



## **How to Use the Climate Change and Health Action Plan**

On April 19, 2016, the *Annals of Internal Medicine* published Climate Change and Health: A Position Paper of the American College of Physicians. The position paper is the result of a Board of Regents-approved resolution passed in 2014 that called on the College to support efforts to address research, education and response to the medical consequences of climate change .

The policy paper maintains that climate change is an individual and public health issue and expresses the College’s concern about the impact that it could have on individual persons and populations in the United States and throughout the world. The College emphasizes that tackling climate change is a “win-win” situation – benefiting not only our planet, but also the health of our patients and community. By addressing climate change, we not only avert environmental catastrophe but also gain public health improvements such as cleaner air and better respiratory health from reduced dirty fuel use and improved cardiovascular health through more active transportation like walking and cycling.

The paper lays out the evidence of how our changing planet has impacted, is impacting and will continue to impact human health. Global warming has not only caused global average temperatures to increase, it has also caused sea levels to rise, land and sea ice to melt, and oceans to acidify. The changing climate has exacerbated drought and intensified extreme storms and other weather events. These climate impacts have consequences for human health in the form of increased risk of heat-related illness, respiratory disease, vector- and water-borne disease, food and water insecurity, and behavioral health problems.

Despite these challenges, physicians can play a substantial role in addressing climate change by taking action to reduce energy use and greenhouse gas emissions in their own practices, advocating for climate change adaptation and mitigation policies, educating themselves about climate change and how it affects public and individual health, and the potential health threats it may pose to their community.

The need for physician action is even more immediate. President Trump and his administration deny the scientific evidence on climate change, support policies to expand use of carbon-emitting fossil fuels, and intend to withdraw the United States from the Paris Agreement, a global accord directing nations to take action to address climate change (1). The administration has moved to reverse other efforts intended to mitigate and adapt to climate change, such as

revoking a regulation on flood risk management, and has erased references to climate change from federal agency websites, including the National Institute of Environmental Health Sciences (2,3). As the federal government abdicates its responsibility to take action on climate change, physicians must educate their colleagues and communities about the climate change and health connection and advocate for policies in their communities and states to address this problem. Education is incredibly important. Although most people comprehend that climate change is real and a major risk, many see the problem as a remote threat that won't affect them (4). Physicians can play a crucial role in providing objective information to their communities and policymakers that climate change is a danger to human health.

To aid in this important endeavor, ACP has developed a Climate Change and Health Action Plan to help our members take initiative. The Action Plan includes:

- PowerPoint presentation – This can be used for chapter presentations, Grand Rounds, and other educational opportunities. It explains climate change, how it affects health, regional impacts, mitigation and adaptation, and how the health care sector can become more environmentally sustainable.
- Regional Talking Points – These brief U.S.-region specific talking points provide guidance on how to talk about how climate change impacts health in each region of the United States and the co-benefits of taking action.
- Greening the Health Care Sector documents – The health care sector uses a massive amount of energy and is responsible for millions of tons of waste a year. These documents provide guidance on how physicians, their colleagues and staff can take action to curb climate change and make their practices more environmentally sustainable.

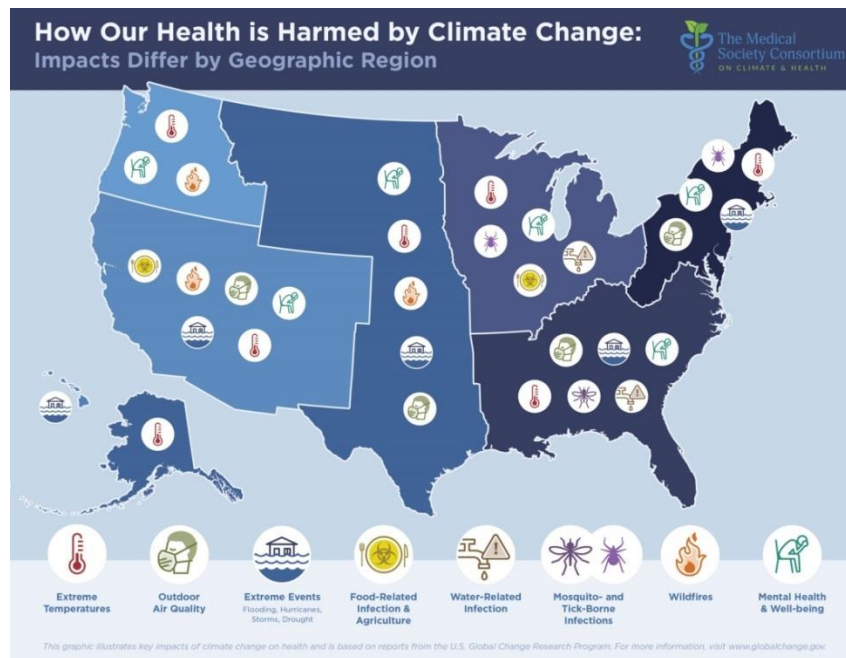
The Greening the Health Sector documents include information for small and solo practices and the rest focus on specific target areas like energy efficiency, transportation, and the built environment. These provide a brief explanation of how the health care sector contributes to greenhouse gas emissions and what can be done to curb impact. Each document includes a "case study" and additional resources on the topic. Since some of these interventions would require physicians and others to advocate to their facility's leadership (such as pushing for installation of combined heat and power systems) the documents include links to resources on working with facility leadership and how to engage colleagues to make your practice environment a more efficient, less wasteful, and healthier place.

**The action plan can be accessed here:** <https://www.acponline.org/climate-change-toolkit>

The following resources provide additional information on climate change:

- Climate Change and Health: A Position Paper of the American College of Physicians. *Annals of Internal Medicine*.  
<http://annals.org/article.aspx?articleId=2513976&guestAccessKey=410f1462-e791-4b47-bc2a-799a658c3a01>
- United States Global Change Research Program. The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment.  
<https://health2016.globalchange.gov/>
- National Academy of Science and the Royal Society. Climate Change: Evidence and Causes. <http://nas-sites.org/americasclimatechoices/events/a-discussion-on-climate-change-evidence-and-causes/>

## How Will Climate Change Affect Health in **Alaska**?



**Climate change is real and largely caused by humans.**<sup>5</sup>

- How do we know? **The global average surface temperature has warmed about 1.5 degrees F since 1880**, while the oceans have warmed and become more acidic, land and sea ice has melted, and sea levels have risen. These changes are primarily caused by rising levels of atmospheric carbon dioxide released by fossil fuel combustion and other forms of heat-trapping pollution. Naturally occurring long-term climate cycles have actually helped to limit the warming during this period.

**Climate change is bad for us and our community in a number of ways.**

- In Alaska, **climate change is contributing to extreme temperatures and wildfires.**<sup>6,7</sup> These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

**We need to start taking action now** to protect the health of our community's most vulnerable members — including our children, our seniors, people with chronic illnesses, and the poor — because our climate is already changing and people are already being harmed.

- Physicians, both individually and collectively, are encouraged to advocate for climate change adaptation and mitigation policies. Moving to clean renewable energy sources will leave our air

and our water cleaner, creating nearly immediate health benefits and helping to limit climate change.

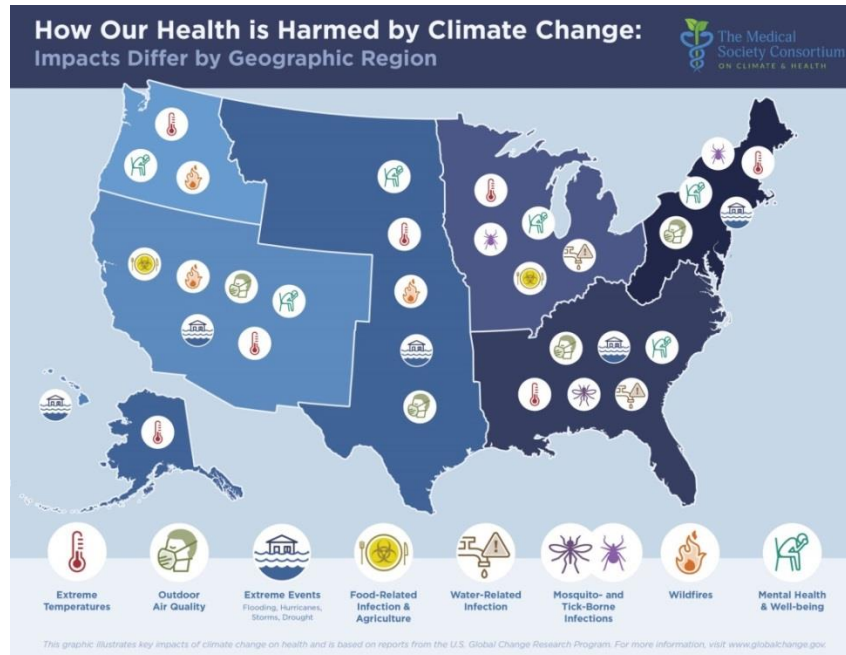
- Physicians and the health care sector should be part of the solution, not only by speaking out, but also by implementing environmentally sustainable and energy-efficient practices.

**Taking action creates a “win-win” situation for us because, in addition to dealing with climate change, most of these actions will benefit our health too.**

- The Lancet Commission report on Health and Climate Change states that “tackling climate change could be the greatest global health opportunity of the 21<sup>st</sup> century.”<sup>8</sup>
- For example, switching from dirty fossil fuel-generated electricity to clean energy sources will reduce air pollution and lower rates of respiratory and cardiovascular illness that are exacerbated by air pollution.
- Using active transportation like walking or cycling to make short trips can improve cardiovascular health.
- Planting trees and installing green roofs reduces the urban heat island effect, lessening heat-related illness risk.
- Eating less meat and more locally grown fruits and vegetables reduces carbon pollution and promotes better cardiovascular health.

## How Will Climate Change Affect Health in the Northwest Region of the United States?

Washington, Oregon, and Idaho



### Climate change is real and largely caused by humans.<sup>9</sup>

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### Climate change is bad for us and our community in a number of ways.

- In the Northwest region, climate change is contributing to extreme temperatures, wildfires, and worse mental health and well-being.<sup>10,11</sup> These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

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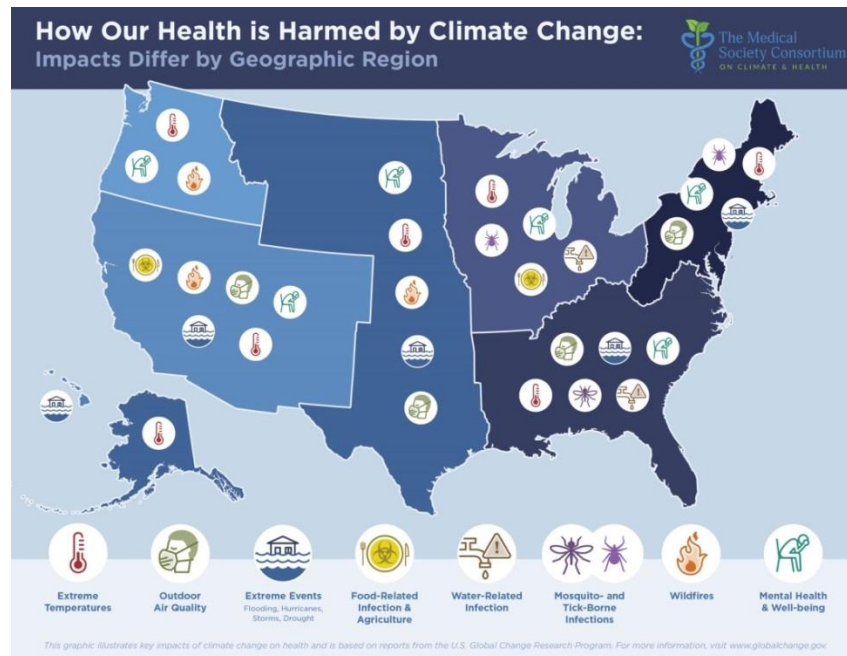
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## How Will Climate Change Affect Health in the Southeast Region of the United States?

Kentucky, Virginia, Tennessee, North Carolina, South Carolina, Arkansas, Louisiana, Mississippi, Alabama, Georgia, and Florida



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Climate change is bad for us and our community in a number of ways.

- In the Southeast region, climate change is contributing to extreme temperatures, extreme weather events like flooding and storms, mosquito-borne infections, reduced outdoor air quality, water-related infections, and worse mental health and well-being.<sup>14,15</sup> These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.



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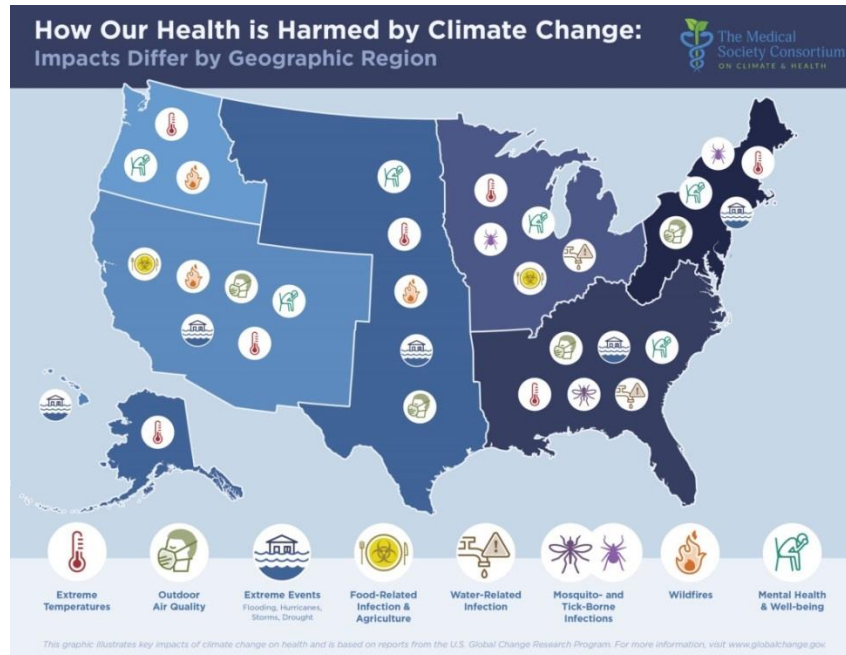
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## How Will Climate Change Affect Health in the Southwest Region of the United States?

*California, Nevada, Utah, Arizona, Colorado, and New Mexico*



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- In the Southwest region, **climate change is contributing to extreme temperatures, extreme weather events, reduced outdoor air quality, wildfires, food-related infections, and worse mental health and well-being.**<sup>18,19</sup> These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

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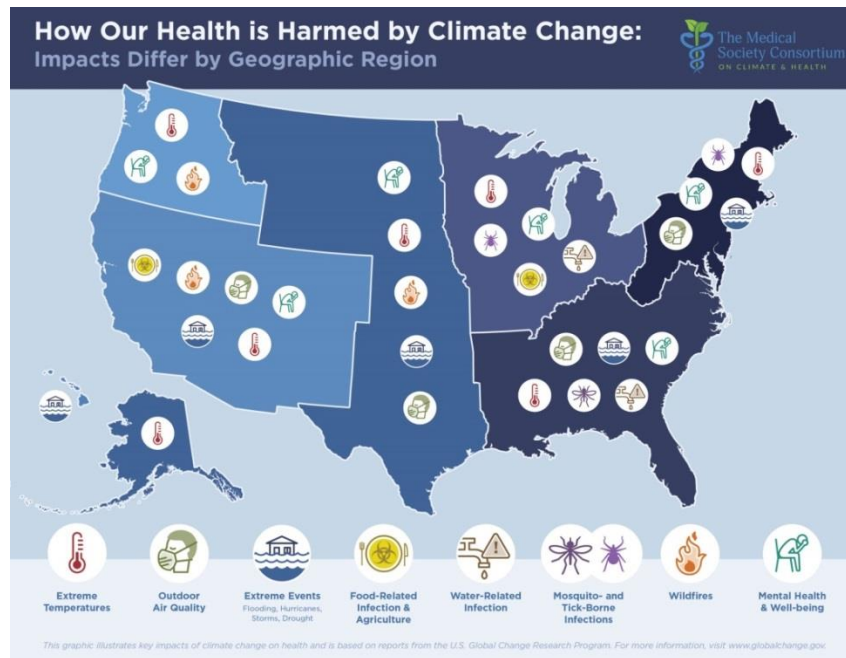
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## How Will Climate Change Affect Health in the **Northeast Region** of the United States?

*Maine; New Hampshire; Vermont; Massachusetts; Rhode Island; Connecticut; New York; New Jersey; Pennsylvania; Delaware; Maryland; West Virginia; and Washington, D.C.*



**Climate change is real and largely caused by humans.**<sup>21</sup>

- How do we know? **The global average surface temperature has warmed about 1.5 degrees F since 1880**, while the oceans have warmed and become more acidic, land and sea ice has melted, and sea levels have risen. These changes are primarily caused by rising levels of atmospheric carbon dioxide released by fossil fuel combustion and other forms of heat-trapping pollution. Naturally occurring long-term climate cycles have actually helped to limit the warming during this period.

**Climate change is bad for us and our community in a number of ways.**

- In the **Northeast** region, **climate change is contributing to extreme temperatures, extreme weather events like flooding, reduced outdoor air quality, tick-borne infections and worse mental health and well-being.**<sup>22,23</sup> These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

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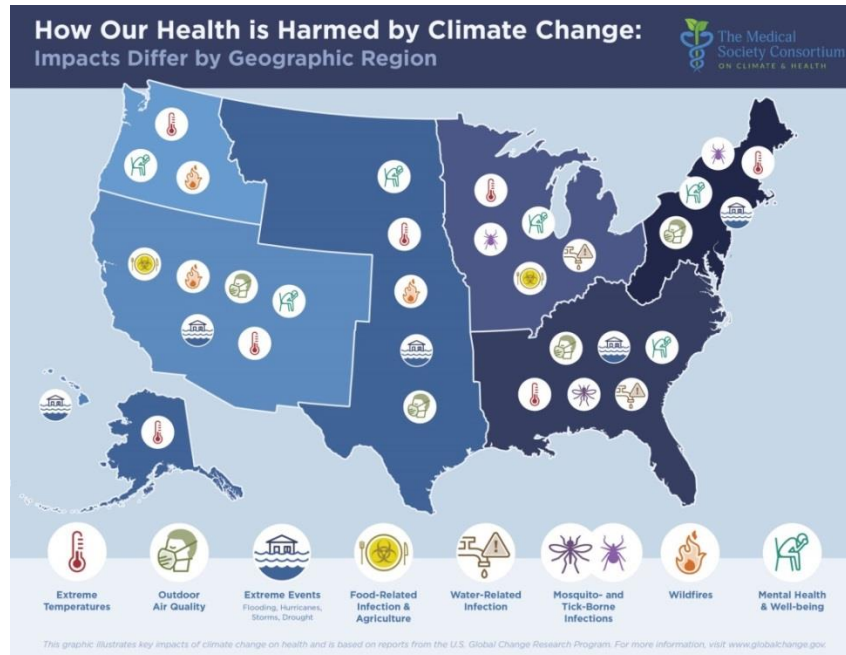
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## How Will Climate Change Affect Health in the **Midwest Region** of the United States?

*Minnesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio, and Missouri*



Climate change is real and largely caused by humans.<sup>25</sup>

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Climate change is bad for us and our community in a number of ways.

- In the **Midwest region, climate change is contributing to extreme temperatures, water-related infection, food-related infection and agriculture problems, tick-borne infections and worse mental health and well-being.**<sup>26,27</sup> Pollen season is coming 2-4 weeks earlier, reducing air quality. These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

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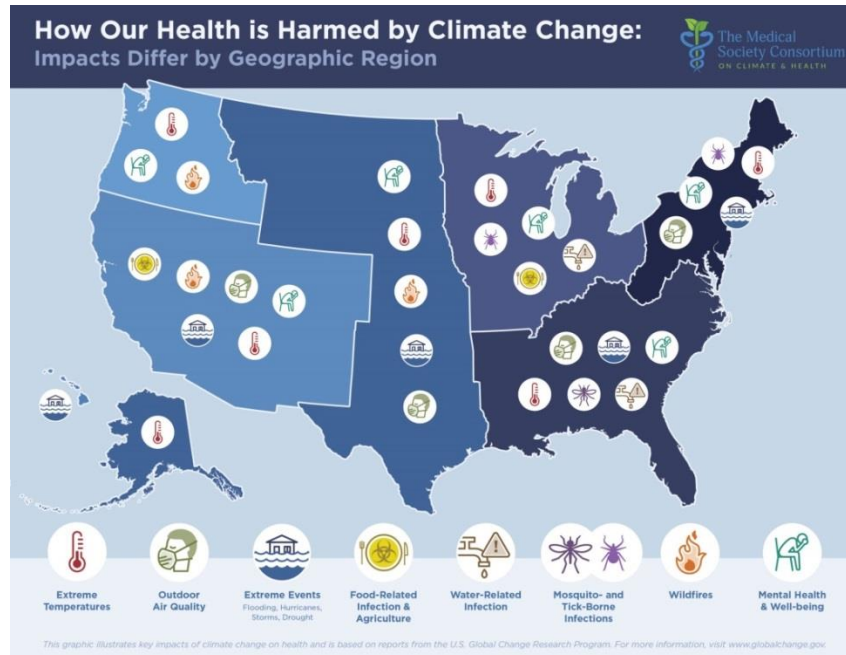
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## How Will Climate Change Affect Health in the **Great Plains Region** of the United States?

*Kansas, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, Texas, Wyoming*



**Climate change is real and largely caused by humans.**<sup>29</sup>

- How do we know? **The global average surface temperature has warmed about 1.5 degrees F since 1880**, while the oceans have warmed and become more acidic, land and sea ice has melted, and sea levels have risen. These changes are primarily caused by rising levels of atmospheric carbon dioxide released by fossil fuel combustion and other forms of heat-trapping pollution. Naturally occurring long-term climate cycles have actually helped to limit the warming during this period.

**Climate change is bad for us and our community in a number of ways.**

- In the **Great Plains** region, **climate change is contributing to poor air quality, extreme temperatures, more extreme weather events like storms and droughts, wildfires, and worse mental health and well-being.**<sup>30,31</sup> Pollen season is coming 2-4 weeks earlier and fire season is starting earlier and lasting longer. These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

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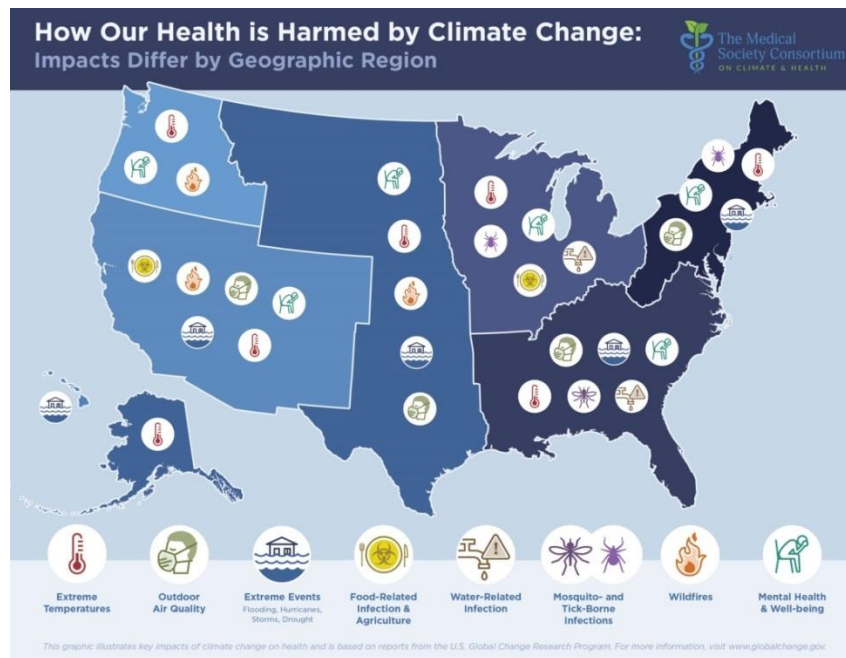


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## How Will Climate Change Affect Health in **Hawaii**?



Climate change is real and largely caused by humans.<sup>33</sup>

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Climate change is bad for us and our community in a number of ways.

- In **Hawaii, climate change is contributing to extreme weather, such as storms, and food and water security problems**<sup>34,35</sup> These effects pose direct and indirect threats to human health and the elderly, children, the poor, and the chronically ill are particularly vulnerable.

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## Why Green Your Health Care Facility?

The health care sector consumes a massive amount of energy, releasing large amounts of dirty carbon into the atmosphere. Hospitals require round-the-clock energy consumption to power ventilators, heating and cooling systems, lighting, and medical equipment. They also generate greenhouse gas (GHG) emissions associated with food service, waste disposal, and transportation. The U.S. health care sector is ranked second in energy use after the food industry; it spends about \$9 billion annually on energy costs<sup>37</sup> and research has found that the sector accounted for 8% of the country's total carbon dioxide output in 2007.<sup>38</sup> The United Kingdom's National Health Service, public health and social care system was responsible for nearly 40% of England's public sector emissions in 2012.<sup>39,40</sup> Hospitals also produce a substantial amount of waste, from single-use disposable medical items to wastewater. Health care sector-related transportation emissions are also incredibly high, and a major contributor is pharmaceutical distribution. In a literature review on the energy burden and environmental impact of health services, Brown and colleagues estimate that "although reducing health-related emissions alone would not solve all of the problems caused by GHGs and climate change, it could make a meaningful contribution: a 10% reduction in emissions from just the US health system would have the same atmospheric impact as a 10% reduction in emissions from the entire Australian economy."<sup>41</sup>

Adopting environmentally-sustainable practices at your facility can reduce costs. By encouraging recycling of plastic items, the University of Chicago Medical Center cut waste costs from \$55,000 to \$35,000 a month. More importantly, carbon and other pollutant emissions pose a serious threat to human health. Reducing your facility's electricity and transportation associated emissions can yield substantial human and environmental health co-benefits such as reductions in respiratory diseases.<sup>42</sup> Further, use of telehealth reduces travel-related emissions, recapture and use of waste anesthetic gases could reduce pollution and exposure-related illness, and better procurement activities could lead to lower distribution-related carbon emissions.<sup>43</sup> Physician offices can take action by adjusting thermostats during closing time, installing energy efficient lighting or using natural light, and other energy use reduction strategies; using fewer paper goods; and encouraging staff to use public transit, walk, or cycle to work. Reducing your facility's carbon footprint takes leadership, but a concerted effort could yield major benefits that will help to mitigate the threat of climate change on human and environmental health. The NHS in England succeeded in lowering its carbon footprint by 11% from 2007-2015 after mounting an aggressive effort to reduce its carbon emissions.<sup>44</sup>

Health Care Without Harm, an organization that guides health sector leaders around the world to become more environmentally sustainable, has identified the following action areas for health care facilities:

- Transportation

- Energy– Operations
- Energy– the Built Environment.
- Waste
- Food Service

As professionals invested in improving human health, physicians and other health care professionals, facility managers, support staff and others must work together to reduce the health sector’s carbon footprint. This toolkit provides more detail on each of these action categories as well as case studies to highlight facilities that are leading the way to a healthier, sustainable future.

### **General Resources:**

[Health Care Climate Council. https://climatecouncil.noharm.org/](https://climatecouncil.noharm.org/)

World Health Organization and Health Care Without Harm: Healthy Hospitals, Healthy Planet, Healthy People. [http://www.who.int/globalchange/publications/climatefootprint\\_report.pdf?ua=1](http://www.who.int/globalchange/publications/climatefootprint_report.pdf?ua=1)

[My Green Doctor: http://www.mygreendoctor.org/](http://www.mygreendoctor.org/)

Health Care Without Harm/Practice Greenhealth: Addressing Climate Change in the Health Care Setting: Opportunities for Action <https://practicegreenhealth.org/pubs/toolkit/reports/ClimateChange.pdf>

United States Global Change Research Program – The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment: <https://health2016.globalchange.gov>

World Health Organization - Health in the Green Economy: Co-benefits to health of climate change mitigation. [http://www.who.int/hia/hgebrief\\_health.pdf](http://www.who.int/hia/hgebrief_health.pdf)

World Health Organization - Promoting Health While Mitigating Climate Change [http://www.who.int/phe/climate/conference\\_briefing\\_2\\_promotinghealth\\_27aug.pdf?ua=1](http://www.who.int/phe/climate/conference_briefing_2_promotinghealth_27aug.pdf?ua=1)

[National Academies Press – Green Healthcare Institutions: Health, Environment, and Economics, Workshop Summary \(2007\). http://www.nap.edu/catalog/11878/green-healthcare-institutions-health-environment-and-economics-workshop-summary](http://www.nap.edu/catalog/11878/green-healthcare-institutions-health-environment-and-economics-workshop-summary)



## Greening the Physician Office

While most of the greenhouse gas emissions from the health care sector are attributed to hospitals and other large facilities, physician offices can also take action to reduce their environmental impact, especially by reducing their energy use. Resources like [My Green Doctor](#) can guide physicians and their staff on how to reduce their carbon footprint and help curb climate change. This document focuses on actions that smaller physician practices can take to make a big improvement to the environmental sustainability of their practice to benefit patients and the planet.

### Transportation

**Help commuters reduce emissions** – Encourage use of mass transit, establish vanpool/carpool programs to make employee commuting more efficient and consider telecommuting for employees. Provide lockers, showers, and bike parking for employees who bike or walk to work.

**When selecting an office space, choose space that is close to public transit.**

### Energy Efficiency

**Reduce your office's energy use** by switching to energy efficient light bulbs (CFLs, LED bulbs), adjust thermostats to save energy when appropriate (up a few degrees in the summer, down a few degrees in the winter), and upgrade major equipment to the most energy-efficient model. Maintain and clean your heating and air conditioning system to ensure it is operating at peak efficiency. Optimize the building envelope with better insulation and energy-efficient windows.

**Install On-Site Renewable Energy Capability** - Facilities can install (or encourage their office building to install) solar panels to generate a portion of facility's energy, and/or solar hot-water heating system.

**Reduce Standby Energy Use** – Plug computers and other electronic equipment into power strips and turn off when not in use. According to the U.S. Department of Energy, plugged-in electrical equipment may consume energy even when it's powered down. Standby power (or "phantom" loads) can consume up to 5 percent of an electrical plug load.<sup>66</sup> Physician offices may be able to buy renewable energy from their utility company in addition to installing on-site renewable energy systems.<sup>45</sup>

**Purchase Green Power** – Use power generated from renewable sources like wind and solar.

**Purchase Energy-Efficient Products<sup>46</sup>** – Buy Energy Star or Federal Energy Management Program-designated products.

**Request an energy audit for your office** - Your utility provider may be able to perform an energy audit to help you set your energy efficiency goals.

**Seek out office buildings that are LEED certified or have earned an Energy Star rating.** Such certification can help to ensure that your office building is making efficient use of resources and keeping greenhouse gas emissions down. More information on EnergyStar buildings can be found here: <https://www.energystar.gov/buildings/about-us/how-can-we-help-you/build-energy-program>

Information on LEED certified buildings can be found here: <https://new.usgbc.org/leed>

## **Waste**

**Recycle and buy recycled products** – *Recycle all recyclable products, including electronics.* Commit your office to reduce, reuse, and recycle whenever possible. According to the Healthcare Environmental Resource Center, the U.S. healthcare industry generates nearly 2 billion pounds of paper and cardboard a year.<sup>47</sup> Paper use can be decreased by printing on both sides of a sheet of paper and/or using a smaller font and by paying bills electronically.<sup>48</sup> If your practice contracts with a paper shredder service to meet privacy law requirements, make sure that they recycle shredded material.<sup>49</sup> Procurement staff should purchase items that are made of recycled materials. Consult the [EPA Comprehensive Procurement Guideline Program](https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program) for additional information: <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>

**Replace bottled drinking water with a water cooler or filtered tap water.** Globally, about 20,000 plastic bottles are made each second, contributing pollution and clogging landfills.<sup>50</sup> Waste can be reduced by using water coolers, reusable drinking containers, and filtered tap water.

**Use cloth instead of disposable paper for linens and gowns.** Also ensure that your laundry service provider practices in an environmentally sustainable manner.

## **Resources**

My Green Doctor <http://www.mygreendoctor.org/>

Bank of American/Merrill Lynch White Paper: Becoming an Environmentally Friendly Medical Practice. <http://corp.bankofamerica.com/documents/10157/67594/Becoming%20an%20Environmentally%20Friendly%20Medical%20Practice.pdf>

Energy Star “Build an Energy Program” <https://www.energystar.gov/buildings/about-us/how-can-we-help-you/build-energy-program>

U.S. Small Business Administration – Green Business Guide <https://www.sba.gov/blogs/how-be-green-business-earth-day-and-every-day>

Environmental Protection Agency – Center for Corporate Climate Leadership <https://www.epa.gov/climateleadership>



## Reducing Healthcare Facilities' Contribution to Climate Change

According to Younger et al. “(b)uildings contribute to climate change, influence transportation, and affect health through the materials utilized, decisions about sites, electricity and water usage, and landscape surroundings. Land use, forestry, and agriculture also contribute to climate change and affect health by increasing atmospheric levels of carbon dioxide, shaping the infrastructures for both transportation and buildings, and affecting access to green spaces.”<sup>51</sup> Hospitals, medical offices and other health care facilities can reduce their carbon footprint by adopting green building principles, choosing construction sites that are close to public transportation and mixed-use areas to cut down on automobile use, by using low-emission and no-emission lighting and heating strategies, and other ways that benefit health and ensure the environmental sustainability of the health care practice.

Facilities situated far from population centers may encourage automobile use, increasing reliance on dirty fuels and causing unhealthy air pollution. Health care sites can be situated in areas that facilitate safe walking, cycling, and social interaction that may enhance physical and mental wellbeing and reduce greenhouse gas emissions. Many health care facilities are seeking “green building” certifications. The Leadership in Energy and Environmental Design (LEED) certification process, designed by the U.S. Green Building Council, guides the development of buildings that are more energy and water-efficient and have lower greenhouse gas emissions. More information on LEED can be found in the Resources section.

Health Care Without Harm and Practice Greenhealth<sup>52</sup> recommend the following interventions:

- **Incorporate green building principles** – *Use day lighting, natural ventilation, green roofs; consult the LEED program<sup>53</sup> for guidance.* Optimize the building envelope with better insulation and energy-efficient windows. Green roofs (roofs with planted vegetation) can increase heating and cooling efficiency, reduce the heat island effect and storm water runoff. Chicago’s Schwab Rehabilitation Hospital uses its green roof to provide horticulture therapy for patients, “a process in which plants and gardening activities are used to improve body, mind and spirit.”<sup>54,55</sup> Natural roofs may also enhance patient wellbeing. Daylighting – the use of natural light to provide indoor illumination, requires no energy and may improve mood and performance.
- **Consider overall transportation impacts of facility siting** – *When selecting a new building or office site, consider an area near a public transportation hub or advocate for increased public transportation service to the facility. Build in already-developed areas to maintain existing green spaces.*
- **Use native vegetation and plant trees on site, use local and regional building materials** – *Trees and vegetation can reduce heat island effect and act as carbon sinks. Native plants need less*



*water*. The heat island effect can exacerbate heat-related health problems connected to climate change. The heat island effect, where sunlight reflects off of impermeable, dark pavement and roof surfaces to increase temperature, can be mitigated by planting trees and other native vegetation, while also creating a carbon sink and natural, zero-energy-dependent shade.<sup>56</sup>

- **Use local and regional building materials:** *Less energy required to deliver local products to building site.* Lower vehicle traffic means reduce energy use and associated air pollution.
- **Purchase only lumber products certified by the Forest Stewardship Council – support sustainable forestry practices.** *Ninety percent of wood products used in the construction of Mulvaney Medical office building in Idaho were from Forest Stewardship Council-certified forests.*<sup>57</sup> The Forestry Stewardship Council is a non-profit organization that sets standards to ensure forests are managed responsibly.

### **Case Study: Group Health Puyallup Medical Center<sup>58</sup>**

The Washington State facility was first in the United States to receive LEED for Healthcare Gold certification.

- Facility includes ground-level vegetation and green roof.
- Designed for water use reduction – Special sensors activate cold water for cooling sanitized medical equipment only when necessary.
- Uses a more efficient steam generator boiler.
- Used local and/or recycled construction materials.
- Car charging stations and bike racks on site.

#### **Resources**

U.S. Green Building Council: LEED Rating. <http://www.usgbc.org/leed#rating>

[LEED 2009 for Healthcare Guide: http://www.usgbc.org/sites/default/files/LEED%202009%20RS\\_HC\\_4-2014\\_cover.pdf](http://www.usgbc.org/sites/default/files/LEED%202009%20RS_HC_4-2014_cover.pdf)

Forest Stewardship Council <https://us.fsc.org/en-us>

Green Guide for Health Care: <http://www.gghc.org/>

[Center for Health Design: https://www.healthdesign.org/topics](https://www.healthdesign.org/topics)



### **Reduce Your Facility's Energy Use (Operations)**

The health care sector consumes a massive amount of energy and is responsible for 8% of greenhouse gas emissions in the United States.<sup>59</sup> Cutting your office or facility's energy use or switching to renewable energy can reduce emissions from fossil fuel electricity generation and air pollution associated with fuel transportation. Air pollution can contribute to asthma and chronic lung disease, among other health problems.

Health Care Without Harm and Practice Greenhealth<sup>60</sup> recommend the following interventions:

- **Make buildings more energy efficient** – *Facilities can reduce their energy use by switching to energy efficient light bulbs (CFLs, LED bulbs), adjusting thermostats to save energy when appropriate, and upgrading major equipment to the most energy-efficient model.* Optimize the building envelope with better insulation and energy-efficient windows. If your facility has on-site power generation, consider installing combined heat and power (CHP) technology, which captures excess heat from electricity generation and uses it for space heating and cooling and heating water.<sup>61,62</sup> CHP systems can also operate during grid power failures, ensuring facility resiliency during storms or other events.
- **Install On-Site Renewable Energy Capability** - *Facilities can install solar panels to generate a portion of facility's energy, and/or solar hot-water heating system.* Kaiser Permanente has installed solar panels at facilities throughout California, equal to 70MW of solar capacity.<sup>63</sup> The system has a plan to become carbon net positive by 2025, using enough clean energy and carbon offsets sufficient to remove more greenhouse gases than it releases.<sup>64</sup>
- **Purchase Energy-Efficient Products** – *Buy Energy Star or Federal Energy Management Program-designated products.* Medical devices, such as LED microscopes and direct-current vaccine storage refrigerators can also be solar powered.<sup>65</sup> CRT computer monitors can be replaced with LCD flat-screen monitors that use significantly less energy and laptop computers use less energy than desktop computers.<sup>66</sup>
- **Reduce Standby Energy Use** – *Plug computers and other electronic equipment into power strips and turn off when not in use.* According to the U.S. Department of Energy, plugged-in electrical equipment may consume energy even when it's powered down. Standby power (or "phantom" loads) can consume up to 5 percent of an electrical plug load.<sup>66</sup>
- **Purchase Green Power** – *Use power generated from renewable sources like wind, solar.* In 2015, Kaiser Permanente announced it would purchase 153 MW of wind and solar power in an effort to achieve its goal of becoming carbon net positive by 2025.<sup>64</sup> Physician offices may be able to

purchase renewable energy credits and buy renewable energy from their utility company in addition to installing on-site renewable energy systems.<sup>67</sup>

### **Case Study: Boston Green Ribbon Commission Health Care Working Group**

- Nearly all major Boston-area hospitals participate. Commission's goal is 25% drop in GHG emissions by 2020, 100% by 2050.
- Member hospitals achieved cuts in electricity, natural gas use, GHG reductions for all fuels.
- Sector energy use dropped by 9.4% from 2011-2015, "avoiding greenhouse gas (GHG) emissions equivalent to 126 million miles traveled by an average passenger vehicle."
- 100% of Partners HealthCare energy is from zero emission sources. Boston Medical Center expects to be 92-100% carbon neutral by 2018.
- Cost savings conservatively estimated at \$15 million, enough to pay for healthcare for 1,357 Massachusetts Medicare enrollees.<sup>68</sup>

### **Resources**

U.S. Department of Energy Commercial Building Energy Alliance/Hospital Energy Alliance  
<http://www1.eere.energy.gov/buildings/alliances/>

My Green Doctor. Workbook – Energy Efficiency. <http://www.mygreendoctor.org/workbook-1-energy-efficiency/>

Energy Star Certified Products. <https://www.energystar.gov/products>

EnergyStar Guidelines for Energy Management: <https://www.energystar.gov/buildings/about-us/how-can-we-help-you/build-energy-program/guidelines>

EPA Combine Heat and Power Project: <https://www.epa.gov/chp>

U.S. Department of Energy. Hospitals Pulling the Plug on Energy-Wasting Electric Equipment and Procedures. <http://www.aep.uci.edu/der/buildingintegration/2/BuildingTemplates/Hospital.aspx>

U.S. Department of Energy. Federal Energy Management Program.  
<http://energy.gov/eere/femp/federal-energy-management-program>



## Transportation

Transportation accounted for 27% of total U.S. greenhouse gas emissions in 2015.<sup>69</sup> Vehicles release carbon monoxide, nitrogen dioxide, hydrocarbons, particulate matter and other emissions that pose a risk to human health.<sup>70</sup> Pollutants from traffic are associated with asthma, nonallergic respiratory morbidity, and cardiovascular morbidity.<sup>71</sup> In the health care sector, emergency medical service operations, with ambulances that are typically powered by diesel or gasoline, emit a substantial amount of carbon per unit response.<sup>72</sup> The transportation carbon footprint of the health care sector also includes suppliers and other fleet vehicles.

Health Care Without Harm and Practice Greenhealth<sup>73</sup> recommend the following interventions:

- **Reduce fleet emissions** – *Hospital fleets, including emergency medical service vehicles, hospital shuttles, and supply vehicles, may include high-fuel efficiency, hybrid, alternative fuel vehicles.* Utah’s Intermountain Health Care has 23 natural gas vehicles and one electric car, cutting its fleet’s carbon footprint by 20% from 2013 to 2014.<sup>74</sup> Stockholm Sweden’s County Council and Council-owned ambulance company AISAB developed the world’s first “eco-ambulance,” which runs on renewable, low-emission biogas.<sup>75</sup> AISAB has also promoted “eco-driving,” training its drivers to operate vehicles in a manner that reduces fuel consumption.
- **Help commuters reduce emissions** – *Encourage use of mass transit, establish vanpool/carpool programs to make employee commuting more efficient; telecommuting for employees; shuttles to public transit.* Mount Sinai Hospital has increased its shuttle service frequency to encourage carpooling and has installed electric car charging stations and bike parking around the campus.<sup>76</sup> Hospitals, clinics, and physician offices can choose sites near public transportation and mixed use areas, encouraging transit use and improving accessibility for patients and employees while reducing the number of automobile trips.
- **Choose suppliers with efficiency or alternative-fuel standards** - *Select vendors and suppliers that share your facility’s sense of mission.*
- **Prefer local suppliers** – Using local suppliers can help reduce transportation and shipping distance, and fuel consumption. The Nottingham University Hospitals NHS Trust sourced its milk from a local dairy, and nearly all of its meat from local providers. The change “saved an estimated 150,000 food miles a year and 6 (million GBP) in costs.”<sup>77</sup>
- **Purchase energy-efficient shipping** – Choose lighter products with less packaging, encourage environmentally sustainable packaging.

### **Case Study; Seattle Children's Hospital**

- SCH developed a Comprehensive Hospital Transportation Plan proposal.<sup>78</sup>
- The plan includes strategies to reduce vehicle traffic by providing shuttles that link to transit hubs, parking changes, encourage carpooling, free transit for employees, and vanpool service.
- It recommends providing areas that are more walking and cycling-friendly through capital investments that link hospital and surrounding community to larger walking/biking networks, free bikes to employees who pledge to bike to work, cash for those who don't drive to work, on-site bike maintenance, and discounts on gear from in-house bike shop.
- According to Streetsblog, the hospital is more than halfway to its goal of getting from 50 percent car commuting to 30 percent.<sup>79</sup>

### **Resources**

International Institute for Sustainability in Emergency Services

<http://greenems.org/>

Best Workplace for Commuters <http://www.bestworkplaces.org/>

[Health Care Climate Council: Climate Action Playbook - https://climatecouncil.noharm.org/](https://climatecouncil.noharm.org/)



## Reduce Waste

The health care sector generates a large amount of waste. This waste has an impact on the planet – transporting waste to landfills via fossil fuel-burning trucks increases greenhouse gas emissions. Landfills emit methane and garbage-burning incinerators are sources of dangerous pollutants. Making environmentally conscious decisions throughout the life cycle of the goods used by the health care sector, from the extraction of materials, manufacturing process, distribution, usage, and end-of-product-life decisions, can help to reduce greenhouse gas emissions.<sup>80</sup> By reusing and recycling materials, the health care sector can reduce demand for materials used in the manufacture of end products, including wood products that act as carbon sinks.

Health Care Without Harm and Practice Greenhealth<sup>81</sup> recommend the following interventions:

- **Prevent waste** – *Through less material manufacturing, reduced use of virgin material, better procurement practices.* Physicians and facility procurement staff can work with suppliers to purchase tools and medical supplies that meet the needs of the practice and have a reduced environmental impact. Choose products with limited or zero packaging waste or with packaging that is recyclable or compostable. Procurement tips from Health Care Without Harm can be found here: <https://noharm-uscanada.org/issues/us-canada/purchasing-goals>
- **Recycle and buy recycled products** – *Recycle all recyclable products, including electronics.* According to the Healthcare Environmental Resource Center, the U.S. healthcare facilities create nearly 2 billion pounds of paper and cardboard waste a year.<sup>82</sup> Paper use can be decreased by printing on both sides of a sheet of paper, using a smaller font and by paying bills electronically.<sup>83</sup> If your practice contracts with a paper shredder service to meet privacy law requirements, make sure that they recycle shredded material. Procurement staff should purchase items that are made of recycled materials. Consult the [EPA Comprehensive Procurement Guideline Program](#) for additional information. New York Presbyterian-Queens hospital recycles over 17% of all waste and installed a bio-digester organic waste decomposition system in its food service department to curb food waste.<sup>84</sup> Healthcare Without Harm has published a list of materials that health care facilities may be able to recycle: [https://noharm-uscanada.org/sites/default/files/documents-files/2379/Recycling\\_Fact\\_Sheet.pdf](https://noharm-uscanada.org/sites/default/files/documents-files/2379/Recycling_Fact_Sheet.pdf)
- **Collect and recycle nitrous oxide anesthetic gases** – *limit the amount that escapes into atmosphere during use and reuse.* Wasted anesthetic gases contribute to global warming and ozone depletion<sup>85</sup> and may pose health hazards such as headaches, fatigue and nausea.<sup>86</sup> Anesthetic gas scavenger systems can capture and recycle wasted gases so they can be reused, mitigating environmental and health-related harm and lowering costs.<sup>87,88</sup>

- **Dispose of waste locally** – *Local disposal reduces travel-related emissions.*
- **Divert at least 90% of constructed waste** – *Building material produced during construction and demolition can be reclaimed and recycled.* The U.S. Environmental Protection Agency estimates that for nonresidential construction, the average waste generation rate is 4.34 pounds per square foot.<sup>89</sup> For a 250,000 square foot medical facility, that equals nearly 1.1 million pounds of construction and demolition waste.<sup>90</sup> By reclaiming or recycling materials like drywall, asphalt, shingles, metal, and cardboard, waste disposal and transportation emissions as well as demand for raw material can be reduced.

#### **Case Study: Virginia Mason Single-Use Device Reprocessing Project<sup>91</sup>**

- Single-use devices including arthroscopic/orthopedic, laparoscopic devices, end up in landfills and use energy during manufacturing, disposal and transport.
- Virginia Mason worked with a reprocessing vendor to help them reduce costs and waste.
- Reprocessed devices must meet FDA safety standards.
- Physicians on leadership team were consulted and visited reprocessing facility to observe quality control and inspection process.
- As a result purchasing costs dropped by \$3 million since 2012, in 2014 Virginia Mason reported it had reprocessed or recycled nearly 19,000 pounds of devices.

#### **Resources**

U.S. Environmental Protection Agency. <https://www.epa.gov/recycle>

Healthcare Environmental Resource Center: <http://www.hercenter.org/index.cfm>

U.S. Environmental Protection Agency. Climate Change and the Life Cycle of Stuff.  
<https://www3.epa.gov/climatechange/climate-change-waste/life-cycle-diagram.html>

[U.S. Environmental Protection Agency. Comprehensive Procurement Guideline Program:  
https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program](https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program)

[Health Care Climate Council. https://climatecouncil.noharm.org/](https://climatecouncil.noharm.org/)



## Healthy Food, Healthy Planet

Climate change could have an impact on the food we eat. According to the United States Department of Agriculture, “climate change is very likely to affect global, regional, and local food security by disrupting food availability, decreasing access to food, and making food utilization more difficult.”<sup>92</sup> Food and water insecurity resulting from climate change-connected drought and temperature changes could lead to malnutrition, rampant hunger, and intensify civil unrest and conflict in some regions of the world. Aquatic life could be endangered by warming oceans and higher carbon concentrations, and marine biodiversity may be compromised. Agricultural practices, use of fertilizers, land-use changes, and food-related transport contribute to greenhouse gas emissions. According to the United Nations Food and Agriculture Organization, the livestock sector is responsible for 14.5% of human-induced greenhouse gas emissions.<sup>93</sup> Health care facilities can switch to more environmentally sustainable food products in their cafeterias and vending machines, reduce and compost food waste, and select filtered tap water instead of bottled water when possible, to help combat climate change.

Health Care Without Harm and Practice Greenhealth<sup>94</sup> recommend the following interventions:

- **Reduce the amount of meat protein on menus** – *The livestock sector and meat protein production is a substantial source of greenhouse gas emissions.* Facilities can reduce their greenhouse gas footprint by offering a broader variety of healthy foods like local fruits and vegetables.
- **Buy local and seasonal food** – *reduce long-distance food transport leads to lower emissions.* Facilities in California<sup>95</sup>, Maryland<sup>96</sup> and elsewhere have participated in farm-to-hospital initiatives, purchasing produce and other food from local farmers. The cafeteria at St. Luke’s Hospital in Duluth, Minnesota serves fish, meat, and baked goods purchased from local sources.<sup>97</sup>
- **Compost food waste** - *Creates a recycled product (compost) that can replace fertilizer.* St. Luke’s Hospital in Duluth, Minnesota composts 40,000 pounds of food a year; through this and other measures, the hospital has reduced its waste pick-up costs by 15%.<sup>98,99</sup>



- **Eliminate bottled water** – *Encouraging tap water use will reduce waste.* In addition to reducing bottle waste and energy use related to bottle transportation and production, switching to non-bottled water could cut water waste: the Pacific Institute, calculates that it takes 3 liters of water to produce 1 liter of bottled water in 2006.<sup>100</sup>

#### **Case Study: Palomar Health's (San Diego, CA) Sustainable, Local, Organic Food Initiative**

- The facility staff worked with local produce vendors to purchase seasonal and bumper crops at reasonable prices.
- Hired a sustainability program manager to work with relevant departments, help set and follow-up on goals, and coordinate activities.
- Hospital leadership organized a Healthy Food Council that included members of the food service, sustainability, wellness, and human resource teams.
- Educated food service team, leading to better buy-in and promotion efforts.
- Increased purchasing of sustainable, local, organic (SLO) food; 13% of total food purchasing is now SLO.
- Resulted in higher cafeteria revenue.<sup>101</sup>

#### **Resources**

**Health Care Without Harm:** Healthy Food in Health Care <https://noharm-uscanada.org/issues/us-canada/healthy-food-health-care>

**Health Care Climate Council:** <https://climatecouncil.noharm.org/>

# Climate Change and Your Health



### What Is Climate Change?

There is clear proof that the world's climate is changing. These changes will affect the usual, expected weather patterns. They are caused by human activities, like operating factories, driving vehicles, and pollution. Climate change could have a serious effect on the health of the public. It can cause:

- Swings in temperature causing more heat waves and storms
- Higher sea levels
- Extreme weather events, such as droughts, floods, wildfires, and hurricanes
- Poor air quality, because of higher rates of pollution and dust
- Changes in food or clean water supply



### How Can Climate Change Affect My Health?

All people will be affected by climate change, but children and older adults may be most affected. Climate change will be linked with health problems, such as:

- **Heat-related conditions:** Extreme heat can cause dangerous changes in your body. This can lead to dehydration, heat stroke, and exhaustion. Extreme heat can make many health conditions worse, such as heart and lung diseases.
- **Breathing problems:** Air pollution is dangerous and can irritate your lungs. It can also make problems, such as asthma and COPD worse.
- **Unsafe water supply:** Floods can cause problems with your town's water supply. For example, a flood could cause sewer systems to overflow into drinking water. This could lead to problems, such as diarrheal disease and cholera.
- **Disease spread by insects:** Weather changes can cause there to be more disease-spreading insects. These insects, such as mosquitos and ticks, can spread such diseases as Zika virus, malaria, and dengue fever.
- **Less food and water:** Climate change can cause problems with food supply. Crops can be damaged and seafood supply may become scarce. Droughts also affect the supply of water for drinking and bathing.
- **Mental health problems:** Extreme weather events like flooding, hurricanes, and heat waves can affect your family's emotional well-being. These events can cause stress, which could lead to such problems as anxiety or depression.

## Climate Change and Your Health



### How Can I Protect Myself and My Loved Ones?

- Prepare for extreme weather events. Visit [www.ready.gov](http://www.ready.gov) for advice. If you have a health condition, be sure you have enough of your medicine before a weather event.
- Protect yourself from insect bites by wearing insect repellent. Wear long sleeves, pants, and socks when outside.
- During a heat wave, wear loose clothing, drink lots of water, and stay out of the sun. Check on children and older family members often to make sure they are safe.
- Check the air quality in your area by visiting [www.airnow.gov](http://www.airnow.gov). Limit outdoor activities during poor air quality days.
- Wash your fruits and vegetables thoroughly before eating. This helps to remove bacteria, pesticides, and other bugs that could cause illness.
- Talk with your health care professional about any concerns you may have.



### What Can I Do to Help?

- Carpool, bike, walk, or take public transportation to get to places you need to go. If you must drive, keep your car in good condition. Things like inflated tires and new air filters save fuel.
- Reduce your food waste and try to eat less meat.
- Buy appliances with the Energy Star label. Find more information at [www.energystar.gov](http://www.energystar.gov).
- Unplug electronics when you are not using them.
- Install energy-efficient LED light bulbs.
- Insulate your home and windows to cut down on heat and air-conditioning use.
- For more tips, visit [www3.epa.gov/climatechange/wycd/](http://www3.epa.gov/climatechange/wycd/).

### For More Information

- **The Centers for Disease Control:** [www.cdc.gov/climateandhealth/](http://www.cdc.gov/climateandhealth/)
- **Environmental Protection Agency:** [www3.epa.gov/climatechange/basics/](http://www3.epa.gov/climatechange/basics/)
- **The National Resource Defense Council:**  
[www.nrdc.org/resources/climate-change-threatens-health](http://www.nrdc.org/resources/climate-change-threatens-health)

### Notes:

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- <sup>2</sup> The White House. Presidential Executive Order on Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure. August 15, 2017. Accessed at <https://www.whitehouse.gov/the-press-office/2017/08/15/presidential-executive-order-establishing-discipline-and-accountability>
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- <sup>4</sup> Leiserowitz A et al. Climate Change in the American Mind: November 2016. Yale Program on Climate Change Communication and George Mason Center for Climate Change Communication. 2017. Accessed at <http://climatecommunication.yale.edu/wp-content/uploads/2017/01/Climate-Change-American-Mind-November-2016.pdf>
- <sup>5</sup> Headings in bold from Maibach E, Nisbet M, Weathers M. (2011) Conveying the Human Implications of Climate Change: A Climate Change Communication Primer for Public Health Professionals. Fairfax, VA: George Mason University Center for Climate Change Communication.
- <sup>6</sup> Sarfaty M, Gould RJ, Maibach E. Medical Alert! Climate Change is Harming Our Health. Medical Society Consortium on Climate & Health. 2017. Accessed at [https://medsocietiesforclimatehealth.org/wp-content/uploads/2017/03/medical\\_alert.pdf](https://medsocietiesforclimatehealth.org/wp-content/uploads/2017/03/medical_alert.pdf) Accessed at <https://health2016.globalchange.gov/>
- <sup>7</sup> U.S. Global Change Research Program. The Impacts of Climate Change on Human Health in the United States. 2016. Accessed at
- <sup>8</sup> Watts N et al. Health and climate change: policy responses to protect public health. *Lancet*. 2015. Vol. 386, No. 10006, p1861–1914.
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- <sup>15</sup> U.S. Global Change Research Program. The Impacts of Climate Change on Human Health in the United States. 2016. Accessed at
- <sup>16</sup> Watts N et al. Health and climate change: policy responses to protect public health. *Lancet*. 2015. Vol. 386, No. 10006, p1861–1914.
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- <sup>18</sup> Sarfaty M, Gould RJ, Maibach E. Medical Alert! Climate Change is Harming Our Health. Medical Society Consortium on Climate & Health. 2017. Accessed at [https://medsocietiesforclimatehealth.org/wp-content/uploads/2017/03/medical\\_alert.pdf](https://medsocietiesforclimatehealth.org/wp-content/uploads/2017/03/medical_alert.pdf) Accessed at <https://health2016.globalchange.gov/>
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