



# Climate Change: A Call to Action for the Psychiatric Profession

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Received: 27 December 2017 / Accepted: 18 January 2018  
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“We have given our planet the disastrous gift of climate change.”

Stephen Hawking [1]

Climate change has the potential to catastrophically impact planetary and public health. The Lancet and the University College of London Institute for the Global Health Commission asserted that climate change is the biggest global health threat of this century [2]. The seriousness of this threat warrants the medical profession’s collective attention and concerted effort to mitigate it.

The American Psychiatric Association (APA) released a position statement in 2017 that climate change “poses a threat to public health including mental health. Those with mental health disorders are disproportionately impacted by the consequences of climate change. APA recognizes and commits to support and collaborate with patients, communities, and other health care organizations engaged in efforts to mitigate the adverse health and mental health effects of climate change” [3]. The American Association of Community Psychiatrists has similarly recognized the disproportionate burden of climate change on vulnerable populations including those with mental illness [4]. The American Psychiatric Association has not to date, however, proposed specific formal actions in order

to respond to climate change. Altha Stewart, who becomes President of the Association in May of 2018, was reported as saying that she will put the mental health issues related to climate change on the front burner [5].

Because of our special interest in educational issues, we searched for articles on climate change in education journals including *Academic Medicine*, *Medical Education*, *Journal of Graduate Medical Education*, *Medical Teacher*, and *Teaching and Learning in Medicine* using the search term “climate change.” We found two articles and one letter to the editor [6–8]. The first argued that the global environmental changes ahead require doctors to be professional, environmentally responsive, and socially accountable and require that doctors align their educational and research activities with the related challenges [6]. The second argued that an overwhelmed medical school curriculum should make way for a thoughtful exploration of environmental stressors (including climate change) and their impacts on human health [7]. The third argued that the profession should negotiate means of reducing its own carbon footprint both individually and collectively while assessing and preparing for the healthcare needs associated with climate change [8]. Other articles in other journals have presented a case for teaching about climate change in medical education [9, 10]. *Academic Psychiatry*, whose mission is to further knowledge and stimulate evidence-based advances in academic medicine in six key domains including education, leadership, finance and administration, career and professional development, ethics and professionalism, health, and well-being, has not previously addressed climate change.

Our goals for this editorial, therefore, are to briefly review the scientific consensus on climate change, the associated potential consequences of climate change on human health and mental well-being, and the policies of professional societies. We comment on what we can do as a psychiatric profession to respond, with a particular focus on opportunities for leadership and education. We wish to encourage a rich and academic discourse in the pages of this journal on possible responses to

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the threats associated with climate change related to each of the journal's key domains and missions.

## Scientific Data on Climate Change

The Intergovernmental Panel on Climate Change (IPCC), which consists of leading meteorologists and climate scientists from 195 countries, is the principal international body for the assessment of climate change. This international body is 95% certain that human activity is the main cause of climate change mediated by increased levels of greenhouse gases (e.g., CO<sub>2</sub>, methane, nitrous oxide) [11]. Fossil fuel combustion and industrial processes, specifically, are the major contributors to rising greenhouse gas emissions and are driven by population and economic growth [11]. In recent decades, rising greenhouse gas emissions have led to measurable changes in the global climate, impacting natural and human systems across every continent [11]. The continued emission of greenhouse gases will cause further increases in global temperature, increasing the likelihood of severe, pervasive, and irreversible impacts on people and ecosystems [11].

A more recent report from 2017 by the US Global Change Research Program found that the changing global climate will affect the climate of the USA [12]. For instance, over the next few decades, annual average temperatures in the USA are expected to rise about 2.5 °F, the incidence of large forest fires is expected to increase, and, due to reduced snowpack, chronic drought is increasingly possible [12]. According to the 2017 report, there is broad consensus that the further and faster the Earth's system is pushed towards warming, the greater the risk of unanticipated changes and impacts [12]. In the USA, the economic damage resulting from climate change is estimated to have the greatest impact on regions that are already poorer on average, increasing preexisting inequality [13]. Moreover, while wealthy countries like the USA have caused much more of today's climate change due to their history of high greenhouse gas emissions, the health burden of climate change is greatest among the world's poor, affecting the least responsible populations [14].

There is a consistent scientific consensus on global warming. An analysis of 928 abstracts published in refereed scientific journals between 1993 and 2003 with the key words "climate change" found that all agreed that human activities were modifying the climate. None argued that climate change was simply a natural phenomenon [15]. Consequently, the ice sheets are melting, the oceans are rising and acidifying, and more extreme variations in the weather are predicted, including more frequent floods, hurricanes, wildfires, and more frequent and longer lasting droughts [2, 11, 16]. Although deaths from severe cold may decrease in some areas, the overall balance of effects is negative [11]. The World Health Organization has estimated that between 2030 and 2050, climate change is expected to cause approximately 250,000 additional deaths per year from malnutrition, malaria,

diarrhea, and heat stress [17]. Furthermore, the planet is currently in the midst of a mass extinction episode due to climate disruption, habitat loss, overexploitation, pollution, and other factors; the decimation of vertebrates and the biological annihilation of nature will have serious consequences for humanity [18].

Floods, which are occasionally devastating in their impact, are the most common natural disaster in both developed and developing countries [19]. The most readily identified flood deaths are those that occur acutely from drowning or trauma, although other important causes of morbidity include injuries, fecal-oral diseases, and vector and rodent-borne diseases [19]. Rising sea levels will intensify storm surge and flooding [20]. Expected sea level rises will increase the frequency of extreme water-level events in the tropics and impair the developing economies of equatorial coastal cities and the habitability of low-lying Pacific Island nations [21]. Residents of atolls in Pacific Island nations affiliated with the USA (through the Compact of Free Association) have already begun to seek refuge in Hawaii and other parts of the country [22]. Health effects of drought include nutrition-related effects, water-related diseases, airborne and dust-related diseases, and vector-borne diseases, as well as deaths associated with heat waves and wild fires [23]. Effects on child health include heat stress, decreased air quality, altered disease patterns of some climate-sensitive infections, physical consequences of weather disasters, and food, water, and nutrient insecurity [24]. Damage to the infrastructure, migration, conflict and violence, and stress on healthcare systems are also indirect health outcomes of global warming [2, 11, 20, 23, 24].

Every nation in the world has signed the Paris Climate Accord, although the USA has declared that it will be withdrawing from the agreement [25]. The Climate Change Performance Index (CCPI), which evaluates 58 nations according to climate protection and performance, rated the performance of the USA as "poor" in 2017 [26]. In the CCPI ranking of 58 nations, the USA ranked 35th in 2016 but dropped to 43rd in 2017 [26]. Acknowledged positive efforts of the USA in 2016 included rejecting the construction of a large oil-sands pipeline and promoting international climate negotiations [27]. The 2017 CCPI report commented that climate policy in the USA is in danger of regression given the present political climate [26]. The USA, as the second largest CO<sub>2</sub> emitter [26], must vigorously reduce greenhouse gas emissions.

## Mental Health Effects of Climate Change

The mental health effects of climate change include those directly related to the physical and traumatic consequences of severe weather events, as well as those related to the disruption of communities, damage to infrastructure, migrations, and associated conflicts and violence. These consequences can be organized in a framework that links impacts on mental

health directly to impacts on physical health or the physical environment, such as increased smoke or dust, or plant disease and infestations [28]. Anxiety, fear and distress, and even existential angst are all potential mental health consequences associated with climate change [28, 29]. Additionally, the permanent loss of ancestral lands (through island flooding, for example) can contribute to cultural trauma.

The mental health consequences of floods include post-traumatic stress disorder, anxiety, and depressive disorders [19]. Flooding can lead to bereavement, behavioral problems in children, increased substance use, and the exacerbation of pre-existing mental health problems [30]. Families are disrupted, beloved pets are lost, and survivors are often stripped of their homes. Moreover, as communities lose contact, important, if not vital support networks become unavailable at times when they are needed most. Family cohesion, for instance, is a critical factor in protecting youth at risk. Looting and violence compound problems of displacement and intensify fears among children and their parents.

There are several distinct and interrelated pathways through which drought can adversely impact mental health [31]. Drought particularly affects the mental health of groups whose livelihood depends on rainfall, such as farming communities [23]. Displacement from communities contributes to vulnerability and to the risk of victimization by human trafficking. Higher rates of suicide have been found in populations affected by drought [23], and there are concerns that climate change could elevate suicide rates [32]. Moreover, an increased rate of death in hotter temperatures has been observed in patients with psychosis, dementia, and in those who misuse substances [33].

Vulnerable populations include the homeless, the mentally ill, children, and the elderly [11, 28, 33–37]. The physical and mental health consequences of climate change on vulnerable populations will exacerbate health disparities and inequities [2]. Many families, particularly those with low incomes, cannot afford flood insurance and thus are at risk of losing everything without the means to rebuild. This perspective is in line with the American Psychiatric Association's position statement [3] and emphasizes our obligation to protect our vulnerable mentally ill patients from climate change.

Other significant problems disproportionately impact vulnerable youth and families, as revealed in the aftermath of hurricanes such as Katrina, Rita, Sandy, and more recently Irma and Helen. First, there are challenges in providing the substantial fiscal support necessary for recovery. In the aftermath of Katrina, for example, entire hospital systems of care were lost, particularly those that provide mental health. Families with insurance or means could more easily find alternative ways of receiving mental health care than those who were poor or working class. And while residents, psychiatrists, and other allied health professionals have volunteered to assist in many regions in the wake of natural disasters, their

efforts, as vital as they have been in the short run, do not provide for the ongoing needs of youth and families managing ongoing stress.

## Policies of Professional Societies

The American Medical Association supports the findings of the Intergovernmental Panel on Climate Change and concurs with the scientific consensus that the planet is undergoing adverse global climate change and that anthropogenic contributions are significant [38]. Moreover, the American Medical Association supports the educational initiatives of the medical community, patients, and the public, supports the involvement of physicians in policymaking, and supports physician efforts in order to ensure that the global health effects of climate change can be anticipated and responded to more efficiently [38]. In 2016, the AMA adopted a new policy in support of initiatives that promote environmental sustainability and efforts to halt global climate change [39]. This new policy called for aiding physicians in adopting environmentally sustainable programs in their practices and sharing these concepts with their patients and communities.

The American Psychological Association and the American Psychiatric Association both note the impact of climate change on mental health and psychological well-being [3, 40]. The American Psychological Association has also noted that the impact of climate change includes harm to plants, wildlife, and physical health and threats to social, economic, and environmental sustainability [40]. The American Psychological Association has resolved to support psychologists' involvement in research, education, and community interventions improving the public's understanding of the impacts of climate change and the psychological contributions to mitigation and adaptation efforts [40]. Similarly, the Royal College of Psychiatrists, which is a member of the United Kingdom Health Alliance on Climate Change, advocates for action to combat and prevent climate change [41].

## Combatting Climate Change

The Intergovernmental Panel on Climate Change highlights the fact that limiting the rate and magnitude of climate change will reduce the overall risks [11]. Furthermore, the panel asserts that we have the means to limit climate change even while allowing for continued economic and human development [11]. The World Health Organization has also asserted that reducing emissions of greenhouse gases through better transport, food, and energy choices can result in improved health, particularly through reduced air pollution [17]. Moreover, mitigation of climate change is a prerequisite for avoiding widening health inequalities [35]. Individual actions

by physicians coupled with education for patients on how and why to reduce greenhouse emissions can make a substantial difference [42, 43]. Practical and healthy actions include driving less and walking, cycling, or using public transportation more, actively recycling, seeking out locally grown food, and consuming less meat [42, 43]. Physicians can encourage their patients to pick up on these healthy habits, while remaining cognizant of the privilege these choices entail.

Collective and organizational actions are surely more effective than those by individual physicians and psychiatrists. The profession has played an important role in reducing smoking, improving car safety, and reducing unintentional poisonings. Some of the methods that applied to the success of those endeavors might also apply to improving firearm safety [44] and to efforts to reduce climate change. These include regulatory and legislative policies, sustained multi-component media and educational campaigns, routine primary care education and counseling, and governmental and non-profit advocacy [44].

One framework for organizing the myriad ways in which psychiatry can contribute to addressing climate change is promoted by the acronym “CARM:” collaborate, advocate, research, and mitigate [45]. This involves collaborating with policy makers, community organizations, and other stakeholders to drive change; advocating for vulnerable populations, including the mentally ill; developing better evidence from research into medical health and climate change; and developing resilient communities to mitigate climate change effects [45]. We propose an alternative organizing framework overlapping with the above that we hope will be similarly helpful: clinical, administrative, research, and educational—to be known by the acronym “CARE.” We outline the components of our framework below.

### Clinical Initiatives

We need to find ways to reduce the carbon footprint of psychiatric interventions through the reduction of waste. There is a developing literature concerning the use of strategies that might take account of the relative carbon footprint of various psychiatric interventions [46, 47]. The carbon footprint of some of the efficacious interventions for the management of depression [46] and chronic psychotic problems [47] has been calculated, which can be considered as a relevant factor when choosing treatments for these conditions.

### Administrative Initiatives

As formerly counseled [43], climate change could be put on the agenda of all departmental and organized psychiatry meetings. Efforts could be launched to reduce departmental energy consumption by turning off electronic devices at the end of each day, resetting thermostats, and replacing old

incandescent light bulbs with energy efficient LED or CFL bulbs [48]. Medical practices can also reduce their carbon footprint and costs by reducing and recycling waste, by seeking out renewable energy solutions (such as solar panels), and by communicating with patients digitally [48]. Departments and psychiatric organizations can also assist in redesigning clinical systems in more environmentally sustainable ways [49]. As psychiatry is one of the few professions where most aspects of care can be delivered through video teleconferencing, there is a potential opportunity to minimize the airplane and motor vehicle travel required to deliver clinical services. We should not have to care for patients in environments where air pollution could aggravate existing illnesses. In London, for example, most hospitals and clinics exceed air pollution limits [50]. We should also protect against a diffusion of responsibility that might limit action. Every individual, department, and psychiatric organization is responsible to this end.

Departments of psychiatry also need to prepare for managing the psychological consequences of weather disasters. There are many examples of departments rising to the challenge [51–55]. Climate change will expectedly place increased pressure on psychiatric services, requiring foresight and planning with special attention to providing for vulnerable populations and vulnerable localities. Because adverse mental health outcomes may not be readily apparent, a systematic approach to case identification and triage and the provision of mental health interventions is warranted [56].

Our departments and training programs need to understand who is at risk in times of natural disasters. They also need to know about the evidence-based clinical interventions that are essential to assist children and adolescents at a range of developmental levels, families, and communities. While all hospitals have disaster plans, we need a disaster-based curriculum within our residency training programs for both residents and faculty. Such curricula should include means of identifying those at risk, prevention efforts to help youth and families prepare for the possibility of harm, and clinical interventions that might be implemented. We should also be cognizant that early responders may also need help; they too are at risk for developing mental health problems, including post-traumatic stress disorder.

### Research Initiatives

There are many research opportunities for the profession related to climate change. For example, there is also much that we do not know regarding the human health consequences of climate change, especially regarding psychological consequences and specific mental health outcomes [36]. Moreover, research is lacking concerning the effectiveness of public health interventions in reducing the health impact of climate change [57] and we know little about interventions to support a public health approach to climate change [58]. We

should also evaluate the evidence concerning the efficacy of pharmacological preventions for post-traumatic stress disorder [59], a serious potential consequence of weather disasters, while continuing to evaluate the efficacy and effectiveness of treatments for this disorder. Moreover, we need to evaluate the psychotherapies that may benefit a wider range of individuals, families, and communities in the wake of natural disasters. Perhaps funding bodies such as the National Institute for Mental Health could look to give these areas of research a higher priority.

### Educational Initiatives

We first need to update ourselves on relevant scientific findings and the complex relationship between climate change and mental health so that we can speak with great authority and well-reasoned judgment as experts and as a profession. To this end, some medical schools have sought to provide education for medical students and other select groups [60]. We can open up pathways for medical students and residents to specialize in the study of climate change and especially to study the psychological, psychiatric, and social impacts, as well as mitigating and adaptive factors.

Medical students, residents, faculty, and the wider psychiatric community should all be educated about the issues at stake. To this end, medical schools might consider hiring climatologists and environmental scientists as faculty. Residency programs (and for that matter, medical schools too) might query if it is necessary to fly in all psychiatry residency (or medical student) applicants when interviews by teleconferencing suffice when done equitably without disadvantaging any one applicant. We should demonstrate by example that our profession takes climate change seriously and encourage others to look for ways to act too.

When educating the public, it has also been argued that we should label anthropogenic warming as a fact [61]. To equivocate may confuse the public and undermine their willingness to act [61]. According to one nationally representative survey of adults in the USA, while most reported a general sense that climate change can be harmful, relatively few understood the types of harm climate change can cause or who is most likely to be affected [62]. We should therefore learn how to communicate key messages clearly and effectively on climate change [61]. In addition, we should consider behavioral change theory and research in order to learn how to shape the public's feelings about the environment and the public's motivations and behaviors to protect it.

### Call to Action

This call to action provides strong priorities and a set of recommendations about why and how the psychiatric profession

should respond to climate change. The challenges associated with climate change potentially relate to every one of the key six domains of the *Academic Psychiatry* mission. Our "CARE" approach provides an organizational framework for a range of preventive interventional recommendations. These clinical, administrative, research, and educational interventions together aim to reduce the carbon footprint, to mitigate the future effects of climate change, to enhance the resilience and adaptability of vulnerable populations including the mentally ill, and to limit the distressing psychological and psychiatric consequences of climate change. The American Psychiatric Association and other major psychiatric organizations have similarly recognized a need to attend to the potentially catastrophic health effects of climate change.

Anthropogenic climate change is an indubitable scientific fact. There are numerous ways in which we can proactively protect our planet and mitigate the potential for disasters. Psychiatric professional organizations and psychiatric departments and every single member of the psychiatric profession have fiduciary obligations to the public. We and our departments and organizations are trusted and influential role models. We should therefore embrace with enthusiasm this critical opportunity for leadership in attending to the very serious threats posed by climate change. It is our obligation to do so. We humbly submit that the time to act is right now.

**Disclosures** On behalf of all authors, the corresponding author states that there is no conflict of interest.

### References

1. Knapton S. Human race is doomed if we do not colonise the Moon and Mars, says Stephen Hawking. *The Telegraph*. June 20, 2017. <http://www.telegraph.co.uk/science/2017/06/20/human-race-doomed-do-not-colonise-moon-mars-says-stephen-hawking/>. Last accessed 1/16/2018.
2. Costello A, Abbas M, Allen A, Ball S, et al. Lancet and University College London Institute for Global Health Commission. Managing the health effects of climate change. *Lancet*. 2009;373:1693–733.
3. American Psychiatric Association. Position Statement on Climate Change. [www.psychiatry.org](http://www.psychiatry.org). Accessed 12/16/2017.
4. American Association of Community Psychiatrists. AACP Position Statement. Mental Health and Climate Change. <https://drive.google.com/open?id=0B89glzXJnn4cekkyRGh0eC0tYm8>. Last accessed 11/23/2017.
5. Brown CF. Psychiatric News. Stewart chosen APA's Next President-Elect. <https://psychnews.psychiatryonline.org/doi/full/10.1176/appi.pn.2017.3a26>. Last accessed 12/17/2017.
6. Pearson D, Walpole S, Barna S. Challenges to professionalism: Social accountability and global environmental change. *Med Teach*. 2015;37:825–30.
7. Gomez A, Balsari S, Nusbaum J, Heerboth A, Lemery J. Environment, biodiversity, and the education of the physician of the future. *Acad Med*. 2013;88:168–72.

8. MacPherson CC. Time for physicians to take action on climate change. *Acad Med*. 2009;84:817.
9. Bell EJ. Climate change: What competencies and which medical education and training approaches? *BMC Med Educ*. 2010; <https://doi.org/10.1186/1472-6920-10-31>.
10. Maxwell J, Blashki G. Teaching about climate change in medical education: An opportunity. *J Public Health Res*. 2016;5:673.
11. Intergovernmental Panel on Climate Change. Climate Change 2014: Synthesis Report, Summary for Policymakers. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental panel on Climate Change. Core Working Team Pachauri RK and Meyer LA, editors. IPCC, Geneva, Switzerland, 2014.
12. US Global Change Research Program. Climate Sciences Special Report, Fourth National Climate Assessment, Volume 1. In: Wuebbles DJ, Fahey DW, Hibbard KK, Dokken DJ, Stewart BC, Maycock TK, editors. U.S. Global Change research Program, Washington, DC, 2017. 470 pp. <https://doi.org/10.7930/j0j964j6>.
13. Hsiang S, Kopp R, Jina A, et al. Estimating economic damage from climate change in the United States. *Science*. 2017;356:1362–9.
14. Patz JA, Gibbs HK, Foley JA, Rogers JV, Smith KR. Climate change and global health: Quantifying a global health crisis. *EcoHealth*. 2007;4:397–405.
15. Oreskes N. Beyond the ivory tower. The scientific consensus on climate change. *Science*. 2004;306:1686.
16. DeConto RM, Pollard D. Contribution of Antarctica to past and future sea-level rise. *Nature*. 2016;531:591–7.
17. World Health Organization. Climate Change and Health. [www.who.int/mediacentre/factsheets/fs266/en](http://www.who.int/mediacentre/factsheets/fs266/en). Accessed 12/17/2017.
18. Ceballos G, Ehrlich PR, Dirzo R. Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. <http://www.pnas.org/content/114/30/E6089.full.pdf>. Accessed 1/13/2018.
19. Ahern M, Kovats RS, Wilkinson P, Few R, Mathias F. Global health impacts of floods: Epidemiologic evidence. *Epidemiol Rev*. 2005;27:36–46.
20. Lane K, Charles-Guzman K, Wheeler K, Abid Z, Graber N, Matte T. Health effects of coastal storms and flooding in urban areas: a review and vulnerability assessment. *J Environ Public Health*. 2013; <https://doi.org/10.1155/2013/913064>.
21. Vitousek S, Barnard PL, Fletcher CH, et al. Doubling of coastal flooding frequency within decades due to sea-level rise. *Sci Rep*. 2017;7:1399. <https://doi.org/10.1038/s41598-017-01362-7>.
22. Mulkern AC. As Pacific Islands Flood, A Climate-Driven Exodus Grows. *Scientific American: Climatewire*. September 9, 2013 <https://www.scientificamerican.com/article/as-pacific-islands-flood-a-climate-driven-exodus/>. Last accessed 12/19/2017
23. Stanke C, Kerac M, Prudhomme C, Madlock J, Murray V. Health effects of drought: A systematic review of the evidence. *PLOS Curr*. 2013;5:5. <https://doi.org/10.1371/currents.dis.7a2cee9e980f91ed769765706cc46004>.
24. Council on Environmental Health. Global climate change and children's health. *Pediatrics*. 2015;136:992–7.
25. Friedman L. Syria Joins Paris climate accord, leaving only US opposed. *New York Times*. Nov 7, 2017. <https://www.nytimes.com/2017/11/07/climate/syria-joins-paris-agreement.html>. Last accessed 1/13/17.
26. Burck J, Marten F, Bals C, Rink E, Heinze I. The Climate Change Performance Index: Results 2017. Climate Action network, Europe. <https://germanwatch.org>. Accessed 11/23/2017.
27. Burck J, Marten F, Bals C, Rink E, Heinze I. The Climate Change Performance Index: Results 2016. Climate Action network, Europe. <https://germanwatch.org>. Accessed 11/23/2017.
28. Berry HL, Bowen K, Kjellstrom T. Climate change and mental health: A causal pathways framework. *Int J Public Health*. 2010;55:123–32.
29. Wellbury C. Code green. *JAMA*. 2014;312:1201–2.
30. Stanke C, Murray V, Amlot R, Nurse J, Williams R. The effects of flooding in mental health: Outcomes and recommendations from a review of the literature. *PLoS Curr* 2012; 4. <https://doi.org/10.1371/4f0f1fa93a3ae>.
31. Vins H, Bell J, Saha S, Hess JJ. The mental health outcomes of drought: A systematic review and causal process diagram. *Int J Environ Res Public Health*. 2015;12:13251–75.
32. Fountoulakis KN, Chatzikosta I, Pasiadis K, Zanis P, et al. Relationship of suicide rates with climate and economic variables in Europe during 2000–2012. *Ann General Psychiatry*. 2016;15:19.
33. Page LA, Hajat S, Kovats S, Howard LM. Temperature-related deaths in people with psychosis, dementia and substance misuse. *BJ Psychiatry*. 2012;200:485–90.
34. Ramin B, Svoboda T. Health of the homeless and climate change. *J Urban Health*. 2009;86:654–64.
35. Friel S, Marmot M, McMichael AJ, Kjellstrom T, Vagero D. Global health equity and climate stabilization: A common agenda. *Lancet*. 2008;372:1677–83.
36. Bourque F, Willcox AC. Climate change: The next challenge for public mental health? *Int Rev Psychiatry*. 2014;26:415–22.
37. Kim KH, Kabir E, Ara JS. A review of the consequences of climate change on human health. *J Environ Sci Health C Environ Carcinog Ecotoxicol Rev*. 2014;32:299–318.
38. American Medical Association Council on Science and Public Health. Report 3 of the Council on Science and Public Health (I-08). Global Climate Change and Human Health. 2008. <https://www.ama-assn.org/sites/default/files/media-browser/public/about-ama/councils/Council%20Reports/council-on-science-public-health/i08-csaph-climate-change-health.pdf>. Accessed 11/23/2017.
39. American Medical Association House of Delegates. Resolution 924(I-16): AMA Advocacy for Environmental Sustainability and Climate. November 2016. <https://www.ama-assn.org/sites/default/files/media-browser/i16-resolutions.pdf>. Accessed 11/23/2017.
40. American Psychological Association. Resolution on affirming psychologists' role in addressing global climate change. [www.apa.org](http://www.apa.org). Accessed 11/2/2017.
41. Royal College of Psychiatrists. Sustainability. College Position Statement. [www.rcpsych.ac.uk](http://www.rcpsych.ac.uk). Accessed 11/23/2017.
42. Gill M. Why should doctors be interested in climate change. *BMJ*. 2008;336:1566.
43. Griffiths J, Hill A, Spilby J, Scott R. Ten practical steps for doctors to fight climate change. *BMJ*. 2008;336:1507.
44. Mozaffarian D, Hemenway D, Ludwig DS. Curbing gun violence. Lessons from public health successes. *JAMA*. 2013;309:551–2.
45. Every-Palmer S, McBride S, Berry H, Menkes DB. Climate change and psychiatry. *Aust NZ J Psychiatry*. 2016;50:16–8.
46. Maughan DL, Davison P. The need for sustainable psychiatry. *Lancet Psychiatry*. 2015;2:675–7.
47. Maughan DL, Lillywhite R, Cooke M. Cost and carbon burden of long-acting injections: A sustainable evaluation. *BJ Psych Bull*. 2016;40:132–6.
48. American Medical Association. Lower costs by going green. [www.ama-assn.org](http://www.ama-assn.org). Accessed 11/23/2017.
49. Phua KL. Redesigning health care systems to meet the health challenges with climate change in the twenty-first century. *J Emerg Manag*. 2015;13:255–63.
50. Castres P, Dajnak D, Lott M, Watts N. Most London hospitals and clinics exceed air pollution limits. *BMJ*. 2017; <https://doi.org/10.1136/bmj.j2855>.
51. Osofsky HJ. In the eye of Katrina: Surviving the storm and rebuilding an academic department of psychiatry. *Acad Psychiatry*. 2007;31:183–7.
52. McClain TC, Hamilton FC, Clothier J, McGaugh J. Opportunity missed: A lesson learned from evacuation mentally ill patients

- following hurricanes Katrina and Rita. *Acad Psychiatry*. 2007;31:188–95.
53. Frank JB, Trinidad AC. Katrina relief: Lessons for the academic medical center. *Acad Psychiatry*. 2006;31:196–9.
  54. Griffies WS. Post-Katrina stabilization of the LSU/Ochsner psychiatry residency program: Caveats for disaster preparedness. *Acad Psychiatry*. 2009;33:418–22.
  55. Capasso R, Adler L. Superstorm Sandy: How the new York University psychiatry residency training program weathered the storm. *Acad Psychiatry*. 2016;40:807–11.
  56. North C, Pfefferbaum B. Mental health response to community disasters. A systematic review. *JAMA*. 2013;310:507–18.
  57. Bouzid M, Hooper L, Hunter PR. the effectiveness of public health interventions to reduce the health impact of climate change: a systematic review of systematic reviews. *PLoS One*. 2013;8:e62041.
  58. Hess JJ, Eidison M, Tlumak JE, Raab KK, Luber G. An evidence-based public health approach to climate change adaptation. *Environ Health Perspect*. 2014;122:1177–86.
  59. Sijbrandij M, Kleboer A, Bisson JI, Barbui C, Cuijpers P. Pharmacological prevention of post-traumatic stress disorder and acute stress disorder: A systematic review and meta-analysis. *Lancet Psychiatry*. 2015;2:413–21.
  60. Friedrich MJ. Medical community gathers steam to tackle climate's health effects. *JAMA*. 2017;317:1511–3.
  61. Oreskes N, Conway EM. Defeating the merchants of doubt. *Nature*. 2010;465:686–7.
  62. Maibach EW, Kreslake JM, Rosen-Renouf C, Rosenthal S, et al. Do Americans understand that global warming is harmful to human health? Evidence from a national survey. *Ann Glob Health*. 2015;81:396–408.