Climate Change and the Professional Obligation to Socialize Physicians and Trainees into an Environmentally Sustainable Medical Culture

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“Well done is better than well said.”
—Benjamin Franklin

On entering medical school, all trainees take on the mantle of professionalism [1]. Professionalism, the collection of behaviors doctors engage in to communicate their fiduciary responsibility to their patients, is central to the trust at the core of the doctor-patient relationship [2]. Physicians in training learn these professional behaviors, as well as the values that govern them, primarily through observing and emulating their mentors, a process referred to as professional socialization [3]. The behaviors and beliefs that physicians adopt while undergoing professional socialization need to be constantly reexamined to ensure that medicine remains true to its fiduciary role. With this goal in mind, we wish to address medicine’s contributions to climate change and the environmentally unsustainable behaviors that physicians are socialized to accept and adopt.

Climate change has been identified as the number one public health concern of the twenty-first century [4], and yet, as of 2013, the US health care system was responsible for 10% of US greenhouse gas emissions, 12% of acid rain production, 10% of smog formation, 1% of stratospheric ozone depletion, and 1–2% of other toxic emissions [5]. These effects on the environment contribute to an estimated loss of 614,000 disability-adjusted life years (DALYs) annually [6], a number comparable to the DALYs incurred by the patients who die annually from medical errors in the US health care system [7]. Climate change negatively impacts nearly all aspects of health [8]. In mental health alone, temperature fluctuations have been correlated with increased prevalence of a number of psychiatric disorders [9], and increased rates of trauma and posttraumatic stress disorder from more frequent and severe natural disasters contribute to increased rates of comorbid substance use and domestic violence [10, 11]. Medicine’s contribution to this significant morbidity and mortality is incommensurate with its obligation to do no harm to its patients.

Psychiatry has a unique role to play in addressing medicine’s current environmentally unsustainable culture because, first, a number of psychological factors make addressing medicine’s carbon footprint difficult for physicians and, second, psychiatry has already started taking a leading role among the medical specialties in addressing its professional carbon footprint. Therefore, in this editorial, we briefly summarize current contributors to the US health care system’s large carbon footprint, reflect on social and psychological factors that may support a medical culture that has not prioritized environmental sustainability, consider how this professional culture may endanger the doctor-patient relationship, and discuss how actions in medicine and specifically psychiatry can be adjusted to socialize medical personnel into a more environmentally sustainable practice that can also sustain the integrity of its fiduciary obligations. This discussion builds upon what Academic Psychiatry has previously published to call the psychiatric community to action in addressing climate change as a profession [12–15].

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Contributors to the US Health Care System’s Carbon Footprint

Many factors contribute to the carbon footprint of the medical profession, though the largest are systemic, arising from the hospital sector (39%) and the development and distribution of prescription medications (14%) [16]. Modernizing hospital care has seemingly become synonymous with generating more trash. For example, over the past two decades, doctors in many nations have moved away from using multi-use medical devices to using single-use disposable devices in efforts to maximize efficiency and minimize health risks.

In one study conducted in Istanbul, disposable items contributed to a 330% increase in hospital waste production between 2000 and 2017, or approximately 0.43 kg of waste/bed-day to 1.68 kg of waste/bed-day [17]. In China and many Western medical systems, hospital waste can even be as high as 3-4 kg of waste/bed-day [18]. Some hospital executives are beginning to make concerted efforts to reduce their waste production and overall carbon footprints [19], though these efforts are still in their infancy.

The activities of pharmaceutical companies generate about 55% more greenhouse gas emissions than the entire automotive sector [20]. Efforts are underway in the pharmaceutical industry to be more environmentally sustainable, including using “green chemistry” to produce fewer environmentally hazardous byproducts, reducing packaging waste, and improving the transportation efficiency of their products [21]. So far these efforts have led to modest improvements in the overall carbon footprint of the pharmaceutical industry [22], though, like hospital systems, there is much room for further improvement.

While much of medicine’s large carbon footprint is determined by large systems of care, individual decisions by physicians also have profound effects. For example, in 2018, 25% of the UK population was prescribed a psychotropic medication [23], yet a follow-up review estimated that at least 10% of total prescriptions were unnecessary (e.g., prescriptions were not clinically indicated, there were more effective non-pharmacological alternatives, prescriptions were redundant) [24]. The rationale of polypharmacy in psychiatry is multifaceted and has historically been difficult to address [25]; however, given the sheer number of psychotropics prescribed and the large carbon footprint generated by producing them, efforts to reevaluate psychiatrists’ current prescribing practices could significantly minimize this waste and the carbon footprint it generates [26].

Professional travel also merits consideration. Traveling to and from the annual meeting of the American Psychiatric Association (APA) produces 1.2–1.6 metric tons of CO2 per person [27], which is roughly equivalent to the per capita annual carbon footprint recommended by the Intergovernmental Panel on Climate Change to prevent worst-case scenarios of global warming by the end of this century [28]. Similarly, medical students applying to psychiatry residency before the COVID-19 pandemic produced on average 5.4 metric tons of CO2 per person traveling to and from their interviews—nearly 4 times their recommended annual footprint [29]. Though telepsychiatry is still in its infancy and requires continued investigation, it too should be considered as a means of reducing psychiatry’s carbon footprint [30]. A growing literature in other specialties has documented that the carbon footprints from travel for medical appointments can be substantial, ranging from 0.70 to 372 kg CO2 equivalents per consultation [31]. To put these numbers in perspective, travel to and from all US ambulatory care visits in 2018 alone [32] generated a carbon footprint that was at least 30 times larger than the total carbon footprint produced by travel for the 2018 APA Annual Meeting [27]. Travel associated with medical training and patient care has historically been considered unavoidable, though COVID-19–related travel restrictions that necessitated virtual meetings, interviews, and televisits have called the essentialness of these carbon footprints into question.

Factors in Medicine That Have Contributed to Environmental Unsustainable Health Care

There are multiple reasons why physicians have historically contributed so substantially to climate change. Perhaps the biggest is that many providers are still unaware of the significant environmental impacts of their practice [26]. In a sample of over 400 international members of the American Thoracic Society, 80% identified that climate change was relevant to patient care, yet nearly half reported lacking knowledge about how to address climate change with their patients, and only 30% were aware of what their hospitals were doing to address their carbon footprints [33]. Even for those who are knowledgeable about this topic, cultural forces within medicine, such as an emphasis on time efficiency, run counter to sustainability. In the same international survey, 45% of the responding physicians cited lack of time for why they did not address climate change in their clinical practice [33].

Other psychological factors may also contribute to physicians’ significant contributions to climate change. For example, some medical providers, much like the general population, feel powerless to make an appreciable impact on climate change [34]. Some have also been socialized to believe that providing good health care comes at the cost of being less environmentally conscious [34], and those caught in this dialectic may manage this double bind and resultant moral distress through repression and denial [35]. Other physicians cope with their outsized carbon footprints through rationalizing that their good work as healers and helpers provides a “moral offset” that outweighs their contributions to climate...
How Medicine’s Large Carbon Footprint May Endanger the Doctor-Patient Relationship

Core to the doctor-patient relationship is the mutual understanding that doctors have patients’ best interests at heart. When this trust is broken, the doctor-patient relationship is fundamentally injured. As patients learn about all the ways that their physicians contribute to climate change and how climate change negatively impacts their health, they may lose faith in the doctor-patient relationship and disengage from the medical establishment. The relational tension currently observed between parents and their children who are anxious about climate change may offer some insights into what the relationship might come to look like for doctors and their patients. In a recent international study of 10,000 adolescents and young adults polled about climate anxiety, 59% of participants reported feeling very to extremely worried about climate change [37], and many expressed a deep sense of confusion, betrayal, and anger toward adults who they perceive as not doing enough to protect them from an unsafe future. For some young people, this perception has contributed to negative clinical consequences [40]. Patients’ trust in their physicians has been shown to be directly related to patients’ willingness to follow treatment recommendations and seek care in a timely fashion [41, 42]. In turn, following treatment recommendations and efficient access to care are directly associated with reduced health care costs and improved clinical outcomes [43, 44]. Beyond the loss of good feeling between patient and physician, the erosion of the doctor-patient relationship fundamentally threatens the quality of care a patient is receptive to receiving from their doctor, much as a child is less able to receive comfort and guidance from a parent whom the child perceives as ineffectual and insecurely attached. While only a theoretical concern currently, the unintended ramifications of medicine’s contributions to climate change on the doctor-patient relationship should be considered, and damage to the doctor-patient relationship could hopefully be minimized through early action as a profession to be more sustainable.

Socializing Medical Personnel into a More Environmentally Sustainable Medical Culture

There is no question that, first and foremost, medicine needs to pursue means of reducing its carbon footprint to cultivate a medical culture that is attentive to its effects on climate change. Instituting systems-level policies to enforce greener hospital practices will be essential to this end. Medical systems, particularly outside the USA, have become increasingly aware of their carbon footprints, and they have been working to find ways to reduce their contribution to climate change. For example, in the UK, the National Health Service has set the goal of delivering carbon-neutral health care as soon as possible, and it has already reduced the carbon footprint of its delivery of care emissions by 57% compared to its 1990 levels [8]. Similar efforts have been made in Australia and Germany [8]. Clinicians in multiple specialties have also endeavored to find ways to reduce the individual carbon footprints of their medical procedures. For example, anesthesiologists in the UK have been advocating for the use of fewer disposable devices and have identified anesthetic agents with fewer damaging impacts on the environment [45]. Other organizations, such as the My Green Doctor Foundation [46], offer guidance and educational materials to physicians for how they can reduce their professional carbon footprints, and payment for carbon offsets (i.e., donations to companies for carbon sequestration and development of sustainable energy) is being used to minimize the net impact of professional travel on climate change [47]. The US government has recently established the goal of reducing the carbon footprint of the US health care system by 50% by 2030, and grants and agencies have been put in place to help support these efforts [48]. Psychiatry has taken a leading role in addressing its carbon footprint as a medical specialty. In 2017, the APA published a position statement affirming its commitment to “mitigate the adverse health and mental health effects of climate change” [49]. In 2019, it divested from companies with significant assets in fossil fuels [50], and in 2021, it established a presidential taskforce on social determinants of health, including environmental health, and created a committee on climate change and mental health to start providing recommendations for how, among other goals, it can reduce its carbon footprint. In accordance with this goal, the APA committee proposed an action paper (Malinas P, Wortzel JR, Haase E, Lee J, Fleming J: Toward making the carbon footprint of the APA Annual
Meeting carbon neutral) that was passed by the APA Assembly in November 2021 (Item 2021A2 12.O) to reduce the carbon footprint of the APA Annual Meeting by at least 50% by the year 2030.

However, efforts to reduce medicine’s carbon footprint may only be nominal if they are not matched by corresponding changes in the culture of medicine on the individual level. For example, efforts to address racism in medicine primarily through policy changes, such as implementing affirmative action in medical school admissions, have had only limited effectiveness because they have not addressed the implicit racism among individual medical personnel [51]. Similarly, medical professionals need to become educated about their many subtle, personal contributions to medicine’s carbon footprint and identify the factors that perpetuate these practices. Educators across a variety of medical specialties [52, 53], including psychiatry [54], are beginning to develop and integrate core learning objectives and classes pertaining to sustainable health care into preclinical and clinical training to help convey the importance of developing a more environmentally sustainable medical culture. In many cases, these curricular changes have been driven by medical trainees themselves who see the importance of learning this material [55]. There have also been efforts to start incorporating environmental sustainability into the quality-improvement programs that are already commonly built into many hospital systems and in which many medical trainees are actively involved [56]. Through these changes, the system-wide interventions may only be nominal if they are not matched by corresponding changes in the culture of medicine on the individual level. Physicians need to become educated about their many subtle, personal contributions to medicine’s carbon footprint and identify the factors that perpetuate these practices.

Conclusion

The Intergovernmental Panel on Climate Change has determined that the world is at a “code red” — a dramatic reduction in humanity’s carbon footprint is needed within this decade to prevent worst-case scenarios of global warming [57]. This reduction is necessary to preserve both human health and the health of the planet and all of its organisms. It is unconscionable that doctors should contribute so significantly to this crisis. Currently, cultural principles and psychological forces conspire to keep medicine environmentally unsustainable. Through education, physicians can foster a medical culture that socializes trainees and current practitioners into a practice of medicine that is more sustainable and preserves the fiduciary responsibility at the heart of the doctor-patient relationship. Doctors all over the world are starting to consider ways in which they can decrease their institutional and personal carbon footprints, and this consideration will role-model for trainees the importance of this task. Academic institutions are also investing in how to explicitly educate medical trainees and personnel to be more sustainable in their practices to propagate a culture that appreciates and supports the institutional changes underway to make medicine greener. Psychiatry as a specialty has been particularly active in this space, though continued efforts on the systems and individual levels are needed to maintain this momentum.

We encourage our readers to investigate how they can reduce their professional carbon footprints and engage in educating their colleagues, trainees, and the general public about this topic. Organizations such as the Climate Psychiatry Alliance [58] are actively considering these issues and offer opportunities to get involved with this work. Resources like My Green Doctor [46] can be used to find ways of reducing personal carbon footprints. Reducing professional travel and strategic use of telepsychiatry can also dramatically reduce carbon production. Psychiatrists also have a particularly important role to play in helping their colleagues in the rest of medicine recognize and overcome the psychological and social barriers that contribute to the perpetuation of a medical culture that is environmentally unsustainable. If medicine can make this transition in modifying its professional culture to be greener and to meet its professional obligations, its actions will speak louder than its words, and we can hope that this transition will not only protect the integrity of the doctor-patient relationship but will also serve to inspire the rest of society to follow suit.

Declarations

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

References

1. Brody H, Doukas D. Professionalism: a framework to guide medical education. Med Educ. 2014;48(10):980–7.
2. McCullough LB, Coverdale JH, Chervenak FA. Trustworthiness and professionalism in academic medicine. Acad Med. 2020;95(6):828–32.
3. Meltose S, Park C, Perry B. Creative clinical teaching in the health professions: Edmonton AB: Athabasca University Press; 2021.
4. Costello A, Abbas M, Allen A, Ball S, Bell S, Bellamy R, Friel S, Groce N, Johnson A, Kett M, Lee M, Levy C, Maslin M, McCoy D, McGuire B, Montgomery H, Napier D, Pagel C, Patel J, et al. Managing the health effects of climate change: Lancet and University College London Institute for Global Health Commission. Lancet. 2009;373(9676):1693–733.
5. Eckelman MJ, Sherman J. Environmental impacts of the U.S. health care system and effects on public health. PloS One. 2016;11(6):e0157014.
6. Eckelman MJ, Sherman JD. Estimated global disease burden from US health care sector greenhouse gas emissions. Am J Public Health. 2018;108(S2):S120–S2.
48. The White House. Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies. April 22, 2021. https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/. Accessed March 3, 2020.

49. American Psychiatric Association. APA position statement: mental health and climate change. 2017. https://www.psychiatry.org/patients-families/climate-change-and-mental-health-connections. Accessed March 3, 2020.

50. Cooper R. Divestment in fossil fuels: a preventive public health strategy. Psychiatric Times. 2019;36(4). https://www.psychiatrictimes.com/view/divestment-fossil-fuels-preventive-public-health-strategy. Accessed January 28, 2022.

51. Arnold JF. Racial inequalities in health care: affirmative action programs in medical education and residency training programs. J Law Med Ethics. 2021;49(2):206–10.

52. Walpole SC, Mortimer F. Evaluation of a collaborative project to develop sustainable healthcare education in eight UK medical schools. Public Health. 2017;150:134–48.

53. Council GA, Committee C. Global Consortium on Climate and Health Education (GCCHE) Core Climate & Health Competencies for Health Professionals. Columbia University; 2018.

54. Wortzel JR, Haase E, Mark B, Stashevsky A, Lewis J. Teaching to our time: a survey study of current opinions and didactics about climate mental health training in US psychiatry residency and fellowship programs. Acad Psychiatry. 2022. https://doi.org/10.1007/s40596-022-01680-7.

55. Mian A, Khan S. Medical education—training toward a greener future. Nat Med. 2020;26(2):156.

56. Sherman JD, Thiel C, MacNeill A, Eckelman MJ, Dubrow R, Hopf H, et al. The green print: advancement of environmental sustainability in healthcare. Resour, Conservation Recycl. 2020;161:104882.

57. Romanello M, McGushin A, Di Napoli C, Drummond P, Hughes N, Jamart L, et al. The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. Lancet. 2021;398(10311):1619–62.

58. Climate Psychiatry Alliance. 2021. https://www.climatepsychiatry.org/. Accessed December 20, 2021.