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Extreme Heat Wave in Phoenix, AZ: A Case Study

Introduction

Arizona is one of the hottest places on earth from May to September. Heat-related illnesses are common during the summer. Year after year, nearly 3,000 people visit Arizona emergency rooms because they experience signs and symptoms and are treated for heat-related illness including dehydration, heat cramps, heat exhaustion, and heat stroke.

Facts of the Case

More than 3,200 people have died from exposure to excessive natural heat in Arizona from 2012 to 2022. Last week, Phoenix set the record for the most 110-degree days in a single year at 54 days. A recent ProPublica study suggested the Phoenix region will be among the country's least-habitable by 2050, with half the year spent at temperatures above 95F¹.

Epidemiological Aspects of the Event

Arizona's Department of Health Services, by employing the Community Assessment for Public Health Emergency Response (CASPER) sampling method, were able to quickly collect data in the field at the household level regarding the health status and basic needs of the community being affected by heat and share information with a range of public health partners for routine health assessments². In Arizona and specific to extreme heat events, the Department of Health created a social vulnerability index of populations most vulnerable in Phoenix, based on demographic and socioeconomic factors well documented to impact health-related outcomes. Using the normalization method to standardize the data and count statistics for census tracts and weighing equally the social variables, the Department of Health is able to identify and locate the high-risk populations including: those under the age of 5; those 65 and older; elderlies who live alone; families whose income is below the poverty line; and people whose income is below the poverty line³.

Management of the Event

Arizona created infrastructure to address the impacts of extreme heat waves on individuals. The state stood up cooling centers, created heat relief networks of free air-conditioned spaces, free water, and places to donate water. The Department of Health Services also took steps to empower individuals with information on how to reduce risk and prevent injuries and fatalities from extreme heat by creating older adult, outdoor worker, and school toolkits, educating the public on heat illness signs and symptoms, and providing instruction on cooling the body, giving fluids, and minimizing shock; all basic life support skills for treating heat emergencies⁴.

Communications of the Event

In response to the impacts of rising temperatures in Arizona, the Department of Health Services created a public facing heat-related illness dashboard that shows the number of heat-related visits to hospital Emergency Departments, tracks temperatures and issues excessive heat warnings, displays extreme heat-related maps, and holds annual extreme heat planning workshops. For individuals, bilingual brochures titled "It's Hot Outside" were created and distributed state-wide to remind people that extremely hot weather can cause sickness and death, to convey the importance of watching for signs of heat exhaustion/heat stroke, and to review action items people can take to prevent adverse events from occurring. Perhaps most important is that the Department of Health has established a system to issue excessive heat warnings, and citizens can sign up to get email alerts.

Summary

Heat waves are very dangerous to public health. In the immediate term while the heat wave is occurring, hospital admissions climb for cardiovascular, kidney, and respiratory disorders. Over the longer term, continued exposure to excessive heat puts individuals, especially those more vulnerable, at risk for cardiovascular disease, respiratory disease, and cerebrovascular disease. Individuals with limited ability to thermoregulate are a special population that must be considered when creating disaster plans.

References

- ¹ Mark Gongloff. How Long Can We Keep Living In Hot Boxes Like Phoenix? *The Washington Post*. July 2023.
- ² Arizona Department of Health Services Disaster Epidemiological Response Guide, January 2018.
- ³ Office of Environmental Health. www.azdhs.gov/phs/oe/heat/index.htm. July 2012.
- ⁴ Arizona Department of Health Services, Extreme Weather and Public Health. Accessed September 16, 2023. <https://www.azdhs.gov/preparedness/epidemiology-disease-control/extreme-weather/heat-safety/index.php#heat-home>