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Preventing Heat-Related Fatalities during the COVID-19 Pandemic

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The deadliest weather-related health outcomes in the U.S. are heat related.[1] On average, heat contributes to over 650 U.S. deaths annually. As we approach what is expected to be a record high temperature summer,[2] the COVID-19 pandemic has created additional risks for heat-related illnesses and deaths.[3] Government restrictions to reduce the spread of the virus will result in fewer public places to go cool down, including public pools, cooling stations, libraries, and indoor shopping malls. Working from home means that some people will not have access to air-conditioned workspaces. Social distancing and fear of contracting the coronavirus could result in isolation of the most vulnerable groups (e.g. older adults and those with preexisting conditions), who may be cut off from the homes of friends or family where air-conditioning might provide some respite on hot summer days.

KEY FINDINGS:

- COVID-19 physical distancing creates challenges for preventing heat-related deaths this summer.
- Adults age 65 and older experienced the highest risk of heat-related death.
- Heat-related death rates are highest in the most urban and most rural areas of the U.S.
- State and local governments must develop age- and place-appropriate interventions to prevent heat-related deaths during the COVID-19 pandemic.

Using mortality data from the U.S. Centers for Disease Control and Prevention Online Database (CDC WONDER), I show how the risk of heat-related death varies by age group and metropolitan status. I also propose recommendations for local leaders to prevent heat-related deaths in the current context of COVID-19 business closures and physical distancing.

The Risk of Heat-Related Death Varies by Age Group

The risk of heat-related death varies by age. Figure 1 shows that from 1999 to 2018, the risk of heat-related death was highest for adults age 65 and older (i.e., older adults). Given that older adults are also at high risk for COVID-19 related mortality, this graph suggests that the very people who most need cooler spaces this summer may be the least likely to use them due to fears about contracting the coronavirus. Figure 1 also shows the high rate of heat-related death among infants. Heat-related deaths among infants can be linked to environmental circumstances such as being left in parked cars as well as lower physical ability to manage heat stress.[4-5]

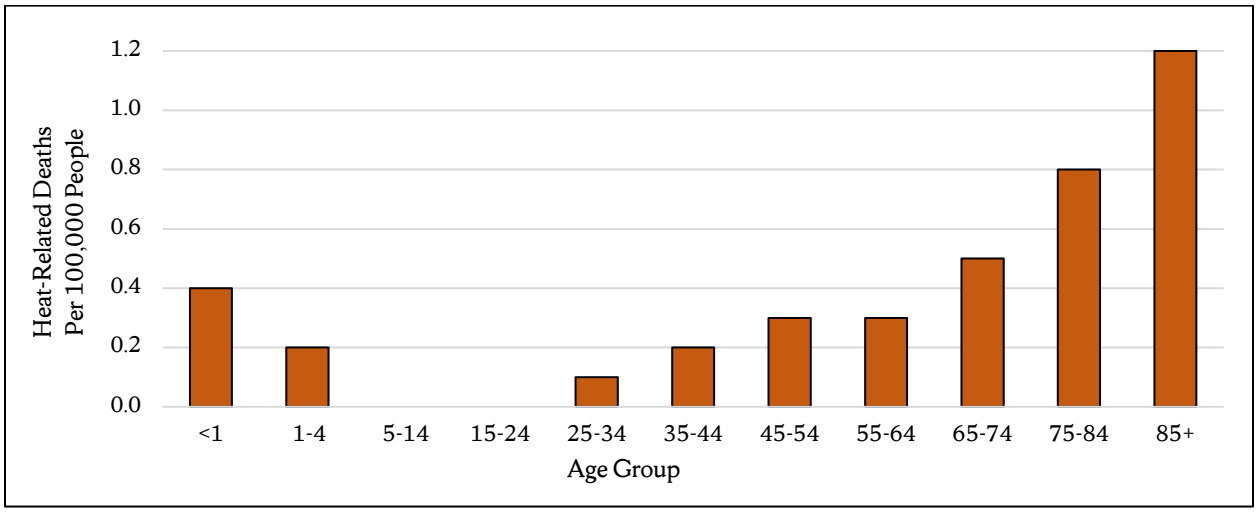

Figure 1: Heat-Related Mortality Rates are Highest among those ages 65 and older
Data Source: U.S. Centers for Disease Control and Prevention, CDC WONDER.
Notes: Values represent age-group specific heat-related death rates (deaths per 100,000 persons), 1999-2018. Heat-related deaths are defined as deaths that include the ICD-10 codes T67 or X30 as either the underlying or contributing cause of death.

Heat-Related Death Rates are Highest in the Most Urban and Rural Places

Heat-related mortality rates also vary by metropolitan status. Figure 2 shows that the most urban counties (i.e., large central metro counties) have the highest rates of heat-related mortality among older adults (ages 65 and older). These areas have dense concentrations of concrete and asphalt and lack vegetation, which subsequently reduces evaporative cooling capabilities. The most rural areas (i.e., noncore counties) have the second highest rate of heat-related mortality, even though they are characterized by lower population density, less asphalt and concrete, and more vegetation. This rural disadvantage may be due to the greater health vulnerabilities of the populations living in these areas, including higher rates of poverty and less access to health care.[6-7] But less access to or longer travel distance to public cooling places may also play a factor.

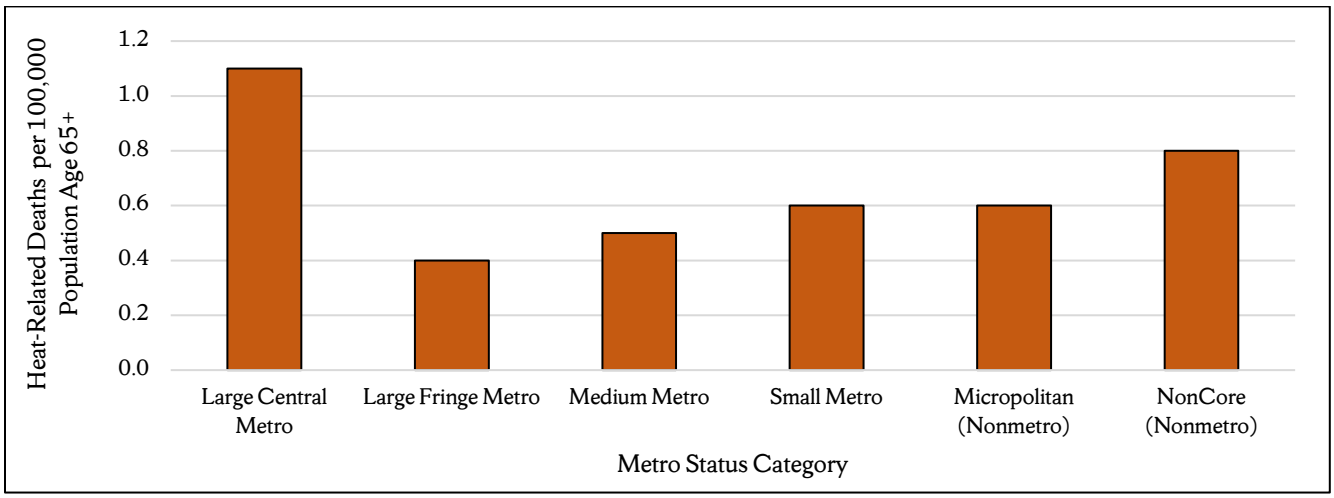

Figure 2: Heat-Related Mortality Rates are Highest among Older Adults (age 65 and older) in the Most Urban and Most Rural areas
Data Source: U.S. Centers for Disease Control and Prevention, CDC WONDER
Notes: Values represent age-adjusted mortality rates (deaths per 100,000 persons) for adults age 65 and older, 1999-2018. Heat-related deaths are defined as deaths that include the ICD-10 codes T67 or X30 as either the underlying or contributing cause of death.

Recommendations for State and Local Leaders

As summer heat increases, and the COVID-19 pandemic continues to warrant social distancing, protecting people from heat-related illnesses and deaths will require inter-sectoral coordination that can be adapted to communities' unique spatial and demographic contexts. Strategies should include:

- Adapting heat health action plans to the current pandemic context;
- Strengthening heat warning systems and media coverage of rising temperatures;
- Coordinating and mobilizing social services that serve vulnerable populations, including older adults, essential workers, and those with preexisting conditions;
- Promoting low-tech cooling options, especially for those who are isolated;
- Creating and adapting cooling centers and outdoor cooling areas to meet CDC physical distancing guidelines;
- Tailoring plans for urban and rural areas

Future research should examine if the risk of heat-related death changes during the pandemic for younger adults and across the rural-urban continuum as a result of social distancing taken to flatten the curve.

The COVID-19 pandemic heightens the risk of heat-related fatalities as social distancing prevents people - and especially vulnerable populations - from cooling down in cooling stations, workspaces, public areas, and the homes of friends or relatives. As summer temperatures increase, communities and organizations must quickly prepare and implement locally appropriate public health measures to reduce the risk of heat-related illnesses and deaths.

Data and Methods

Mortality data were accessed using the U.S. Centers for Disease Control and Prevention WONDER Online Database. Heat-related deaths for 1999 to 2018 were identified as those with an underlying or contributing cause of death (ICD-10) code of T67 (effects of heat and light) or X30 (exposure to excessive natural heat).[8]

References

1. NOAA Weather Related Fatality and Injury Statistics (2018). Retrieved from https://www.weather.gov/hazstat/
2. NOAA Climate Prediction Center: Three Month Outlook (2020). Retrieved from https://www.cpc.ncep.noaa.gov/
3. Martinez, G., Linares, C., de'Donato, F., Diaz, J. (2020). Protect the vulnerable from extreme heat during the COVID-19 pandemic. *Environ Res* 187. doi: 10.1016/j.envres.2020.109684
4. Guard, A., Gallagher, S. (2005). Heat related deaths to young children in parked cars: an analysis of 171 fatalities in the United States, 1995-2002. *Injury Prevention*. 11(33-37). DOI: 10.1136/ip.2003.004044.
5. Basagaña, X., Sartini, C., Barrera-Gómez, J., Dadvand, P., Cunillera, J., Ostro, B., . . . Medina-Ramón, M. (2011). Heat Waves and Cause-specific Mortality at all Ages. *Epidemiology*, 22(6), 765-772. DOI: 10.1097/EDE.0b013e3182303 lc5
6. Benmarhnia, T., Deguen, S., Kaufman, J., Smargiassi, A. (2015). Review Article: Vulnerability to heat-related mortality: A systematic review, meta-analysis, and meta-regression analysis. *Epidemiology*, 26(6): 781-93. doi: 10.1097/EDE.0000000000000375
7. Lam, O., Broderick, B., Toor, S. (2018, Dec 12). How far Americans live from the closest hospital differs by community type. Pew Research Center. Retrieved from https://www.pewresearch.org/fact-tank/2018/12/12/how-far-americans-live-from-the-closest-hospital-differs-by-community-type/
8. U.S. Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2018, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Retrieved from http://wonder.cdc.gov/mcd-icd10.html

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