



Heated Conversations: Improving Heat Related Outcomes Through Climate Communication

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EXECUTIVE SUMMARY

In 2022, the National Health Council launched its research brief series with an inaugural brief on climate change and its intersection with chronic disease. While it has become apparent that climate can have severe long-term health effects on chronic conditions and disrupt the health care ecosystem, extreme heat events have emerged as an important public health concern. As hotter days become more frequent, the effects of higher temperatures put patients with one or more chronic conditions and members of vulnerable communities at a higher risk for negative health outcomes. These health outcomes include the exacerbation of existing condition/s, heat stress, heat-related illness, or even heat stroke. Efforts to mitigate heat exposure and other climate change impacts often occur through high level policies or programs. However, patient organizations, researchers, practitioners, and others within the health care ecosystem can make individual or community-level impacts on patient engagement and climate conversations by improving communication of environmental risks.

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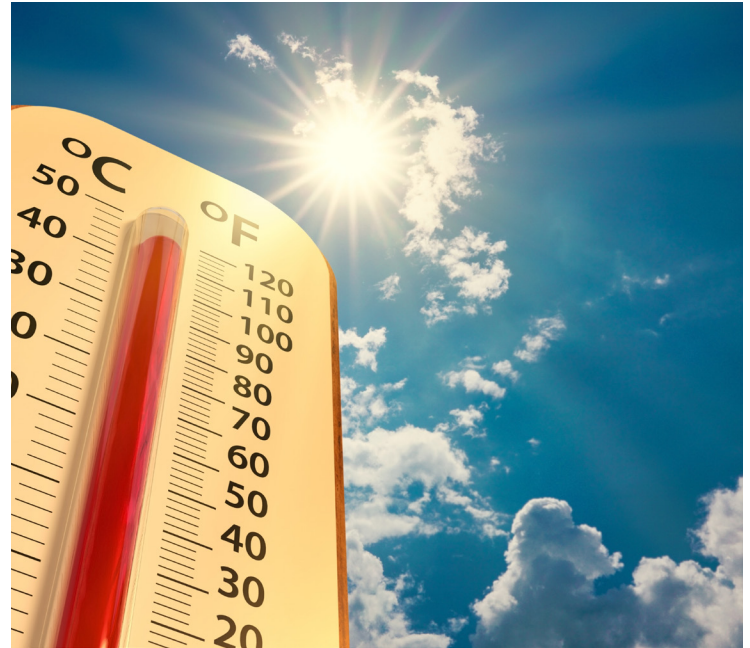
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1 EXTREME HEAT AND NEGATIVE EFFECTS ON CHRONIC HEALTH OUTCOMES

Extreme heat is a global issue that is closely linked with negative health outcomes. In a 2021 study, it was estimated that approximately 490,000 heat-related deaths occurred each year from 2000–2019.¹ Heat also exacerbates underlying illnesses, such as cardiovascular disease, diabetes, and other chronic conditions.² As both the intensity and frequency of extreme heat events increase, it is important for people, especially those with one or more chronic conditions, to be aware of how the warming climate could adversely affect their health and wellbeing.

High temperatures and increased exposure to heat can have severe physical repercussions. In 2023, Centers for Disease Control and Prevention (CDC) recorded a significant increase in the proportion of emergency department visits due to heat-related illness during warmer months (May–September): an average of 180 out of every 100,000 visits compared to the average of 151 out of every 100,000 visits from 2018–2022.³ As temperatures rise, the body physically responds to regulate internal temperature, a process called thermoregulation. The most immediate and visible response is sweat production to cool off the skin and body. However, excessive sweating can cause dehydration by moving water away from other bodily functions, which can lead to heat stress, heat-related illness, heat exhaustion, or even heat stroke. Other physiological functions impacted by heat include increased blood pressure leading to cardiovascular strain, impaired immune system, kidney disease, and, in extreme cases of high internal temperature, respiratory distress or even organ damage.^{2,4} These physical effects emphasize the importance of decreasing heat exposure to mitigate negative health outcomes that can become deadly, especially for those with pre-existing conditions.

Excessive heat directly impacts the morbidity and mortality rates of specific diseases and the efficacy of



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certain medications. A 2021 study on diabetes showed that heat exposure increased the average risk of mortality by almost 14%, while a 2022 systematic review on cardiovascular disease associated with heatwaves reported an approximate 12% increase in risk of mortality.^{5,6} Similar research conducted in 2021 on kidney disease outcomes indicated that an increase of 1°C could increase kidney disease morbidity by 1% and kidney-related mortality up to 3%.⁷ During heat waves, disrupted bodily functions can also prevent therapies and medications working as intended, a phenomenon that has been studied in diabetes, cardiovascular and kidney disease, neurological disorders, and cancer.⁸ As the chronic health dangers of acute and prolonged heat exposure become more pronounced, it is imperative that health care systems engage in programs and policies aimed at mitigating the impacts of climate change, especially among the most vulnerable populations.

2 AN EQUITABLE APPROACH TO EXTREME HEAT

Extreme heat affects everyone. However, the likelihood of experiencing extreme heat exposure and its impacts is disproportionate across age, race and ethnicity, location, occupation, and socio-economic conditions.^{9–15} The complex intersection of these social drivers of health highlight the need for equitable considerations when developing heat mitigation strategies.

Heat can be a major contributing factor to health outcomes for vulnerable populations such as pediatrics, older adults, historically underrepresented racial/ethnic (HURE) communities, and pregnant people. For example, infants and children struggle with thermoregulation due to different metabolic demands compared to healthy adults.¹⁵ Comparatively, older adults (age 65 and older) have higher rates of age-related chronic disease or illness and also face additional physiological challenges in thermoregulation, increasing their risk of negative health outcomes with higher temperatures.¹³ A 2020 study of HURE communities found that American Indian/Alaska Native, Black, and Latino older adults exhibited higher mortality rates from 1997–2017 compared to white or Asian/Pacific Islanders when exposed to excessive heat.¹⁶ A 2024 study conducted in Texas found that heat exposure was associated with an increased risk of preterm births up to 15%, especially for parents of HURE communities.¹⁷ The impact of heat on these intersectional identities show that it is crucial to prioritize mitigation efforts to ensure better health outcomes for current and future generations of marginalized groups.

Although heat exposure can be partially dictated by local climate, the intersection of location, socio-economic status, and occupation can determine heat intensity and affect health outcomes. In 2022, an evaluation of census tracts across the United States determined heat vulnerability scores using a mix of environmental and demographic data including temperature, land cover, housing, economics, and



prevalence of chronic conditions.¹² (Figure 1) The study revealed that non-Hispanic Black and Hispanic/Latino neighborhoods had significantly higher heat vulnerability scores compared to white neighborhoods. These findings indicate that HURE communities living in areas with higher temperatures and less green spaces or tree coverage were more likely to have lower income or be unemployed and had a higher prevalence of diabetes and underlying health conditions.¹² In 2021, a study used satellites to remotely measure land surface temperature across over a thousand U.S. counties and found that around 75% had significantly more daytime urban warming in lower-income and racial and ethnic areas that could contribute to negative health outcomes.⁹ Another 2021 study across 125 major U.S. cities showed that in “70% of the cities, people below the poverty line had higher heat exposure than those above twice the poverty line” and communities of color had higher heat exposure than non-Hispanic whites in 97% of U.S. cities.¹⁸ Understanding the disproportionate heat exposure of low-income HURE communities from an equity and justice perspective can help inform future efforts to improve health outcomes.

3 CURRENT APPROACHES TO EXTREME HEAT AND ELEVATING THE PATIENT EXPERIENCE

On a systemic level, exposure to extreme heat can be mitigated through various mechanisms at the intersection of policy and public health. For example, cities can work to implement urban planning policies focused on developing more green spaces and providing tree coverage to increase shade and cool spaces that have the co-benefit of reducing heat-related mortality.^{19,20} Another example is investment in clean energy infrastructure that would lower pollution, which is known to be a major contributing factor to the heating of urban areas, and also decrease the morbidity of chronic cardiovascular and respiratory diseases.²¹ These policy changes require a high level of management and governance, but the policy development process provides opportunities for patient organizations and individual patients to voice their support for actions that can positively affect health outcomes.

Institutional-level mitigation efforts of heat-related health outcomes can be tailored for specific health care facilities or conditions. For example, health care facilities can work to lower harmful emissions and indirectly lower heat exposure by implementing decarbonization programs that include sustainable assessments of operational processes, decreasing physical waste, and increasing telehealth for economic, societal, and health benefits.^{11,22} In recent years the percentage of MD-graduating schools requiring climate change effects as a topic in their curriculum rose from 27% to 65% from 2019 to 2022, improving medical knowledge about which medications could make people more susceptible to the risks of heat.²³ Government organizations such as the [CDC](#) and the [U.S. Department of Homeland Security](#) can help build resilience against extreme heat events by sharing information on how to prepare for extreme heat, what to do during a heat wave, and how to identify heat-related illnesses. Educational resources can also inform patients about management of specific chronic conditions, such as the American Lung Association's [resource page](#) on extreme heat and

risk factors to pulmonary disease. Other organizations such as the [Epilepsy Foundation](#) and the [Alliance for Aging Research](#) also disseminate vital information on summer safety and extreme temperatures. As institutions continue to create curriculums or other resources on heat, education on disease-specific effects and mitigation strategies is an opportunity to engage patients and ensure that the strategies would work for their experience with a disease or condition.

For a more individual or community-specific approach, it would be beneficial to improve communication on climate change within the existing health care system. In 2023, a survey of over 50 health professionals focused on improving climate-related health care practices identified opportunity timepoints, such as outpatient visits and acute care settings, where clinicians could engage with patients on risk factors and how their individual health intersects with the climate.²⁴ (Figure 2) If practitioners are empowered to start these climate conversations in a clinical setting, this provides an opportunity for follow up to better understand the patient perspective determining when, where, and how they would like these conversations to occur.

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These approaches offer a glimpse of a more manageable future, but there are still many knowledge gaps on how patient-centered approaches could improve climate communication and identify effective patient engagement strategies. For example, more research should be done to determine the level of technical language needed to properly inform patients without being a barrier to understanding or engagement with certain communities.^{25,26} Other recommendations for research include exploring how patient behavior affects heat-related outcomes with the recent rise of health and climate misinformation.²⁷ This opens an opportunity to elevate and utilize the patient experience to better inform future heat mitigation efforts and address heat-related disparities.



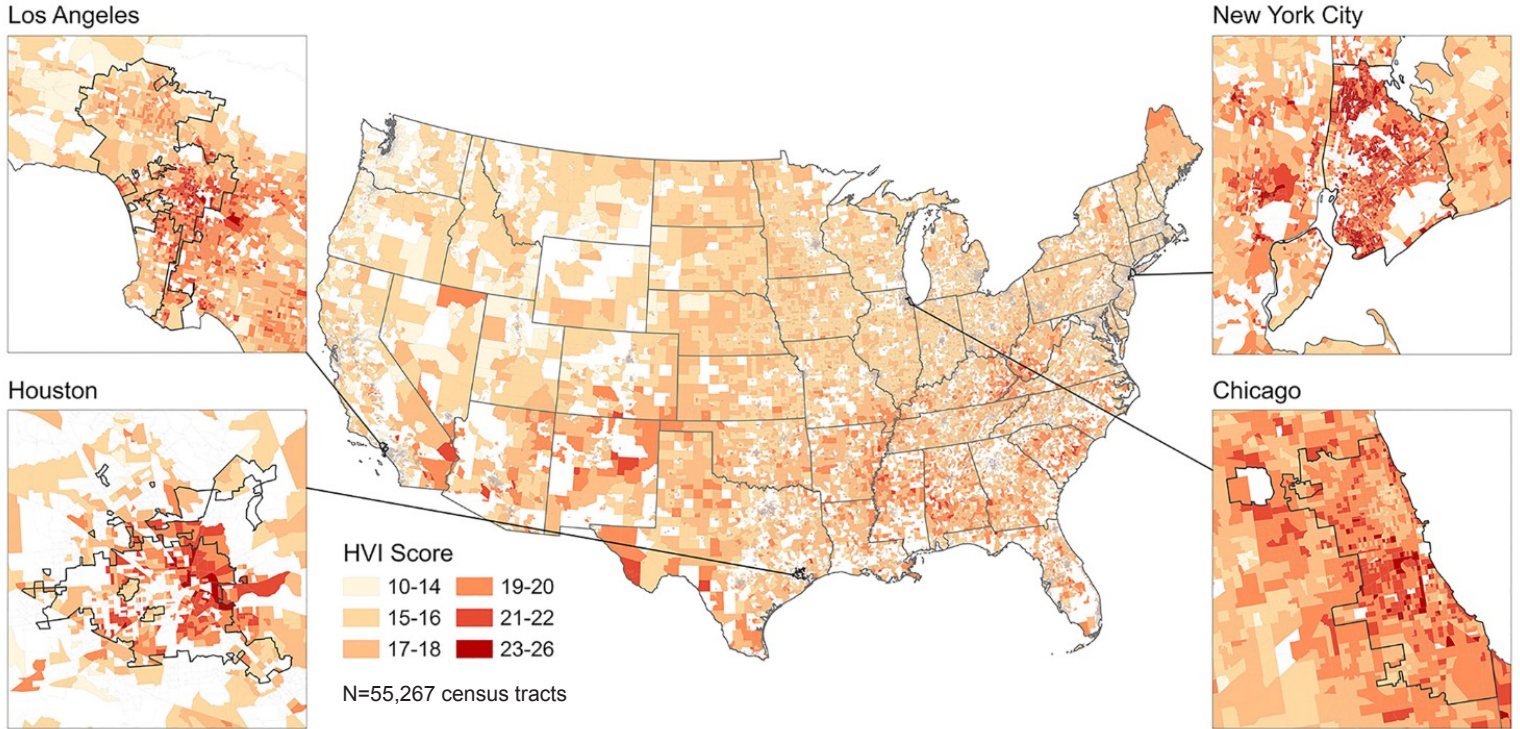
RECOMMENDATIONS

The patient experience is a valuable perspective to addressing the wide-spread effects of extreme heat. As temperatures continue to rise, the NHC's commitment to championing the patient voice in the face of climate change is more critical than ever. This research brief provides the following recommendations to NHC members:

- Patient communities can help reduce negative health related outcomes from heat exposure and build resilience by engaging with educational resources, supporting climate policies, and working with researchers or institutions to better identify the needs of patients in extreme heat events.
- Patient organizations can continue to improve patient outcomes through development and dissemination of educational resources that provide disease-specific guidance on extreme heat and utilizing their collective influence to advocate for climate policies.
- Medical schools and providers can continue to strengthen climate and health knowledge by elevating climate as a topic in medical school curricula, continuing education in climate fellowships, and using their unique influence to advocate for climate policies.
- Research institutions and think tanks can help elevate the patient voice and improve climate communication strategies through more research on effective climate terminology and identifying crucial timepoints within the existing health care system when patients would like to be, or be open to, conversations about extreme heat and how it affects their health.
- Policy makers at various levels can improve the health outcomes of their constituents by considering the intersectional needs of their communities to ensure that proposed heat mitigation policies address disparities.

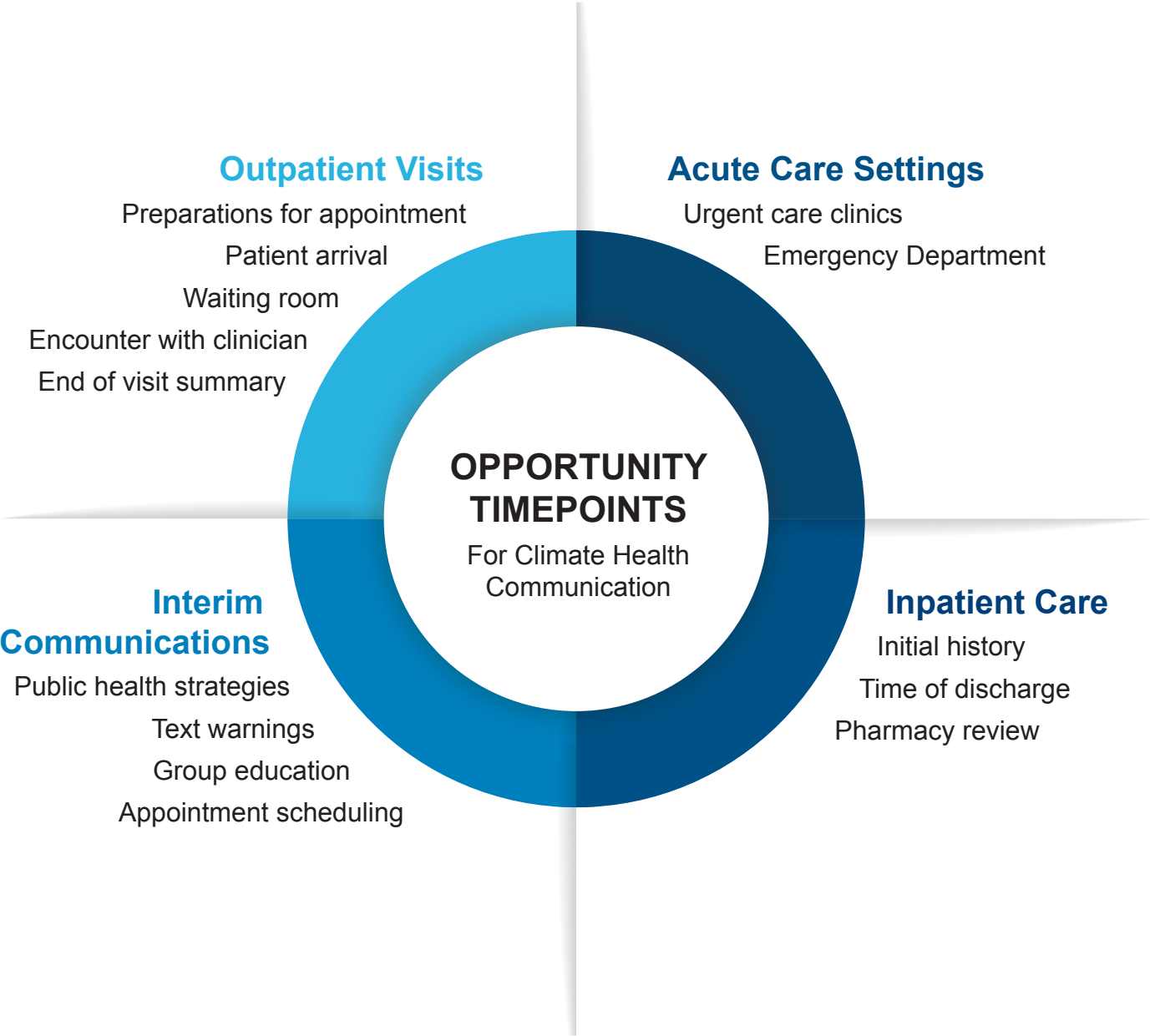
APPENDIX

Figure 1: Heat Vulnerability Index (HVI) Score Maps, By U.S. Census Tracts



Referenced from Manware M, Dubrow R, Carrión D, Ma Y, Chen K. Residential and Race/Ethnicity Disparities in Heat Vulnerability in the United States. *GeoHealth*. 2022;6(12):e2022GH000695. doi:10.1029/2022GH000695

Figure 2: Opportunity Timepoints for Climate Health Communication Across Patient's Health Care Journey



Referenced from Chang A, Gundling K. Innovating patient care in the era of climate change. *J Clim Change Health*. 2023;13:100250. doi:10.1016/j.joclim.2023.100250

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