

Climate Change and Underserved Communities



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KEYWORDS

- Climate change • Global warming • Greenhouse gases • Greenhouse gas emissions
- Patient education

KEY POINTS

- Climate change is a threat to the basic necessities of life, especially for the most vulnerable. These necessities include health, shelter, food, and water.
- Climate change will have direct health impact on populations seen in primary care.
- The effects of climate change must be dampened with adaptation and mitigation strategies.

A GLOBAL PERSPECTIVE ON CLIMATE CHANGE

The Intergovernmental Panel on Climate Change defines climate change as a change in the state of the climate that persists for an extended period, typically decades, and can be identified by the variability of its properties. It is also any change in climate over time, whether due to natural variability or as a result of human activity.¹ Climate change is not currently widely accepted as a health hazard by health care professionals in the United States; yet it is the single greatest global health threat of the twenty-first century.² The effects of climate change on global health are so enormous that in the next few decades billions of lives will be affected.² The concept of climate change, despite skepticism and political opposition, is valid. Available science concludes with 90% certainty that the earth's climate has warmed over the past few decades as a result of greenhouse gas emissions from human activities.^{1,3} Moreover, no credible body of climate scientists have found an alternate explanation for the rising global temperature.

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Climate change occurs due to an imbalance between incoming and outgoing radiation in the atmosphere.⁴ When solar radiation from sunlight enters the atmosphere, some of the radiation is absorbed by the earth's surface and emitted as infrared radiation. Greenhouse gases, such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), absorb the infrared radiation, heating up the lower atmosphere.^{5,6} These greenhouse gases can occur naturally or from human activities. Fluctuations in the temperature of the lower atmosphere have occurred in the past due to variations in concentrations of naturally occurring greenhouse gases. The significant rise in global temperatures now experienced, however, is due to a rise in the concentration of global greenhouse gases in the atmosphere due to various human activities. CO₂ accounts for 76% of greenhouse gas emissions and is a product of petroleum product combustion, natural gas, and coal. CH₄ is a product of landfills, coal mines, and oil and gas operations and accounts for 16% of emissions, whereas N₂O accounts for 5% of emissions and is a product of nitrogen fertilizers, burning biomass, and waste management processes. Finally, fluorinated gases account for 2% of emissions and are a product of industrial processes like refrigeration (Fig. 1).⁷

Since the industrial revolution, atmospheric concentration of CO₂ has increased from 280 parts per million to approximately 395 parts per million today.^{3,5} This has led to record-high global temperatures. The planet's average temperature has increased by 0.8°C since 1880 and if the current trend of CO₂ emission levels remains stable, it is predicted that the planet's average temperature will increase by an additional 1.8°C to 5.8°C by the end of the twenty-first century.⁵ This is expected to have an impact on basic human needs like food, water, shelter, and health. Increased global temperature will disrupt the water cycle because warmer air retains more moisture, causing flooding in some areas and drought in others; this will affect crop yield from farming and even livestock productivity. Increased temperature can also lead to heat waves increasing the incidence of heat-related illnesses. Heat waves can also increase the ambient level of some air pollutants, which can increase morbidity and mortality related to cardiorespiratory conditions. Also, flooding or drought can affect the geographic distribution of vector-borne diseases, such as malaria and dengue fever. Increased global temperature will also increase ocean

- Carbon dioxide (from fossil fuel burning, forestry, industrial processes)
- Methane (from landfills, coal mines, oil & gas operations)
- Nitrous oxide (from nitrogen fertilizers, burning biomass & waste management processes)
- Fluorinated gases (from industrial processes like refrigeration)

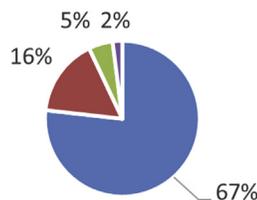


Fig. 1. Global greenhouse gas emissions.

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