

**ID: 88153558**

**Environmental Health - Host Site Description**  
**Maricopa County Department of Public Health**

**Assignment Location:** Phoenix, AZ  
Maricopa County Department of Public Health  
Division of Epidemiology and Informatics

**Primary Mentor:** Aaron Gettel, MPH  
Senior Epidemiologist  
Maricopa County Department of Public Health

**Secondary Mentor:** Ariella Dale, PhD, MPH  
Chief Science Officer  
Maricopa County Department of Public Health

**Work Environment**  
Hybrid

**Assignment Description**

The Fellow will be placed on the Climate and Health Epidemiology Branch within the Division of Epidemiology and Informatics at the Maricopa County Department of Public Health (MCDPH). The Climate and Health Epidemiology Branch consists of two full-time employees. In addition, the Branch works very closely with the Climate and Health Programmatic Branch that consists of three full-time employees. The Division of Epidemiology and Informatics supports MCDPH in data collection, analysis, and interpretation to guide programs, policies, and emergency responses across Maricopa County. Within this division, the Climate and Health Epidemiology Branch focuses specifically on monitoring and addressing climate-related health outcomes, including heat-related illness and mortality. The day-to-day activities of the fellow will include analyzing datasets such as vital records, hospital discharge data, and syndromic surveillance with a focus on heat morbidity and mortality, conducting heat surveillance, and generating reports and dashboards. In addition, the Fellow will be involved in the department's summer heat response activities. The Fellow will also be supported by the Chief Science Officer, a department-level position that readily identifies new collaboration opportunities with academic and community partners. The Fellow will be well positioned to join new county initiatives.

**Describe Statistical and Data Analysis Support, Such as Databases, Software, and Surveillance Systems Available to the Fellow**

The Fellow will have access to a variety of public health datasets, including vital records (birth and death data) and hospital discharge data, to support epidemiologic analyses. In addition, they will have access to ESSENCE, a syndromic surveillance system, to monitor real-time trends in heat-related illness and other climate-sensitive health outcomes. They will use SAS, R, Power BI, and ArcGIS Pro for data management, analysis, and visualization. In addition, there are many data subject matter experts available within MCDPH across public health interest areas, including infectious disease, chronic disease, maternal and child health, environmental disease, injury, and more. The Chief Science Officer serves as a subject matter expert regarding epidemiological methods and analysis. We can also offer statistical software training support for the Fellow.

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**Projects**

**Surveillance Activity Title: Assessment of Physical and Mental Disability Indicators Among Heat-Related Illness (HRI) Cases**

*Surveillance Activity Description:*

This surveillance activity will examine the prevalence and patterns of physical and mental disabilities among individuals experiencing heat-related illness (HRI) in Maricopa County. Using ICD-10-CM codes to query hospital discharge data, this project will identify disability-related diagnostic codes to better understand how disability status may influence vulnerability to heat morbidity. The project will assess demographic distributions, temporal trends, geographic patterns, and healthcare utilization associated with HRI cases with disability indicators compared to the overall heat-related illness trends. Findings will inform public health planning, intervention strategies, and equity-focused outreach for populations disproportionately affected by extreme heat.

*Surveillance Activity Objectives:*

Objectives —1) Identify HRI cases with co-occurring physical or mental disability ICD-10-CM codes across available public health datasets. 2) Describe demographic, temporal, and geographic characteristics of HRI cases with disability indicators. 3) Compare patterns between HRI cases with disability-related codes to the overall trends of HRI cases. Deliverable(s) —1) A report summarizing findings on disability-related ICD-10-CM codes among HRI cases, including data tables, visualizations, and key findings. 2) Documentation of the HRI case definition used, disability ICD-10-CM codes used, and SAS/R code.

*Surveillance Activity Impact:*

This surveillance activity will enhance MCDPH's understanding of how physical and mental disabilities intersect with vulnerability to extreme heat. Individuals with disabilities may face mobility limitations, impaired thermoregulation, medication effects, dependence on caregivers, limited access to cooling environments, or other barriers during periods of extreme heat. By identifying the burden and characteristics of those with a disability among people who experienced an HRI, the project will provide information to support equitable heat preparedness and response efforts. Findings may guide improved outreach strategies, cooling center accessibility planning, emergency communication, and cross-sector partnerships with disability-serving organizations.

**Surveillance System Evaluation Title: Evaluation of Day-to-Day Seasonal Patterns in Heat-Related Illness using ESSENCE HRI v2 and Hospital Discharge Data, 2021-2025**

*Surveillance System Evaluation Description:*

This surveillance project will evaluate day-to-day seasonal patterns of heat-related illness (HRI) identified through the ESSENCE HRI v2 syndrome definition compared with confirmed HRI cases from hospital discharge data (HDD) from 2021 through 2025. ESSENCE provides near real-time monitoring of daily heat-related morbidity, while HDD provides a confirmed but delayed record of illness.

The project will focus on whether HRI cases identified via ESSENCE HRI v2 are consistent with HRI cases identified within HDD. Results will help determine how reliably ESSENCE reflects short-term changes in heat-related illness and supports in-season public health response.

*Surveillance System Objectives:*

Objectives —1) Compare the timing and magnitude of the peak. 2) Assess seasonal curve alignment. 3) Determine the accuracy of ESSENCE heat-related illness v2 definition in capturing HDD HRI cases. Deliverable(s) —A report summarizing findings, including data tables, visualizations, and key findings.

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*Surveillance System Impact:*

Daily surveillance of heat-related illness is critical for real-time situational awareness during extreme heat events. By evaluating how closely ESSENCE HRI v2 mirrors day-to-day seasonal patterns observed in confirmed hospital discharge data, this project strengthens confidence in syndromic surveillance as a decision-support tool.

Findings will improve the interpretation of daily ESSENCE signals and guide operational responses such as outreach activation and resource deployment. This project will enhance MCDPH's ability to respond quickly and effectively to protect vulnerable populations.

**Major Project Title: Identifying Pre-Fatal Healthcare Encounters among Confirmed Heat Deaths, Maricopa County, AZ, 2021—2025**

*Major Project Description:*

This project will evaluate whether individuals with confirmed heat-related deaths had a hospital encounter prior to death, with the goal of identifying potential intervention points to prevent future fatalities. Confirmed heat deaths will be matched to Hospital Discharge Data (HDD) using available identifiers such as date of birth, sex, dates of service, facility, and ZIP code, following established data linkage and privacy protocols. The analysis will assess the proportion of heat deaths with an emergency department visit or inpatient hospitalization using a tiered time-bound approach to examine encounters occurring within 7 days, 30 days, 90 days, 180 days, and 365 days before death. We will characterize the timing, diagnoses, and disposition of those encounters. Descriptive and temporal analyses will be conducted to examine patterns in healthcare utilization prior to death, including time from last hospital encounter to death and presence of heat-related or comorbid conditions.

*Major Project Objectives:*

Objectives —1) Determine the proportion of confirmed heat deaths with at least one hospital encounter prior to death, 2) Characterize the timing of hospital encounters (e.g., same day, 1-7 days, 8-30 days before death), 3) Identify common diagnoses, comorbidities, and discharge dispositions associated with pre-fatal hospital encounters, 4) Assess whether prior encounters included heat-related diagnoses.

Deliverables - 1) A linked analytic dataset connecting confirmed heat deaths with HDD encounters, 2) Summary tables, 3) Visualizations, 4) A report highlighting key findings and intervention opportunities.

*Major Project Impact:*

Heat-related deaths are often preventable. By identifying whether and when confirmed heat deaths had hospital encounters, this project may provide insight into opportunities for intervention, such as discharge planning, referral to cooling centers, or follow-up outreach during extreme heat. The findings can inform protocols and increase partnerships between public health and healthcare systems.

**Additional Project #1 Title: Pregnancy Outcomes During Periods of Extreme Heat in Maricopa County  
Project #1 Type: Surveillance Activity**

*Project #1 Description:*

This project will examine the relationship between extreme heat and adverse pregnancy outcomes in Maricopa County. Using vital records (birth certificates) and meteorological data, the project will assess how exposure to extreme heat affects outcomes such as preterm birth, low birth weight, and other clinically relevant indicators. The analysis will include temporal linkage between heat events and pregnancy outcome data, subgroup stratification, and identification of populations at elevated risk. The goal is to strengthen understanding of how heat exposure impacts maternal and infant health.

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*Project #1 Objectives and Expected Deliverables:*

Objectives —1) Identify any association between extreme heat periods and adverse pregnancy outcomes. 2) Describe demographic, geographic, and temporal patterns in pregnancy outcomes during extreme heat events. 3) Assess whether risk for outcomes such as preterm birth, low birth weight, and pregnancy-related complications increases during extreme heat periods compared to periods of non-extreme heat. 4) Identify subpopulations disproportionately affected by heat-related pregnancy risks, including by age and race/ethnicity.

Deliverable(s) —1) A report summarizing findings on pregnancy outcomes during periods of extreme heat, 2) Documentation of definitions used, including what is considered extreme heat, how pregnancy outcomes were identified, and what is considered adverse, and SAS/R code.

*Project #1 Impact:*

This project will provide a better understanding of how extreme heat influences maternal and infant health in Maricopa County. By identifying heat-associated risks for outcomes such as preterm birth or low birth weight, the project can guide targeted outreach, messaging, and public health interventions.

**Please Describe the Fellow’s Anticipated Role in Preparedness and Response Efforts – Include Activities and Time Allocation (Required Competency of Fellowship)**

The fellow will play an active role in the MCDPH annual heat season (May—September) response by completing data requests, conducting in-season surveillance, and developing data tools as needed. Their work will support timely situational awareness for internal and external partners, ensure that heat-related illness and mortality trends are monitored throughout the season, and strengthen the department’s capacity to respond effectively during periods of extreme heat.

**Please Describe the Fellow’s Anticipated Role in Cluster and Outbreak Investigations – Include Activities and Time Allocation (Required Competency of Fellowship)**

The Fellow would support the Climate and Health Epidemiology Branch in a cluster analysis of heat deaths or illnesses. The Fellow would conduct the following activities in collaboration with colleagues: 1) data collecting, 2) data cleaning, 3) geocoding, 4) conducting spatial or spatiotemporal cluster analysis, 5) interpreting findings, and 6) sharing results with Climate and Health Programmatic Branch members. The Fellow will have access to necessary software (SAS, R, SatScan, ArcGIS) as needed, be trained on a similar protocol developed by the Substance Use and Mental Health Epidemiology Branch and have access to internal subject matter experts for this process within noninfectious and infectious disease epidemiology teams to complete the cluster analysis. We anticipate this project will take several months to complete and will ensure that this is balanced within the Fellow’s portfolio of opportunities. Should an emergency response arise within the scope of the Climate and Health Epidemiology Branch’s purview, the Fellow would be incorporated within the incident command system.