, and children under age five living in poverty represent 80% of victims of sanitation-related illnesses and diarrheal disease (Bartlett, 2008).

Climate impacts may have long-term and even permanent effects, such as changing the developmental potential and trajectory of a child. Currie and Almond (2011) reviewed evidence that even minor disturbances during childhood may have effects on health and earning potential that last into adulthood. Studies have shown that children who experience a flood or a drought during key developmental periods are shorter, on average, as adults (Bartlett, 2008). Fetuses are vulnerable to heat waves, with research shows that exposure to heat waves especially during the second and third trimesters of pregnancy leads to a lower average birth weight and possibly a greater incidence of preterm birth (Kousky, 2016). Malnourishment or severe threat to health during the early years is associated with fewer years of schooling and reduced economic activity as adults, as well as with behavioral and motor problems and reduced IQ (Kousky, 2016). Additionally, early exposure to disease provoked by climate change can have a major and permanent impact on neurological development, as can be dramatically seen in children exposed prenatally to the Zika virus (e.g., Mlakar et al., 2016).

Children can experience PTSD and depression following traumatic or stressful experiences with more severity and prevalence than adults. After climate events, children typically demonstrate more severe distress than adults (Fritze et al., 2008; Somasundaram & van de Put, 2006). Furthermore, the prevalence of distress is also higher; higher rates of PTSD were found in children two years after a flood (Fernandez et al., 2015). Children's mental health can also be affected not only by their experiences of stressors, such as natural disasters, extreme weather,

and ecomigration, but also by the mental health of their caregivers (Simpson et al., 2011). Children also have the potential to be emotionally affected if they become separated from their primary caregivers. Similar to physical experiences, traumatic mental experiences can have lifelong effects. Of course, early childhood is critical for brain development. Studies have documented that high levels of stress during childhood can affect the development of neural pathways, in ways that impair memory, executive function, and decision-making in later life (e.g., Shonkoff, Garner, & the Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, and Section on Developmental and Behavioral Pediatrics, 2012).

Disasters may cause children to lose their social support networks to a greater extent. During adversity, people draw upon all of their personal resources—emotional and material. Although social networks can fill the gaps when individual resources become depleted during extreme trauma (Hobfoll, 1989; Ungar & Liebenberg, 2013), the resources available from a tight-knit community may not go far, especially if the network is small or the community is poor. When disasters hit an area, they affect everyone and put entire neighborhoods in need of help. A study of children impacted by Hurricane Katrina found that those who were hit hardest by the storm also experienced less social support, likely because people in their immediate support network were themselves suffering (Banks & Weems, 2014).

Children are more vulnerable to many of the effects due to their small size, developing organs and nervous systems, and rapid metabolisms (Bartlett, 2008).

Children are also at increased risk from disruptions to the educational system (Kousky, 2016). Natural disasters, in particular, can damage or destroy schools or make them inaccessible to teachers and students. After Hurricane Katrina, for example, 196,000 public school students had to change schools, and many of them missed a month or more of schooling. In this case, because the hardest-hit school districts were also some of the worst-performing ones, some students benefitted by transferring to better schools. However, the effects on school achievement were negative (Kousky, 2016).

A CLOSER LOOK
Children's Emotional Responses to Climate Change, *Elizabeth Haase, MD*

Children's fears about climate change revolve around known and mysterious future effects. Direct experience with natural disasters can cause symptoms of post-traumatic stress disorder, including panic symptoms, nightmares, and phobic behavior. For example, some pre-school children who lost their homes to Hurricane Sandy developed a phobic avoidance of rain, waves, and thunder that generalized to panic about getting in bathtubs, going to school (which they feared might flood), and going to swimming lessons.

The emotional **dysregulation** children experience after environmental trauma reflects the idiosyncrasies in ascribing **agency** and **causality** of small children. A four year old whose parents' discipline method was withholding toys held her mother responsible for losing her dolls to Sandy and had rages in which the child accused her mother of "taking and killing" her dolls (Felix, Haase, & Haller, 2016). A three year old, grief-stricken about local clear-cutting that was killing large numbers of beloved local animals, declared that he would destroy the perpetrators by "calling them a bad word."

Children, with less ability to articulate their feelings in language, are also more likely to regress, showing babyish behaviors, or **somatize**, developing stomachaches or other physical symptoms to express upset, as did one child when his school cafeteria refused to recycle.

Finally, children are more dependent, and therefore are more vulnerable to separation reactions. One boy whose dog was harmed by a tornado that also destroyed his home and killed several peers became preoccupied with securing the animal's safety; his inability to leave his dog behind when necessary curtailed his friendships, as well as his academic and extra-curricular achievement (Haase, notes).

Children also develop symptoms because they fear losing control over an unknown future. Often obsessive-compulsive behaviors result, such as picking up every piece of garbage on the way to school or running relentlessly through "what if" scenarios. One young patient, terrified that climate ruin would leave him poisoned by toxins, developed a rigid nightly schedule of self-improvement to prepare and educate himself. Only by checking off every evening ritual could he ward off panic attacks and insomnia (Haase, notes). In Inuit and Aboriginal cultures, youth are reporting higher rates of suicidal thinking and depression linked to lost social rewards because nature-based activities are no longer available to them (Hersher, 2016). Alienation and depression are common in young people who have suffered climate consequences and are living in a cultural setting that does not validate their climate concerns.

Thankfully, emerging literature suggests the possibility of post-traumatic growth following natural disasters, reflected in greater resilience and transformation to more sustainable lifestyles. Such progress requires the developmental and psychological abilities to grieve and articulate feelings in a narrative format. Interestingly, data shows that in particular, prolonged reflective rumination on climate in combination with hope and coping advice from supportive caregivers brings such positive transformation and healing.

DISADVANTAGED COMMUNITIES

Some communities of color are prone to experience increased impacts. A persistent reality in American culture is the existence of environmental injustice: Some racial and ethnic groups tend to be more exposed to environmental risks and to have fewer financial and political resources to buffer the impact (e.g., Grineski et al., 2012; Parks & Roberts, 2006). This is partly, but not completely, explained by economic status. Communities with fewer resources and greater exposure, for example, in Phoenix, Arizona, are likely to experience greater rates of high temperature impacts than majority groups (Luber & McGeehin, 2008). Lower-income communities are more likely to have outdated infrastructure, such as a lack of extreme weather warning systems, inadequate storm surge preparedness, and clogged or inadequate storm sewer systems, which places these communities at greater risk for the impacts of climate change. Areas with a high number of residents who lack access to health care or health insurance, or already experience poor health (Edwards & Wiseman, 2011), are more likely to be affected by climate change. Communities are also less resilient when they are weakened by social stressors, such as racism, economic inequality, and environmental injustices. Many of the communities in New Orleans that were affected by Hurricane Katrina possessed all of these characteristics (Norris et al., 2008; Yun et al., 2010), and the effects of racial disparities were clearly visible in the aftermath of the storm (Luber et al., 2014).

OCCUPATIONAL GROUPS

Certain lines and fields of work are more directly exposed to the impact of climate change. These occupations may include but not be limited to first responders, construction workers, health care work-ers, farmers, farm workers, fishermen, transportation workers, and utility work-ers (Benedek, Fullerton, & Ursano, 2007). Inequitable health outcomes may arise directly through workers' exposure to increased temperatures, air pollution, and extreme weather, and indirectly through vector-borne diseases, increased use of pesticides, and many other elements (Centers for Disease Control and Prevention, 2016). According to the U.S. Environmental Protection Agency, outdoor workers will be the first to endure the effects of climate change, as they will be exposed to extreme heat, which can cause heat stroke, exhaustion, and fatigue. As natural disasters occur more frequently, such as wildfires and flooding, firefighters and paramedics face increased safety risks. Agricultural workers face increased vulnerability to allergens, insects carrying diseases, such as West Nile, and pesticide exposure that are increased by changing weather and insect migration patterns (U.S. Environmental Protection Agency, 2016).

ADDITIONAL POPULATIONS OF CONCERN

Individuals of all ages with disabilities or chronic mental or physical health issues may experience climate-related impacts at a greater extent (Page, Hajat, Kovats, & Howard, 2012). Often, people living with disabilities have disproportionately far lower access to aid during and after climate-related disasters. Those with mental health disorders can also experience exacerbated symptoms due to natural disasters. Degraded infrastructure creates barriers for people with mental illnesses to receive proper medical attention, leading to additional negative mental and physical health outcomes. For instance, following the 2012 Wisconsin heat wave, 52% of all heat-related deaths were among individuals with at least one mental illness. Half of

those suffering from mental illness were taking psychotropic medications, which impede one's ability to regulate one's body temperature. These medications that treat mental illness are one of the main underlying causes of heat-related deaths (Dodgen et al., 2016). Additionally, those suffering from ongoing asthma and respiratory illnesses, like chronic obstructive pulmonary disease (COPD), are more sensitive to reduced air quality. Moreover, inequalities in the incidence of those who are chronically ill arise as a result of several socioeconomic factors (Gamble et al., 2016).

Due to increased health and mobility challenges, the elderly are very susceptible to the risks of climate impacts. Higher rates of untreated depression and other physical illnesses reported among seniors contribute to this increased vulnerability. Research suggests the elderly, in particular, experience declines in cognitive ability when exposed to air pollution over the long term (Dodgen et al., 2016). A study by Dominelli (2013) found that when infrastructure broke down (e.g., roads were impassable) due to floods, heat waves, or freeze-thaw events (all potentially climate-driven), formal care services were not available to vulnerable people, such as the elderly. They could not get to the services, and their normal services could not come through. Heat can have a particularly severe impact on the elderly and on people with pre-existing mental health problems; some of the medications associated with mental illness make people more susceptible to the effects of heat (Martin-Latry et al., 2007). Extreme temperatures or pollution can also make it more difficult for seniors to engage in regular outdoor activities, thus depriving them of the associated physical and mental benefits.

The stress directly related to supporting a child makes women more affected by climate change. Because of a mother's frequent caregiver role, and because, on average, women have fewer economic resources than men, women may also be more affected, in general, by the stress and trauma of natural disasters (Trumbo, Lueck, Marlatt, & Peek, 2011; Wasini et al., 2014). Possible loss of resources, such as food, water, shelter, and energy, may also contribute to personal stress. Epidemiological studies of post-disaster cohorts and the general population, suggest that women are more likely to experience mental health problems as a result of trauma. For example, the prevalence of PTSD in the general population is reported to be approximately twofold greater in women than in men (Somasundaram & van de Put, 2006).

**KEY TAKEAWAYS:
The Problem of Inequity**

A number of populations are especially vulnerable to the mental health effects of climate change, including:

- People living in risk-prone areas

- Indigenous communities

- Some communities of color

- Certain occupational groups with direct exposure

- Those with existing disabilities or chronic illness

- Older adults, women, and children

III. ADDRESSING THE MENTAL HEALTH IMPACTS

BUILDING RESILIENCE

Developing plans to adapt and cope is critical in addressing the physical and psychological impacts of climate change. In this section, we introduce psychological resilience, individually and on a community level. Resilience can be defined as the ability of a person (or a community) to cope with, grow through, and transcend adversity (Hobfoll, Stevens, & Zalta, 2015).

Climate change is no longer a distant, unimaginable threat; it is a growing reality for communities across the globe. Recognizing the risk, many local governments in the United States (as well as other places around the world) have created preparation or adaptation plans for shoring up physical infrastructure to withstand new weather and temperature extremes. These plans, while an important step, generally overlook the psycho-social impacts of a changing climate and do little to create or support the soft infrastructure needed for community psychological well-being (Baussan & Kelly, 2016). How can communities prepare themselves to minimize suffering and promote **resilience** in the face of the challenging impacts of climate change? Resilient communities can create the physical and social infrastructure that makes them less susceptible to negative effects.

On an individual level, resilience is built internally and externally through strategies, such as coping and self-regulation, and community social support networks. Most people come through adversity with positive adjustment and without psychopathology (Bonnano, 2008; Hanbury, Indart, & Saklofske, 2013). In fact, some individuals may even experience what is called **post-traumatic growth** and come through a significant disruption with the feeling of having gained something positive, such as stronger social relationships or specific skills (Lowe et al., 2013; Ramsay & Manderson, 2011).

Even so, much can be done to increase the resilience capacity of individuals and communities, particularly in response to climate change. The following sections describe factors that support psycho-social resilience in both.

Resilient communities can create the physical and social infrastructure that makes them less susceptible to negative effects.

A CLOSER LOOK
Resilience in the Face of Climate Change, *Victoria Derr, PhD*

In collaboration with Resilient Boulder (a project of the Rockefeller Foundation's 100 Resilient Cities network), Growing Up Boulder (GUB) worked with an economically and ethnically diverse sample of children and youth to develop their perceptions of resilience within the city of Boulder, Colorado. In the pilot phase of the project, children made a mural with aspects of their community that supported or inhibited resilience and took pictures of their community that explained these concepts. In an in-depth phase, elementary and high school students explored resilience at various scales of the community through drawings, identification of assets and vulnerabilities, and recommendations for making Boulder more resilient. Finally, high school students continued this work through a poetry project developed in partnership with several Latino poets and the U.S. poet laureate. Children and youth also shared their ideas with local leaders and developed recommendations for increasing the resilience of Boulder's young people.

Across all methods, these young people identified access to nature and *family, friends, and supportive networks* (from school and community) as critical factors in supporting resilience, while global climate change was described as a vulnerability. Concerns about climate change emerged from the first brainstorming session, in which youth jotted down ideas for assets and vulnerabilities on large butcher-paper sheets. One student wrote "the news," and then many other students expanded on this idea, adding many more news sources. Students largely hear about climate change via news media, with little opportunity to feel empowered or to take positive, local action.

In the high school poetry project, students described a personal moment of resilience. Many of these stories included family losses and coping with poor family health, the challenges of immigration, and surviving Boulder's recent flood. In 2013, Boulder experienced a 100-year flood, as well as a 1,000-year rain event, which severely impacted the city and region, with many families temporarily or permanently displaced. Some students wrote about resilience in the context of this flood, describing a family member handling it alone, without social support.

Students focused on local issues that impact their daily lives and their potential to support resilience, including access to nature. Many across all age groups said nature, from views of the mountains from their high school to small parks and open space, helped build resilience. However, many of the students in this research do not have daily access to nature despite living in a relatively green city. Greater access to nearby nature could provide young people with sources for restoration and resilience.

In general, youth identified climate change as negatively impacting their personal resilience and access to nature as supporting resilience. However, they tended to focus on many social and economic factors, such as poverty and immigration status, that are more directly seen and felt than climate change. This focus suggests that for these students, as for many others, climate change still seems to be an abstract issue.

TIPS TO SUPPORT INDIVIDUALS

Some people seem to function more effectively in difficult situations than others do. No single factor sets highly resilient individuals apart (Bonanno & Diminich, 2013). Instead, an individual's ability to recover from trauma, or to experience post-traumatic growth, depends on a complex and dynamic set of factors. Here, we provide tips on the factors of personal attributes and social support designed to help practitioners, policymakers, and communicators support individuals' success in becoming resilient.

PERSONAL ATTRIBUTES AND ACTIONS

1. Build belief in one's own resilience.
Several personal dispositional characteristics are associated with individual resilience. People who feel positive about their ability to overcome a source of stress and trauma do better than people with lower **self-efficacy**. Belief in one's own resilience has been correlated with fewer symptoms of PTSD and depression after disasters (Shenesey & Langhirichsen-Rohling, 2015).

2. Foster optimism.
People who are able to reframe and find something positive in their circumstances tend to do better than people who are less able to regulate their thinking, emotions, and actions (Bonanno & Diminich, 2013; Hanbury et al., 2013; Harper & Pergament, 2015; Iacoviello & Charney, 2014; Petrasek Macdonald, Ford, Cunsolo Willox, & Ross, 2013; Prince-Embury, 2013). Positively reappraising one's circumstances helps move one forward rather than becoming stuck in a cycle of negative emotions. Additionally, optimism likely contributes to a person's ability to feel positive emotions during a hard time, which may help people better recover and cope (Terpstra, 2011). In a study of low-income mothers who survived Hurricane Katrina, Lowe et al. (2013) found that optimism helped the mothers adjust and grow after a disaster. Of course, excessive optimism may result in disappointment or surprise if the expected outcome does not come to pass; therefore, the right balance is needed.

3. Cultivate active coping and *self-regulation.*
Another strength is active coping, which involves cognitive dimensions, such as maintaining an awareness of one's own thoughts and appraisals, and behavioral dimensions, such as continuously seeking solutions and support (Iacoviello & Charney, 2014). Self-regulation, or the ability to control one's immediate impulses in favor of a more considered, long-term strategy, is another characteristic of resilient individuals (National Scientific Council on the Developing Child, 2015).

4. Find a source of personal meaning.
Involvement in a faith community has been cited as a protective factor for mental health in several interview studies with people experiencing trauma (e.g., Cline, Orom, Child, Hernandez, & Black, 2015; Fernando, 2012; Harper & Pargament, 2015; Weine et al., 2014). For many, faith gives a sense of peace during difficulty (Marks, Hatch, Lu, & Cherry, 2015), and studies have shown that having a spiritual practice tends to boost an individual's well-being and can be an important

coping resource. In addition to the social support that is often provided by a faith community, having a spiritual practice can help people manage and find meaning in suffering during significant adversity (Ramsay & Manderson, 2011). **_Mindfulness_** can be another type of practice, through yoga and meditation, that gives people a greater sense of purpose and meaning (Garland, Farb, Goldin, & Fredrickson, 2015). In each case, the ability to flexibly reappraise adverse events in a way that enhances a sense of meaning is key for promoting personal well-being.

5. Boost personal preparedness.

Mental health can be incorporated into existing disaster preparation efforts. Recommendations for short-term disaster or emergency kits often include things like food, water, supplies, and medication. Yet items that can preserve and shore up mental health are also equally important to include (Missouri Department of Mental Health, 2006). These items might include comfort items, such as spiritual or religious objects, pictures, blankets and toys for small children, favorite foods or treats to supplement stable shelf food, recreational items such as books and games, and paper and writing instruments to journal or write down important information. Pets, which also provide some with a sense of comfort, must also be considered when making emergency kits and plans (Centers for Disease Control and Prevention, 2016; American Red Cross, 2017). Public agencies and other organizations may also want to encourage community members to incorporate these items into their disaster preparation kits. Other facets of preparedness, including family, neighborhood, school, and work response plans and other measures, can help increase confidence and the feeling of safety and reduce fear.

SOCIAL CONNECTION

6. Support social networks. Individuals' personal capacity to withstand trauma is increased when they are connected to their networks off-and online. One strategy frequently noted in resilience studies is cultivating and maintaining strong social connections (Iacoviello & Charney, 2014). Connectedness to others is a core psychological need and an essential foundation for well-being (e.g., Deci & Ryan, 2011). During difficult times, people turn to those they are close to, such as family, friends, and neighbors, for emotional support, as well as material help (e.g., money, food, or a temporary place to stay). Resilience scholars note that social support is a critical protective resource during adversity (Kaniasty, 2012). Researchers have found that higher levels of social support during and in the aftermath of a disaster are associated with lower rates of psychological distress (Greene, Paranjothy, & Palmer, 2015; Self-Brown, Anderson, Edwards, & McGill, 2013). The positive mental health impact of a strong social support system, or the negative impacts of lower social support, can persist for years after a disaster, such as a hurricane (Banks & Weems, 2014). As described above, a faith community, or any other tight-knit and supportive social network, can provide significant emotional and material support (Cain & Barthelemy, 2008; Marks et al., 2015). People living in areas most impacted by Hurricane Katrina reported in an interview study that their "church family" (p. 256) offered them a listening ear, empathy, and moral support in the extremely difficult aftermath of the hurricane (Marks et al., 2015).

7. Encourage connection with parents, family, and other role models.

The supportof family and close connections are particularly important for children. Parents are likely the most central source of support for children during trauma and adversity, and children are at higher risk of

long-term physiological and mental health stress burdens when parents themselves suffer acute levels of distress (Simpson et al., 2011; Weine et al., 2014). Petrasek MacDonald et al. (2015) reported that spending time with family and friends helps protect the mental health of youth enduring the impacts of climate change on their land and environment. Parents and caregivers also serve as buffer against trauma and protect children from neglect and abuse by providing necessities, such as shelter and food (Kousky, 2016).

Support for children can come from outside the family as well. The National Scientific Council on the Developing Child (2015) found that children and youth optimize resilience during adversity if they have the help of non-caregiver role models, such as teachers or coaches. These role models are especially important following natural disaster events. Children look to parents and other caregivers as models in managing their emotions. Effective coping strategies should be taught during this time, such as encouraging children to talk about the event or turning to other resilient communities that have endured natural disasters and recovered (Lazarus, Jimerson, & Brock, 2002). Support networks, such as the National Alliance on Mental Health's Parents and Teachers as Allies program, can help these role models identify children with mental illness and relay the proper resources to parents.

8. When possible, uphold connection to place.
As climate change alters the landscape, it also forces change upon cultures tied to the land. As already noted, indigenous communities are experiencing rapid cultural change as the climate warms and makes many traditional cultural practices difficult. Research in affected communities indicates that people do not wish to leave their homes, despite the changes they may experience (e.g., Cunsolo Willox et al., 2012). Staying in a place to which one feels

connected can increase resilience because people are more likely to take adaptive actions, such as preparing for flooding (Adger et al., 2013).

9. Maintain connections to one's culture.
New immigrant and refugee communities are another vulnerable group whose mental health benefits from a connection to culture, especially during adversity. Weine et al. (2014) interviewed Burundian and Liberian refugees, many of whom were adolescents who had recently moved to the United States. The authors noted family cohesion, participation in religious traditions, and cultural connectedness were resources that protected individuals' mental health during difficult times. Refugees may find it particularly important to maintain cultural connections as their homes have been disrupted (Fullilove, 2013).

KEY TAKEAWAYS:
Tips to Support Individuals

In order to support individuals' success in becoming resilient, the following are tips to consider that address personal attributes and support social cohesion:

1. Build belief in one's own resilience.
2. Foster optimism.
3. Cultivate active coping and self-regulation.
4. Find a source of personal meaning.
5. Boost personal preparedness.
6. Support social networks.
7. Encourage connection to parents, family, and other role models.
8. Uphold connection to place.
9. Maintain connections to one's culture.

TIPS TO SUPPORT COMMUNITIES

We know a great deal about what helps individuals become more resilient. In contrast, little research has explored psycho-social resilience at the community level (Bonanno, Romero, & Klein, 2015). A resilient and **healthy community** is not just the sum of many resilient individuals; it multiplies individual capacity by bringing people together for joint action and mutual support. Resilience also requires more than crisis preparedness. To be resilient in the face of climate change, a community must have the flexibility to respond to the entire unpredictable array of potential climate impacts. Communities must be ready for sudden traumatic events, such as extreme storms, heat waves, and floods. Communities should also make plans that include tools for the slow, unsettling alterations of climate change, such as increasingly warmer winters or changes in local wildlife and plant communities.

Among other benefits, communities can be a source of stability and safety for their citizens or members. Humans fare better when they perceive the world around them as orderly, predictable, and benevolent (e.g., Hanbury et al., 2013; Kaniasty, 2012). As noted earlier, climate change brings great unpredictability and uncertainty for the future. Many people have difficulty coming to terms with the negative news they hear about climate change; they feel loss and despair. Similar to natural disasters and other large-scale traumas, climate change may cause people to question their beliefs about themselves, the people around them, and the world (e.g., Harper & Pargament, 2015; Marks et al., 2015). Similar to sufferers of physical trauma, people need tools to manage their anxiety and other feelings (Bonanno, 2008). To help restore people's equilibrium and their faith that there is good in the world, here are some tips to consider when building **resilient communities**.

COMMUNITY SUPPORT AND PLANNING

1. Assess and expand community mental health infrastructure.
Infrastructure plays an enormous role in shaping how vulnerable communities are to psychological impacts. A community with poor infrastructure is more vulnerable to the physical impacts of climate change, which, in turn, affect mental health. Mental health infrastructure, in particular, should be assessed (Weissbecker & Czinez, 2011). Dominelli (2013) suggested that part of the assessment of the mental health infrastructure should include questions about who may be available on an informal basis to provide help, care, medicine, and comfort when formal services break down. For example, neighbors and community members are often

Building resilience for disasters and confronting the gradual changes due to climate change will help communities alleviate adverse health outcomes. Although these tips are targeted toward city, state, and national planners and policymakers, a range of organizations (from public health agencies to faith-based communities) can use these suggestions to advance efforts and strengthen communities' response to disasters and gradual climate impacts.

the most available and the quickest to help people in their proximity (Dominelli, 2013). When assessing the community mental health infrastructure, here are some specific questions to consider:

1. Does the community have a plan to serve people in need after a shock/disaster?

2. Does the community have the capacity to serve the potential increased needs of people as climate impacts grow?

3. Currently, can all community members access the mental health care they need?

4. What are the gaps, and what areas of service may need to be augmented?

5. Is there a disaster mental health coalition?

Public health agencies are one channel for guiding and encouraging the expansion of infrastructure for adaptation and preparation. Although many public health officials do not yet perceive addressing climate change as a priority for their agencies, those who perceive greater risk from climate change are more likely to have begun to address it (Syal, Wilson, Crawford, & Lutz, 2011).

2. Facilitate social cohesion through community design.

Individual mental health is better in communities with stronger social fabric (Friedli, 2009). Strong community networks more easily develop in neighborhoods with spaces and organizations that bring people together, such as community centers, parks, and a streetscape of shops and sidewalks. This idea was borne out during the 1995 Chicago heat wave, when an analysis comparing two neighborhoods showed that people living in Chicago's Auburn Gresham neighborhood fared much better through the heat wave than

those in the adjacent and demographically similar (poor and largely African American) Englewood neighborhood. Heat wave–related deaths in Englewood were more than three times that of Auburn Gresham, and scholars attribute the low heat wave fatality rate in Auburn Gresham, which was lower than that of many very affluent Chicago neighborhoods, to the high social cohesion facilitated through an urban landscape of shops, public spaces, and community organizations (Klinenberg, 2013). During the heat wave, people in the Auburn Gresham neighborhood were more likely to check on one another, and thus, the most vulnerable, such as the housebound elderly, had a lifeline.

3. Train the people who will serve the community during a disaster.

Following a disaster, when people are in the throes of extreme distress and high emotion typical in the immediate aftermath (e.g., fear, anger, terror, helplessness, shock, grief), it is crucial that the services available to them be sensitive and interactive (Raphael, 2007). However, in the rush to provide basic necessities and to search for and rescue missing or injured people, this type of compassion may not always be present. Hobfoll (2007) offered five evidence-based principles to guide intervention in the aftermath of a disaster or acute event and to move rescue workers and responders toward compassion. Communities that implement these principles, by training first responders and others, can limit the long-term negative psychological consequences and trauma of acute events. The goals include promoting the following:

1. A sense of safety
2. Calmness
3. A positive *sense of self* and a sense of *community efficacy*
4. Connectedness
5. Hope

A CLOSER LOOK
Finding a Place for Psychology in Climate Change Deliberations, *Linda Silka, PhD*

One of the overarching concerns about climate change is its impact on the infrastructure we all depend on. What happens to vulnerable neighborhoods when roads and bridges are destroyed by extreme precipitation or when hurricanes hit a coastal community, leaving emergency services unable to reach the families hit hardest? How do communities get the information they need to prepare for such events and build resilience in the face of the changing climate?

In New England, many major cities are right on the ocean. Key parts of our infrastructure—roads and bridges and the like—could be underwater in the not-too-distant future. Various kinds of expertise are needed for the complex task of preparing for these impacts. I've seen this firsthand as part of the Infrastructure and Climate Network (theicnet.org), an NSF-funded network that brings together infrastructure engineers, climate scientists, and other researchers, such as psychologists, to strengthen communication across relevant disciplines. Through websites, workshops, webinars, and writing, ICNet members have found innovative ways to overcome disciplinary differences, across varying models of infrastructure failure and climate uncertainty, in order to provide information that can help communities prepare and adapt.

As researchers from diverse fields of study, we have talked together, shared models and approaches, and worked with practitioners such as in-state departments of transportation, in order to develop integrated roadmaps for addressing climate change. After four years of work, we now have much more actionable strategies for how the people on the ground can prepare for the coming climate change. In one of our most exciting ICNet meetings, a leading climate modeler involved in ICNet (Dr. Katherine Hayhoe of Texas Tech), alongside scholars from other disciplines, presented climate change models to a room full of infrastructure specialists from throughout New England. Participants repeatedly said afterward that for the first time they could see how they could actually use climate change information to prepare for coming challenges.

I was brought in as a social and community psychologist because the ICNet team members realized that they needed expertise in cross-disciplinary communication. There is much that psychology can contribute that too often goes untapped because it is not labeled as relevant to climate change. Psychology is central to much of what is being discussed, such as the worries the other disciplines expressed about how their findings will be implemented. Psychological research can help address group process, community problem-solving, social cohesion and connectedness, lack of trust between community members and institutions, differences in vulnerability, attitude–behavior links, heuristics and risk perception, and fear appeals. We psychologists have an important role to play in helping professionals from different fields collaborate effectively to prepare for climate impacts.

It is also important that first responders and others be trained to recognize the signs and symptoms of mental health distress, which vary widely across cultural communities and stages of life. Equally as important is cross-training between mental health and first responders. Those suffering acute emotional trauma benefit from immediate assistance (Madrid & Grant, 2008), and it is important that available resources be focused upon those who need them most. **Critical incident stress management** can be used to help alleviate the potential for developing PTSD (Everly, Flannery, & Eyler, 2002). Among the growing number of climate refugees forced to relocate, some experts recommend having screening tools to assess losses in physical and psychological resources, needs, and symptoms (Hollifield, Fullilove, & Hobfoll, 2011). Not everyone experiences psychological distress after a disaster, and some may be worse off if they are coerced into participating in an unnecessary intervention (Bonanno, 2008).

Diversity training is also essential for those who work in community facilities, such as designated cooling centers or shelters, where people from all backgrounds may seek aid and assistance. Those running these facilities must ensure a safe and welcoming environment for all community members regardless of gender identity, age, racial or ethnic background, sexual orientation, or religion (Phadke, Manning, & Burlager, 2015).

4. Provide clear and frequent information.
In an example of a slowly evolving environmental disaster (an asbestos leak in a Montana town characterized by high levels of uncertainty), people expressed the need for clear information (Cline et al., 2015). Those affected by the disaster also had unmet emotional needs because others in the community did not recognize or acknowledge their suffering. It is possible that those feeling trauma from the gradual impacts of climate change may experience a similar need for informational and emotional support. One barrier to this kind of support is a hesitance that many people feel to talk about climate change with others. It is critical that those communicating with impacted people are seen as reliable, legitimate, and credible (Stockholm Environment Institute, 2016). Information from other communities that have already experienced significant disasters can be invaluable in helping communities prepare for climate changes.

5. Reduce disparities.
Communities as a whole cope better with an acute event when economic disparity is reduced and the needs of the economically vulnerable are attended to in advance (Iacoviello & Charney, 2014; Norris et al., 2008). Wickes, Zahnow, Taylor, and Piquero (2015), in a study of Brisbane, Australia, residents, found greater community-wide trauma after a flood in areas with high concentrations of economically vulnerable people in comparison with a similar community where residents were more affluent. After the flood, affluent neighborhoods with access to material resources displayed greater resilience than less well-off communities, regardless of their level of social capital (Wickes et al., 2015). A community with large resource disparities is not resilient. To broaden resilience community-wide, Baussan and Kelly (2016) suggested that communities do what they can to reduce disparity by investing in affordable housing, expanding employment opportunities, and improving public transportation.

6. Pay special attention to vulnerable populations.
As discussed throughout this report, not everyone will experience climate change in the same way. In particular, low-income communities, indigenous groups, immigrants,

refugees, pregnant women, children, and older adults are especially susceptible to the psychological effects of climate change. (See "The Problem of Inequity" on page 31.) Planners and policymakers should take this fact into account when developing programs and protocols to prepare for climate change. Planners may also choose to use climate risk and vulnerability maps, like those that have been used by the City of Toronto (Gower et al., 2010), to identify areas and populations that may be especially susceptible to impacts on human well-being and plan accordingly.

DISASTER PLANNING

7. Develop trusted and action-focused warning systems.

An effective warning system for severe weather events can save lives, reduce injuries, and reduce property damage from disasters. Unfortunately, these systems do not always function as effectively as they could, due, in part, to limitations and uncertainties inherent in forecasting technologies. However, warning systems are also often less effective because individuals ignore warnings or downplay them. Research suggests a number of factors that influence the likelihood people will take warnings seriously and take protective action. For example, people with little personal prior experience with a disaster or who don't understand the severity of possible impacts appear to be less motivated to take the warning seriously or to seek further information (e.g., Knocke & Kolivras, 2007; Lee, Meyer, & Bradlow, 2009). It is also possible that a warning system that has been wrong on numerous occasions may be perceived as unreliable, and thus is less likely to evoke a response (for a discussion, see Barnes, Gruntfest, Hayden, Schultz, & Benight, 2007). Some research also suggests that there may be important racial differences in how individuals respond to a warning (e.g.,

Lachlan, Burke, Spence & Griffin, 2009). This difference, in turn, can affect the likelihood and severity of psychological and other impacts on human well-being. Communities should consider testing their warning systems to be sure that:

1. All residents are reached.
2. All residents understand what the warning means and the steps they should take to respond to it.
3. The warnings are perceived as reliable and credible.
4. The warnings communicate that the government and other organizations are actively taking steps to care for the community.

8. Provide a fast response.

After an acute trauma, support must be mobilized quickly. Many psychological stress symptoms stem from the early phases of a disaster (Simpson et al., 2011), and a sense that aid is slow in coming, non-existent, or distributed unfairly can contribute to people viewing their community as uncaring and unavailable (Kaniasty, 2012). Those living in the community itself, and organizations located there, are often the quickest to come to others' aid during a disaster (Baussan, 2015), which underscores the importance of community engagement in climate resilience planning (see Section 11 "Engage community members" below).

9. Have a post-disaster plan.

As noted earlier, psychological distress following a disaster may linger for several years. Communities can alleviate some of the long-term impacts with post-disaster planning, particularly targeting lower-resourced communities that tend to be harder hit materially and emotionally (Baussan, 2015). One important element of a post-disaster plan is the return of evacuated residents. Although people may

need to leave their homes in the case of disasters, their rapid return to their home environments will avoid the more significant trauma associated with displacement.

Communities can alleviate some of the long-term impacts with post-disaster planning

10. Ensure equitable and transparent distribution of resources.

Following an acute event, distribution of relief or help may further divide a community if it is perceived as being done inequitably (Kaniasty, 2012). Of course, distribution inequity often falls along the divisions of pre-existing inequalities; those with greater power and privilege may receive a greater amount or more rapid assistance than people who occupy a marginalized place in the community. Perceived inequities such as these can lead to polarization within the community; this kind of tear in the social fabric of the community and the concomitant loss of empathy and connection to others are harmful for individual, as well as group, functioning (Prince-Embury, 2013). Inequitable distribution of resources can also create distrust of government and

institutions. One way to address this inequity is by including conservation areas for community gardens and "foraging," rather than zoning open space for unused infrastructure.

COMMUNITY ACTION

11. Engage community members.

Scholars agree that **adaptation** and resilience planning is most likely to succeed if the community is involved (Cox, 2012; Moser & Boykoff, 2013; Moser & Pike, 2015; Norris et al., 2008). Top-down disaster planning decisions can be effective in providing basic infrastructure, such as emergency responder training, shelters, or emergency food, water, and energy supplies. However, given the unpredictability and unevenness of climate change impacts, there is no top-down, one-size-fits-all way to prepare a community to respond to climate change. Instead, planners should work to help the community, as a social unit, prepare itself to collectively and creatively respond to psychological and social adversity (Cox, 2012; Moser & Boykoff, 2013; Norris et al., 2008). Focusing on community-level capacities may also be the most efficient and effective way to build the resilience necessary for individuals and communities to successfully prepare for and cope with the potential psychological impacts of climate change (Cox, 2012; Moser & Pike, 2015). Communities can also coordinate messages and efforts across government and non-government organizations, which can multiply the strength and validity of the messages before, during, and after disasters.

Community members should be engaged in all stages of climate change resiliency work, beginning with advance planning and capacity building and continuing through disaster management and recovery (Norris et al., 2008). To scale up these strategies,

communities should work with individuals already involved in communication and engagement to introduce a network that supports collaboration of these skills (Moser & Pike, 2015). Deep community engagement yields multiple benefits, such as utilizing local skills and maintaining cultural practices. As an intervention in Haiti demonstrated, cultural sensitivity is an essential feature to ensure a program's acceptance and success (Bastien, 2012). When community members are involved in planning, there is a greater sense of autonomy and ownership, which is likely to increase their sense of efficacy. This can help combat the denial and passivity that undermine effective response (Ojala, 2012; van Zomeren, Spears, & Leach, 2010) and decrease the skepticism that some communities feel toward external help (Phadke et al., 2015). Community members are also more likely to participate if someone from their social network is already involved in efforts and reaches out to them personally (Phadke et al., 2015). Representation from people from a wide range of backgrounds in the community is more likely to highlight differential vulnerabilities across groups, such as race, class, gender, or economic status, and allow them to be addressed during planning. According to Reed et al. (2013), ameliorating these drivers of injustice and vulnerability should be the focus of climate change resilience and adaptation planning.

12. Increase cooperation and social cohesion.
One problem in mobilizing community support after a community-wide traumatic event is that those in the social network, whom an individual might otherwise count on for assistance or companionship, are likely to also be victims of the same trauma. This makes it difficult for close neighbors to come to each other's assistance. People

within the community are unlikely to be able to replenish their own emotional well-being when all are suffering from a communal resource drain (physical, financial, emotional).

Social cohesion can be cultivated by bringing people together to discuss and deliberate. People can forge closer social bonds, improve their communication, and come to agreement that residents will work together when needed. At a minimum, strengthening social networks may require only that community members and neighbors make an explicit agreement that they will help each other during adversity (Briggs & Weissbecker, 2011). Community planners can also devise ways to provide resources to existing social networks (Norris et al., 2002), such as churches and other civic groups.

13. Provide opportunities for meaningful action.
Community engagement during a crisis has further benefits. For one thing, it expands the reach of efforts to help those suffering; as the number of community members involved in helping during a crisis increases, the number of people helped also grows. The people doing the helping may benefit even more than those receiving their aid. A well-known finding in psychology is that one's own well-being increases through helping others. Research in trauma-impacted communities has confirmed that this effect holds true during personally difficult times (Kaniasty, 2012; Petrasek MacDonald et al., 2013). For example, families experiencing trauma report that helping others increased their own ability to cope (Lietz, 2015). In a study conducted after Hurricane Katrina, interviewees emphasized the importance of "giving back" to others in their own healing process (Marks et al., 2015, p. 256). Becoming involved in post-disaster

community efforts may also have a self-reinforcing positive effect on people's perceptions of their own and the community's resilience. When people see firsthand that many others are participating in resilience-building efforts, they become more confident not only in the collective efficacy of the community but also that help will be available when they themselves need it (Kaniasty, 2012; Kaniasty & Norris, 2009).

Additional Resources for Responding to Mental Health Needs After Disasters
The following sites provide helpful overviews of the steps emergency personnel and individuals can take to care for themselves and others:

- Centers for Disease Control and Prevention
- U.S. Department of Veteran Affairs
- Washington, D.C. Government
- American Psychiatric Association
- Federal Emergency Management Agency
- PreventionWeb
- U.S. Department of Health and Human Services
- Substance Abuse & Mental Health Services Administration
- The National Child Traumatic Stress Network
- International Critical Incidence Stress Foundation
- The Center for the Study of Traumatic Stress

KEY TAKEAWAYS: Tips to Support Communities

Community planners, policymakers, and additional leaders may have experience preparing for the physical impacts of climate change, but it is also important to be well-equipped for the potential mental health impacts. Here are some tips to help with preparing and responding to acute and gradual change:

1. Assess and expand the community mental health infrastructure.
2. Facilitate social cohesion through community design.
3. Train the people who will serve the community during a disaster.
4. Provide clear and frequent information.
5. Reduce disparities.
6. Pay special attention to vulnerable populations.
7. Develop trusted and action-focused warning systems.
8. Provide a fast response.
9. Have a post-disaster plan.
10. Ensure equitable and transparent distribution of resources.
11. Engage community members.
12. Increase cooperation and social cohesion.
13. Provide opportunities for meaningful action.

WHAT INDIVIDUALS CAN DO

ACTIONS AT HOME

Have an emergency plan. For example, emergency-preparedness organizations, such as the Federal Emergency Management Agency (FEMA), the CDC, and the American Red Cross, suggest having a household emergency plan that everyone is aware of and has practiced. They also suggest creating an emergency kit with supplies, such as a flashlight, food and water, first aid supplies, and other things one might need during or after a disaster. Additional items to include in an emergency kit, such as a book, religious literature or other spiritual items, journal, toys, or treats, can support mental health resilience. Awareness of your work or school's emergency plans is also critical to ensure a comprehensive plan. Doing so can help to alleviate anxiety or worry, and potentially instill a sense of control and security.

Understand one's own medical needs. Medications can have a wide number and variety of side effects, which can be intensified or present under certain changes in environment. For example, psychotropic medications can impact body temperature regulation or water retention. In extreme heat, this could lead to overheating and dehydration. Ask your pharmacist to explain and provide documentation on the side effects of your and your family's medications and include a cheat sheet of this information in your emergency kit.

Learn resilience interventions. Various intervention programs are offered to help people approach adversity with active engagement and hope. For example, a capacity-building intervention developed by Seligman and Peterson (2003) aims to bolster people's coping skills through a learned optimism framework. The intervention helps people develop a stronger sense of self-efficacy and feelings of control and encourages them to practice adaptive strategies rather than disengaging from difficulty. In addition, resilience scholars have noted the importance of staying physically active (Iacoviello & Charney, 2014). Physical activity helps regulate mood and boosts confidence, which can be useful if one must endure through trauma.

ACTIONS IN THE COMMUNITY

Develop and maintain social connections. Because of the tremendous benefits of social support, it is essential that people nurture their connection to family, friends, neighbors, and other important social ties, such as people from their

People can take tangible actions at home and in the community to begin to prepare for the projected impacts of climate change. These actions, in turn, can provide a greater sense of individual security and control. This section outlines some key steps individuals can take to prepare themselves for the mental health impacts of climate change.

faith community. Taking the lead in organizing something that brings people together, such as a community event, helps increase community social cohesion. As already noted, participating in community-level action has multiple benefits for the individual and the community.

Support solutions to reduce and prevent further climate change. One way to take action to address climate change within the community can be through public awareness of clean energy or other approaches to climate change mitigation. Discussing the co-benefits of clean energy with family and friends spreads the knowledge and facilitates change from the ground up. This proactive approach can help provide those who are concerned about climate change some level of psychological "relief" and a sense of accomplishment in helping others and the environment.

Start a community resilience project. Building community resilience before climate disruptions pays dividends in the aftermath of trauma. Although these efforts traditionally might have been initiated by a government agency, communities are beginning to understand that they are capable of organizing and spearheading such projects from within and that these efforts can strengthen the fabric of communities in sustainable ways. Here are a few points to keep in mind when building a community resilience project:

1. Gather a diverse team of stakeholders to create a shared vision, catalog local resources, identify gaps in services, and create a manageable plan.

2. Be flexible and inclusive, respect cultural sensitivities, keep an open mind about what might need to be changed, and make decisions with input from a variety of trusted community partners.

Projects can help increase awareness of available resources, such as the Disaster Distress Helpline. Importantly, these efforts emphasize behaviors, thoughts, and actions that can be learned and developed. Community skill-building can include proactive resilience building, as well as trainings designed to organize community response in the aftermath of climate disasters to reduce distress, foster short-term coping skills, and support long-term resilience.

KEY TAKEAWAYS:
What Individuals Can Do

Actions at Home

- Have household emergency plans that are routinely practiced.
- Understand family medications and their side effects.
- Learn resilience interventions.

Actions in the Community

- Connect with family, friends, neighbors, and other groups to build strong social networks.
- Support clean energy to prevent further climate change.
- Start a community resilience project.

WHAT MENTAL HEALTH PROFESSIONALS CAN DO

Health and mental health practitioners have a unique role in influencing professional communities, the public, and policymakers on the future well-being of our health and climate. Education, awareness, communication, and involvement are key components in motivating engagement and action on climate solutions. This final section highlights opportunities for health leaders to elevate their climate leadership.[c]

BECOME A CLIMATE-LITERATE PROFESSIONAL

In order to elevate leadership on climate change, awareness of the potential impacts on mental health, as well as ways to protect it, must be increased.

- Use this report to increase knowledge about the mental health impacts of climate change, and what you can do.
- Review the report's reference material as needed to dive deeper into available data and resources.
- Assess for climate-induced anxiety, depression, etc.
- Stay abreast of climate information, news, and the breadth of solutions.
- Increase your capacity and skills to communicate effectively on climate change and mental health.

ENGAGE OTHER MENTAL HEALTH PROFESSIONALS

Climate leadership can extend to fellow mental health colleagues, many of whom are just as concerned, and who would see benefit from being invited to engage on the issue. To help inspire and empower their leadership:

- Share successes, ideas, and best practices with your professional associations and colleagues, and encourage them to join in taking a stand on climate.
- Facilitate a presentation or workshop at a regional or national conference, and collaborate with peers to increase the power of your message. Colleagues will be more effective at making the connection between climate and mental health when they are given the education, tools, and ability to connect with and inspire their peers.

BE VOCAL LEADERS WITHIN YOUR COMMUNITIES

Individuals in the mental health community have a respected platform to influence and mobilize climate change discussions. Their knowledge and network can influence the dialogue and bring awareness to the interdependent relation of climate

c. For additional resources, see ecoAmerica's guide Let's Talk Health and Climate: Communication Guidance for Health Professionals.

change and mental health. They have the opportunity to help guide our communities on a path of progress through clean, healthy climate solutions.

- Educate local leaders on the mental health impacts of climate change and the mental health benefits of solutions.

- Encourage the broader community to protect and preserve personal, family, and community health and mental health through climate preparedness and prevention solutions.

- Have dialogues that enable common ground.

- Collaborate with fellow leaders to create community mental health preparedness plans for climate-related disasters and impacts.

- Help create or support climate and mental health programs and policies locally and regionally.

- To illustrate commitment and authenticity, institute programs and practices within your own organization and personal behavior to reduce your climate impact, such as energy saving programs, disaster preparedness trainings, or incentives to use public transportation.

- Coordinate communications efforts and messages within your professional community and at all levels of government.

SUPPORT NATIONAL AND INTERNATIONAL SOLUTIONS

Constructing solutions on a larger scale creates a clear and united approach to climate solutions and awareness of the far-reaching impacts of climate change. Health and climate experts, policy makers, communicators, and other professionals have the role and opportunity to set the stage for discussing relationship between climate and mental health.

- Submit articles, letters to the editor, op-eds, and white papers on the topic to newspapers, magazines, radio, social media, blogs, and TV outlets.

- Offer to be media spokespeople on climate and mental health.

- Write a climate column for your organization's blog, do podcasts, and/or share up-to-date news on social media.

- Participate in research efforts that get published for national distribution and share your expertise on climate and mental health through briefings with key leaders and policymakers.

- Collaborate with colleagues, community, and climate advocates to influence policy design and outcomes.

KEY TAKEAWAYS:
What Mental Health Leaders Can Do

As trusted messengers, mental health leaders have the opportunity to help make the link between health and climate. Here are some ideas to try:

- Become a climate-literate professional and stay up-to-date with current climate change news and communications best practices.

- Engage other mental health professionals by facilitating conversations and workshops that allow your colleagues to be more effective in inspiring action.

- Be vocal, model leaders within your community by getting involved locally to create support for climate solutions.

- Support national and international solutions by publicly sharing your expertise to influence the media, health leaders, and policymakers.

A CLOSER LOOK
Our Moral Obligation: The Duty to Warn and Act, *Lise Van Susteren, MD*

I am a doctor. A psychiatrist. Over the years, I have seen some of the darkest parts of the human condition. Nothing has prepared me for what I am now seeing.

Each day, our world devolves more quickly toward disruption from climate change. The news is coming at us from all sides—CO_2 emissions climbing, record-high temperatures, oceans increasingly acidifying, coral reefs dying, ice sheets melting, failing nations, the massive displacement of people.

Those least responsible for the crisis will be hurt the most—the poor, the elderly, the disabled, the emotionally vulnerable. The psychological toll is becoming more apparent—but much is being overlooked. I am seeing a growing number of climate *Cassandras* gripped by thoughts of future harm, suffering from pre-traumatic stress response (a before-the-fact version of classic PTSD) because they know the world has not heard the warnings forcefully enough.

What can we do? Mental health professionals help people face reality, because we know living in denial can ruin a person's life. As the climate crisis unfolds, we see people whose anger, anxiety, and depression, caused by the shortcomings of a previous generation, prevent them from leading productive lives themselves. We know about trauma from repeated exposure to horrifying events. We are trained, we are ethically bound, to respond to emergencies.

Why, then, are some mental health professionals slow to respond to this issue? Are we in denial ourselves? Surely, we have enough respect for science that the findings of 97% (Cook et al., 2016) of climate experts aren't disputed. Surely, we don't believe that destroying life is "not our problem."

We know change can be a challenge, but determined efforts to bring attention to problems break down resistance. Action is growing, but in the face of unprecedented danger, instability, and mounting impacts, more is needed. We prod ourselves with the questions, "Where are the journal articles, mission statements, letters to the editor, the flood of calls to Congress that show the full gravity of the crisis registering? Where is the collective effort to break through denial and get people to change—quickly?"

Our canon of ethics says we have a duty to protect the public health and to participate in activities that contribute to it. Mental health professionals are required in all 50 states to report child abuse. It is a legal obligation, but it is also a moral one. Is it any less a moral obligation to report that we are about to hand over a destroyed planet for generations to come?

Surely, in this time of crisis, as mental health professionals, truth seekers and healers, we will want to act. **What are we waiting for?**

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GLOSSARY

Acute: A condition that is severe and sudden-onset. (pg. 24)

Adaptation: Modification to fit a changed environment or adjust to cultural surroundings. (pg. 25)

Agency: The feeling of being the agent exerting power over a given action. (pg. 38)

Aggression: Hostile or violent behavior or attitudes toward another; readiness to attack or confront. (pg. 26)

Anxiety: A negative emotional state occurring in some forms of mental disorder that cause nervousness, fear, apprehension, and worry. (pg. 24)

Arousal: Heightened physiological activity caused by reaction to stimuli. (pg. 26)

Cassandras: With origins in Greek mythology, the Cassandra syndrome occurs when valid warnings or concerns are dismissed or disbelieved. (pg. 59)

Causality: The mental experience that one event follows another because one caused the other. (pg. 38)

Chronic: A condition that is a long-developing syndrome. Note that a chronic condition may cause an acute condition. (pg. 24, 29)

Community efficacy: The sense within a community that members have the resources and the ability to use them to achieve common goals. (pg. 48)

Critical incident stress management: An adaptive, short-term psychological helping process that focuses solely on an immediate and identifiable problem. It can range from pre-incident preparedness to acute crisis management to post-crisis follow-up. (pg. 50)

Directly: An impact that occurs through immediate interaction of an activity. (pg. 24)

Dysregulation: An abnormality or impairment in the metabolic, physiological, or psychological regulation processes. (pg. 38)

Ecoanxiety: A chronic fear of environmental doom. (pg. 29)

Ecomigration: The migration of populations for economic or ecological reasons; often occurs as a result of the deterioration of land. (pg. 31)

Environmental refugees: People who have been forced to permanently or temporarily leave their traditional habitat because of a natural or triggered environmental disturbance that seriously jeopardizes their quality of life or existence. (pg. 31)

Food insecurity: Being without reliable access to food that is sufficient in quantity and quality. (pg. 10)

Food safety: Handling, preparation, and storage of food in ways that prevent food-borne illness. (pg. 13)

Group identity: Sense of belonging to a group. (pg. 32)

Healthy community: A community with a strong social fabric and mutual support, that encourages civic involvement, allows people to express themselves, and maintains structure and order (Moos, 2008). (pg. 47)

Indirectly: An impact that is produced away from or as a result of a complex impact pathway. Also known as secondary or even third-level. (pg. 24)

Intergroup: A group that deals with two or more collections of different people; taking place or being between groups. (pg. 23)

Mental health: The ability to function cognitively and emotionally.

Meta-analysis: A statistical technique that looks for significant patterns of results across multiple scientific studies. (pg. 24)

Mindfulness: A mental state achieved by focusing one's awareness on the present moment, while calmly acknowledging and accepting one's feelings, thoughts, and bodily sensations, used as a therapeutic technique. (pg. 45)

Motivated cognition: A psychological phenomenon that illustrates how incoming information can be selectively interpreted and used to reach specific, biased conclusions rather than ones based on an unbiased assessment of the evidence. (pg. 19)

Post-traumatic growth: Positive psychological change experienced as a result of a challenge or adversity in order to increase functioning. (pg. 42)

Psychological distance: The extent to which an individual thinks about an event, person, or idea as abstract and separate from his or her current reality, instead of being concrete and directly experienced. (pg. 18,6)

Psychopathology: A mental disorder in which an individual displays amoral and antisocial behavior and lacks the ability to love or establish meaningful personal relationships. (pg. 24)

Phobic: Relating to phobia, which is a persistent and irrational fear of a specific object, activity, or situation that leads to a desire to avoid it. (pg. 24)

Resilient communities: Communities that continues to function and offers aid and kindness through adversity. (pg. 47)

Risky behavior: A lifestyle activity that places a person at increased risk of suffering a particular condition, illness, or injury. (pg. 25)

Resilience: The ability of a person (or a community) to function in the face of adversity, to survive, and, perhaps, even to thrive (Hobfoll, Stevens, & Zalta, 2015). The capacity to recover quickly from adversity or difficulties. (pg. 10, 42)

Self-efficacy: People's belief in their own ability to succeed in a situation or to accomplish a task. (pg. 44)

Self-regulation: A person's ability to direct and control his or her behavior and impulses. (pg. 26)

Sense of self: An individual's perception of his or herself, or self-image. (pg. 48)

Social capital: The aggregate of social resources or networks of relationships that enable a community to function effectively. (pg. 31)

Social cohesion: The willingness of members of a society to cooperate with each other in order to survive and prosper. (pg. 31)

Solastalgia: The lived experience of negatively perceived change to a home environment. (pg. 27)

Somatize: To experience psychological distress in the form of physical symptoms, such as headaches or stomachaches. (pg. 38)

Somatic: Mental disorders characterized by an emphasis on physical symptoms, such as pain or fatigue. (pg. 24)

Suicidal ideation: Suicidal thoughts, or thoughts about how to kill oneself, which can range from a detailed plan to a fleeting consideration that does not include the final act of killing oneself. (pg. 24)

Worldviews: Sets of deeply held beliefs and attitudes about how the world works and how people should relate to one another. (pg. 19)

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