

Combatting Climate Change: 10 Interventions for Dermatologists to Consider for Sustainability

Divya Sharma, MD; Lilia C. Murase; Jenny E. Murase, MD; Misha Rosenbach, MD

The impacts of anthropogenic climate change on human health are numerous and growing. The evidence that climate change is occurring due to the burning of fossil fuels is substantial, with a 2019 report elevating the data supporting anthropogenic climate change to a gold standard 5-sigma level of significance.¹ In the peer-reviewed scientific literature, the consensus that humans are causing climate change is greater than 99%.² Both the American Medical Association and the American College of Physicians have acknowledged the health impacts of climate change and importance for action. They encourage physicians to engage in environmentally sustainable practices and to advocate for effective climate change mitigation strategies.^{3,4} A survey of dermatologists also found that 99.3% (n=148) recognize climate change is occurring, and similarly high numbers are concerned about its health impacts.⁵

Notably, the health care industry must grapple not only with the health impacts of climate change but with the fact that the health care sector itself is responsible for a large amount of carbon emissions.⁶ The global health care industry as a whole produces enough carbon emissions to be ranked as the fifth largest emitting nation in the world.⁷ A quarter of these emissions are attributed to the US health care system.^{8,9} Climate science has shown we must limit CO₂ emissions to avoid catastrophic climate change, with the sixth assessment report of the United Nations' Intergovernmental Panel on Climate Change

and the Paris Agreement targeting large emission reductions within the next decade.¹⁰ In August 2021, the US Department of Health and Human Services created the Office of Climate Change and Health Equity. Assistant Secretary for Health ADM Rachel L. Levine, MD, has committed to reducing the carbon emissions from the health care sector by 25% in the next decade, in line with scientific consensus regarding necessary changes.¹¹

The dermatologic impacts of climate change are myriad. Rising temperatures, increasing air and water pollution, and stratospheric ozone depletion will lead to expanded geographic ranges of vector-borne diseases, worsening of chronic skin conditions such as atopic dermatitis/eczema and pemphigus, and increasing rates of skin cancer.¹² For instance, warmer temperatures have allowed mosquitoes of the *Aedes* genus to infest new areas, leading to outbreaks of viral illnesses with cutaneous manifestations such as dengue, chikungunya, and Zika virus in previously nonindigenous regions.¹³ Rising temperatures also have been associated with an expanding geographic range of tick- and sandfly-borne illnesses such as Lyme disease, Rocky Mountain spotted fever, and cutaneous leishmaniasis.^{13,14} Additionally, short-term exposure to air pollution from wildfire smoke has been associated with an increased use of health care services by patients with atopic dermatitis.¹⁵ Increased levels of air pollutants also have been found to be associated with psoriasis flares as well as hyperpigmentation and wrinkle formation.^{16,17}

Dr. Sharma is from the Department of Medicine, OhioHealth Riverside Methodist Hospital, Columbus. Ms. Murase is from the San Francisco Dermatologic Society, California. Dr. Murase is from the Palo Alto Foundation Medical Group, Mountain View, California, and the Department of Dermatology, University of California, San Francisco. Dr. Rosenbach is from the Department of Dermatology, University of Pennsylvania, Philadelphia. Drs. Sharma and Murase as well as Ms. Murase report no conflict of interest. Dr. Rosenbach is the co-founder and co-chair of the American Academy of Dermatology's (AAD's) Expert Resource Group on Climate Change and Environmental Issues; the opinions expressed here are his own and not those of the AAD.

Correspondence: Misha Rosenbach, MD, Department of Dermatology, Hospital of the University of Pennsylvania, 3400 Civic Center Blvd, Philadelphia, PA 19104 (misha.rosenbach@penmedicine.upenn.edu).
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Skin cancer incidence is predicted to rise due to increased UV radiation exposure secondary to stratospheric ozone depletion.¹⁸

Although the effects of climate change are significant and the magnitude of the climate crisis may feel overwhelming, it is essential to avoid doomerism and focus on meaningful impactful actions. Current CO₂ emissions will remain in the atmosphere for hundreds to thousands of years, and the choices we make now commit future generations to live in a world shaped by our decisions. Importantly, there are impactful and low-cost, cost-effective, or cost-saving changes that can be made to mitigate the climate crisis. Herein, we provide 10 practical actionable interventions for dermatologists to help combat climate change.

10 Interventions for Dermatologists to Combat Climate Change

1. Consider switching to renewable sources of energy. Making this switch often is the most impactful decision a dermatologist can make to address climate change. The electricity sector is the largest source of greenhouse gas emissions in the US health care system, and dermatology outpatient practices in particular have been observed to have a higher peak energy consumption than most other specialties studied.^{19,20} Many dermatology practices—both privately owned and academic—can switch to renewable energy seamlessly through power purchase agreements (PPAs), which are contracts between power providers and private entities to install renewable energy equipment or source renewable energy from offsite sources at a fixed rate. Using PPAs instead of traditional fossil fuel energy can provide cost savings as well as protect buyers from electrical price volatility. Numerous health care systems utilize PPAs such as Kaiser Permanente, Cleveland Clinic, and Rochester Regional Health. Additionally, dermatologists can directly purchase renewable energy equipment and eventually receive a return on investment from substantially lowered electric bills. It is important to note that the cost of commercial solar energy systems has decreased 69% since 2010 with further cost reductions predicted.^{21,22}

2. Reduce standby power consumption. This refers to the use of electricity by a device when it appears to be off or is not in use, which can lead to considerable energy consumption and subsequently a larger carbon footprint for your practice. Ensuring electronics such as phone chargers, light fixtures, television screens, and computers are switched off prior to the end of the workday can make a large difference; for instance, a single radiology department at the University of Maryland (College Park, Maryland) found that if clinical workstations were shut down when not in use after an 8-hour workday, it would save 83,866 kWh of energy and \$9225.33 per year.²³ Additionally, using power strips with an automatic shut-off feature to shut off power to devices not in use provides a more convenient way to reduce standby power.

3. Optimize thermostat settings. An analysis of energy consumption in 157,000 US health care facilities found that space heating and cooling accounted for 40% of their total energy consumption.²⁴ Thus, ensuring your thermostat and heating/cooling systems are working efficiently can conserve a substantial amount of energy. For maximum efficiency, it is recommended to set air conditioners to 74 °F (24 °C) and heaters to 68 °F (20 °C) or employ smart thermostats to optimally adjust temperatures when the office is not in use.²⁵ In addition, routinely replacing or cleaning air conditioner filters can lower energy consumption by 5% to 15%.²⁶ Similarly, improving insulation and ruggedization of both homes and offices may reduce heating and cooling waste and limit costs and emissions as a result.

4. Offer bicycle racks and charging ports for electric vehicles. In the United States, transportation generates more greenhouse gas emissions than any other source, primarily due to the burning of fossil fuels to power automobiles, trains, and planes. Because bicycles do not consume any fossil fuels and the use of electric vehicles has been found to result in substantial air pollution health benefits, encouraging the use of both can make a considerable positive impact on our climate.²⁷ Providing these resources not only allows those who already travel sustainably to continue to do so but also serves as a reminder to your patients that sustainability is important to you as their health care provider. As electric vehicle sales continue to climb, infrastructure to support their use, including charging stations, will grow in importance. A physician's office that offers a car-charging station may soon have a competitive advantage over others in the area.

5. Ensure properly regulated medical waste management. Regulated medical waste (also known as infectious medical waste or red bag waste) refers to health care-generated waste unsuitable for disposal in municipal solid waste systems due to concern for the spread of infectious or pathogenic materials. This waste largely is disposed via incineration, which harms the environment in a multitude of ways—both through harmful byproducts and from the CO₂ emissions required to ship the waste to special processing facilities.²⁸ Incineration of regulated medical waste emits potent toxins such as dioxins and furans as well as particulate matter, which contribute to air pollution. Ensuring only materials with infectious potential (as defined by each state's Environmental Protection Agency) are disposed in regulated medical waste containers can dramatically reduce the harmful effects of incineration. Additionally, limiting regulated medical waste can be very cost-effective, as its disposal is 5- to 10-times more expensive than that of unregulated medical waste.²⁹ Simple nudge measures such as educating staff about what waste goes in which receptacle, placing signage over the red bag waste to prompt staff to pause to consider if use of that bin is required before utilizing, using weights or clasps to make opening red bag

waste containers slightly harder, and positioning different trash receptacles in different parts of examination rooms may help reduce inappropriate use of red bag waste.

6. Consider virtual platforms when possible. Due to the COVID-19 pandemic, virtual meeting platforms saw a considerable increase in usage by dermatologists. Teledermatology for patient care became much more widely adopted, and traditionally in-person meetings turned virtual.³⁰ The reduction in emissions from these changes was remarkable. A recent study looking at the environmental impact of 3 months of teledermatology visits early during the COVID-19 pandemic found that 1476 teledermatology appointments saved 55,737 miles of car travel, equivalent to 15.37 metric tons of CO₂.³¹ Whether for patient care when appropriate, academic conferences and continuing medical education credit, or for interviews (eg, medical students, residents, other staff), use of virtual platforms can reduce unnecessary travel and therefore substantially reduce travel-related emissions. When travel is unavoidable, consider exploring validated vetted companies that offer carbon offsets to reduce the harmful environmental impact of high-emission flights.

7. Limit use of single-use disposable items. Although single-use items such as examination gloves or needles are necessary in a dermatology practice, there are many opportunities to incorporate reusable items in your workplace. For instance, you can replace plastic cutlery and single-use plates in kitchen or dining areas with reusable alternatives. Additionally, using reusable isolation gowns instead of their single-use counterparts can help reduce waste; a reusable isolation gown system for providers including laundering services was found to consume 28% less energy and emit 30% fewer greenhouse gases than a single-use isolation gown system.³² Similarly, opting for reusable instruments instead of single-use instruments when possible also can help reduce your practice's carbon footprint. Carefully evaluating each part of your "dermatology visit supply chain" may offer opportunities to utilize additional cost-saving, environmentally friendly options; for example, an individually plastic-wrapped Dermablade vs a bulk-packaged blade for shave biopsies has a higher cost and worse environmental impact. A single gauze often is sufficient for shave biopsies, but many practices open a plastic container of bulk gauze, much of which results in waste that too often is inappropriately disposed of as regulated medical waste despite not being saturated in blood/body fluids.

8. Educate on the effects of climate change. Dermatologists and other physicians have the unique opportunity to teach members of their community every day through patient care. Physicians are trusted messengers, and appropriately counseling patients regarding the risks of climate change and its effects on their dermatologic health is in line with both American Medical Association and American College of Physicians guidelines.^{3,4} For instance, patients with Lyme disease in

Canada or Maine were unheard of a few decades ago, but now they are common; flares of atopic dermatitis in regions adjacent to recent wildfires may be attributable to harmful particulate matter resulting from fossil-fueled climate change and record droughts. Educating medical trainees on the impacts of climate change is just as vital, as it is a topic that often is neglected in medical school and residency curricula.³³

9. Install water-efficient toilets and faucets. Anthropogenic climate change has been shown to increase the duration and intensity of droughts throughout the world.³⁴ Much of the western United States also is experiencing record droughts. One way in which dermatology practices can work to combat droughts is through the use of water-conserving toilets, faucets, and urinals. Using water fixtures with the US Environmental Protection Agency's WaterSense label is a convenient way to do so. The WaterSense label helps identify water fixtures certified to use at least 20% less water as well as save energy and decrease water costs.

10. Advocate through local and national organizations. There are numerous ways in which dermatologists can advocate for action against climate change. Joining professional organizations focused on addressing the climate crisis can help you connect with fellow dermatologists and physicians. The Expert Resource Group on Climate Change and Environmental Issues affiliated with the American Academy of Dermatology (AAD) is one such organization with many opportunities to raise awareness within the field of dermatology. The AAD recently joined the Medical Society Consortium on Climate and Health, an organization providing opportunities for policy and media outreach as well as research on climate change. Advocacy also can mean joining your local chapter of Physicians for Social Responsibility or encouraging divestment from fossil fuel companies within your institution. Voicing support for climate change-focused lectures at events such as grand rounds and society meetings at the local, regional, and state-wide levels can help raise awareness. As the dermatologic effects of climate change grow, being knowledgeable of the views of future leaders in our specialty and country on this issue will become increasingly important.

Final Thoughts

In addition to the climate-friendly decisions one can make as a dermatologist, there are many personal lifestyle choices to consider. Small dietary changes such as limiting consumption of beef and minimizing food waste can have large downstream effects. Opting for transportation via train and limiting air travel are both impactful decisions in reducing CO₂ emissions. Similarly, switching to an electric vehicle or vehicle with minimal emissions can work to reduce greenhouse gas accumulation. For additional resources, note the AAD has partnered with My Green Doctor, a nonprofit service for health care practices that includes practical cost-saving suggestions to support sustainability in physician practices.

A recent joint publication in more than 200 medical journals described climate change as the greatest threat to global public health.³⁵ Climate change is having devastating effects on dermatologic health and will only continue to do so if not addressed now. Dermatologists have the opportunity to join with our colleagues in the house of medicine and to take action to fight climate change and mitigate the health impacts on our patients, the population, and future generations.

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