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DISPARITIES IN EXTREME HEAT EXPOSURE IN MARICOPA COUNTY, ARIZONA: THE INTERSECTION OF RACE/ETHNICITY AND OLDER AGE

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Abstract:

Extreme heat causes more deaths than all other extreme weather events combined in the US. Due to climate change, heat waves are becoming more frequent, more intense, and longer, while human populations increasingly concentrate in urban areas that function as heat islands. Epidemiological studies have documented disparities in heat-related morbidity and mortality based on older age, racial/ethnic minority and low socioeconomic statuses. Distributive environmental justice (EJ) studies find that disproportionately high temperature exposures burden racial/ethnic minority and low socioeconomic status (SES) groups in the US, which amplifies the heat-related health disparities they experience. Few studies have examined how racial/ethnic status intersects with other dimensions of social inequality to influence hazard exposures, and a complete lack of knowledge exists regarding the intersection of racial/ethnic minority status with older age status in shaping patterns of environmental injustice with respect to heat. We address those limitations through a novel analysis of the intersection of racial/ethnic and older age statuses in exposure to extreme heat in Maricopa County, Arizona. Socio-demographic data for Maricopa County census tracts come from the American Community Survey 2018 5-year estimates. Remote sensing data on land surface temperature (LST) for the summer months of the years 2014-2018 at a 30-meter resolution come from US Landsat Ready Data, which we use to calculate the mean LST of census tracts. Our analysis approach consists of two parts. First, we conducted a univariate analysis in which we mapped and calculated descriptive statistics for our analysis variables. Second, we conducted multivariable generalized estimating equation analyses to test for differences in mean LST across census tracts based on racial/ethnic composition, older age composition, and racial/ethnic by older age composition at the census tract level, adjusting for the effects of geographic clustering and other variables. Our findings indicate that there are disparities in land surface temperature across Maricopa County census tracts based on racial/ethnic composition, SES, older age composition, and the intersection of racial/ethnic and older age composition. As median household income and the composition of older residents in census tracts increased, temperatures decreased. Higher proportions of Latinx as well as older vs. younger Latinx residents in census tracts predicted increased heat. In contrast, higher proportions of white residents and older vs. younger white residents in census tracts predicted cooler temperatures. These findings complement existing knowledge about the vulnerability of older persons and minority groups to the health effects of heat. The intersectional heat inequities experienced based on older age and Latinx status in Maricopa County demand targeted public health interventions. Future studies should assess the intersectional effects of race/ethnicity and older age on hazard exposure elsewhere.