

Arizona Department of Health Services
Pima County
Implementation and Monitoring
Strategy (IMS) For:
Heat-Related Illness



This IMS is a living document. It outlines a plan of action for the Pima County Health Department to support implementation of adaptations and interventions aimed at disrupting the pathway between Heat-Related Illness and its subsequent health outcomes. Interventions and adaptations described throughout this IMS were deemed suitable through previous steps of BRACE (Steps 3 and 4) as well as through engagement with stakeholders to the adaptations and interventions. This plan of action requires a description of how each adaptation and intervention will be implemented, communicated, and evaluated. An initial, completed IMS for all selected exposure foci will satisfy performance measures A through H of the CDC-RFA-EH16-1602. Updates to all IMS' over time will satisfy performance measure K of the CDC-RFA-EH16-1602.

INTRODUCTION

Climate and Health in Pima County

Environment is a key factor and predictor in human health. In Arizona, the natural environment and effects of climate can pose major risks to the health and wellness of people who live and work in the diverse geographic regions of the state. In Pima County, extreme weather events and long-term trends in climate require planned adaptations and interventions to build resilience among communities and prepare for the risks associated with increasing temperatures, dust storms, changes in air quality, and other weather conditions. These climate risks are reflected in the potential for human health outcomes including chronic diseases such as asthma, heat-related illness, and infectious diseases such as coccidioidomycosis and vector-borne diseases. These hazards and health outcomes are already occurring and are projected to get worse. The Arizona Department of Health Services proposes to collaborate with Pima County Health Department and the University of Arizona to prevent heat-related illness.

Heat-Related Illness

Pima County Health Department (PCHD) recognizes the unique challenges posed to its residents by extreme temperatures, with daily temperatures reaching 110°F and above during summer months, sometimes for consecutive days. Each year, news stories of heat-related illness and death reach the newspapers. The effects are felt across the County in people’s homes and in emergency rooms and other medical care facilities. On average there are 298 heat-related emergency room visits and 67 inpatient hospitalizations annually in Pima County. There have been 408 heat-related deaths in the past 10 years (2009-2019) and that number has also trended downwards over the same period. Heat-related illness and death continues to be a priority challenge for PCHD.

In order to build resilience against extreme heat and reduce morbidity and mortality, PCHD plans to develop resources that would be useful to increase collaboration with key stakeholders and determine which interventions would be most effective and appropriate for the people of Pima County. This starts with conducting a baseline assessment of cooling centers, splash pads, and areas of respite for residents within the county. While assessments have been performed in the past, this more robust and systematic data collection and analysis is necessary to share this information publicly on county websites to ensure accurate information is shared. Additionally, a baseline assessment of hiking trails, noted from previous work in the County as high-risk “hot spots” for heat-related illness, will be completed. The first step in the assessment will be to map the hiking trails so that data from other partners (e.g. emergency search and rescue teams) can be integrated to identify areas where enhanced messaging should be developed.

BRACE Framework and Implementation and Monitoring Strategy

PCHD’s approach is based on the CDC’s Building Resilience Against Climate Effects (BRACE) Framework, a process which assists in the development of strategies to mitigate

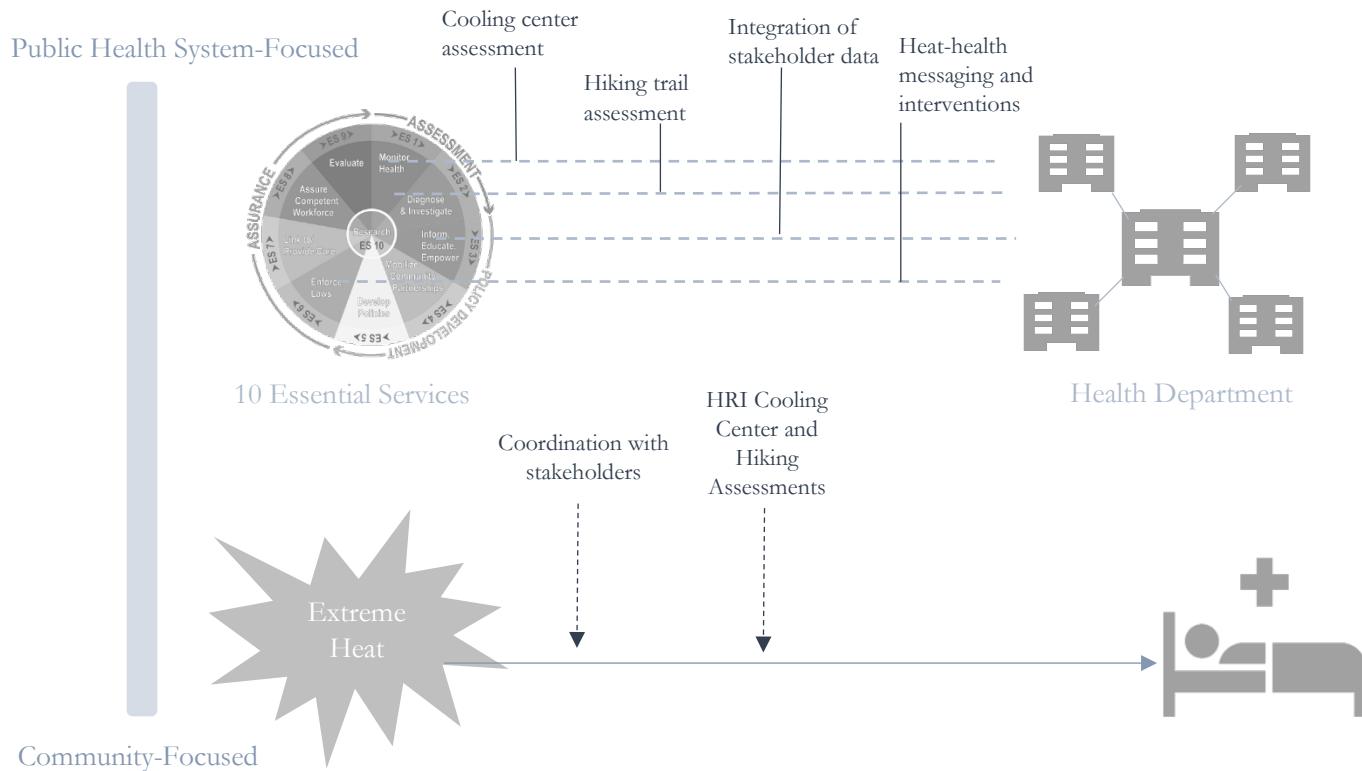


Figure 1: 5 Steps of the BRACE Framework (<https://www.cdc.gov/climateandhealth/brace.htm>)

the potential risks of extreme weather. The Implementation and Monitoring Strategy (IMS) is a part of this toolkit. Using this tool, PCHD can delineate the steps we will take toward the long-term outcome of reduction in HRI burden by improving and translating the assessments into meaningful public health action, outlining specific adaptations and interventions and a plan to evaluate these activities.

SELECTED EXPOSURE-RESPONSE ADAPTATIONS AND INTERVENTIONS

EXPOSURE – RESPONSE PATHWAY



Adaptation: Assessment of Cooling Centers and Risk-Factor Analysis of Hiking Trails for Heat-Related Illness in Pima County

Description of Adaptation

As adaptations to the increasing rates of heat-related illness (HRI) in Arizona and at the county-level, PCHD is initiating and formalizing a range of activities to increase awareness and knowledge about heat-related illness in the county and provide data for future public health interventions. Due to COVID-19, these activities will be undertaken and provided to PCHD by the University of Arizona (UA) team. These activities include:

1. Descriptive assessment and mapping of cooling centers, splash pads, and areas of respite from publicly available data in Pima County
2. Cooling center and splash pad utilization surveys to inform future interventions
3. Descriptive assessment and mapping of hiking trails with high-risk of HRI from previous work at the County
4. Recommendations for future health messaging at hiking trails deemed as high-risk

The assessment of cooling centers, splash pads, and areas of respite in Pima County will allow for the mapping of heat-relief locations. This map will be shared with the County to post publicly and maintain over time. Descriptive assessments and mapping of the hiking trails within Pima County will result in a map of locations that are at high-risk of HRI from previous work at Pima County. Descriptions of previous hiker morbidity and mortality gathered from medical records, news reports, and search and rescue data from PCHD stakeholders can be integrated into this map to determine high-risk areas for future public health messaging. The cooling center and splash pad utilization surveys will be used to inform future iterations of PCHD's work. This IMS is iterative and will be adapted over time to account for availability of PCHD staff throughout the COVID-19 pandemic.

Site locations

All activities will be primarily performed remotely by University of Arizona staff in support of PCHD's goals. Activities may also be performed by PCHD as staff and resources become available.

Methodology

Publicly available data on cooling centers, splash pads, and areas of respite will be collected. Information on location, hours of operation, contact information, scope of population served, services provided, limitations, and any restrictions due to COVID-19 will be collected. Each cooling center will then be contacted to confirm participation in the summer 2020, and subsequent summers, cooling center list. Information will be provided from the UA to PCHD to post on internal or external websites as well as the Arizona Department of Health Services (ADHS). PCHD and ADHS may choose to share the results of the efforts with internal and external stakeholders through an ArcGIS map, which will be provided by UA.

Data on hiking trail locations, hours of operation, limitations and restrictions will be collected. This information will build upon previous work in Pima County. Then, publicly available data on areas where hikers have experienced heat-related illness rescues, hiker deaths, and search and rescue data from PCHD stakeholders will be used to identify which hiking trails are at the highest-risk in the summer months for heat-related illness morbidity and mortality. This information can then be used to develop hiking trail specific messaging for outdoor recreation. This messaging could be in the form of alerts on

the PCHD internal or external websites, sharing information with stakeholders of the trails, or direct messaging at the trailheads. The UA will provide PCHD with this information in order to make an informed decision about public health messaging.

The cooling center survey will be done in conjunction with other Arizona counties and will provide a qualitative look at the summer 2020 cooling center availability and utilization. This survey was co-created by the ASU Cooling Center Workgroup. The intern for the project will complete this survey in August 2020. The splash pad survey was developed in the Spring 2020 for use in future PCHD work. Due to park closures from COVID-19, the survey was unable to be deployed in-person in the summer 2020. The survey as well as a survey deployment strategy will be provided to PCHD for future use of the instrument.

Local Data

The UA will utilize publicly available data and data provided by Pima County for both projects. Additional data from PCHD stakeholders (e.g. Southern Arizona Search and Rescue) may be available as changes in the COVID-19 pandemic make PCHD staff more available and will contribute to refinement of publicly available data. Additionally, the UA will utilize best practices from other jurisdictions for heat-related public health messaging and will take these into account when providing recommendations to PCHD.

Stakeholder and Team Roster and Responsibilities

All project tasks will be performed by the UA and shared with PCHD for appropriate decision making. All information will be provided to PCHD to share with internal and external stakeholders as they deem necessary. Data from external stakeholders will help supplement publicly available data, but is not required to complete the activities. ADHS will provide technical assistance on the CDC BRACE Framework steps.

Timeline with Milestones and Deadlines

Year 1 (2020)

- May – June
 - Collect publicly available information on cooling centers and splash pads including hours of operation, location, restrictions, and services
 - Contact cooling centers to confirm participation in Summer 2020 cooling center list
 - Provide information to PCHD on cooling centers and splash pads for internal and external posting
 - Continue working on IMS and finalize evaluation plan
 - Provide splash pad survey and deployment strategy to PCHD for future use
- July
 - Complete IMS and submit to Arizona Department of Health Services for review and finalization
 - Collect information on hiking trails and publicly available data on hiker morbidity and mortality
- August – December
 - IMS complete and approved
 - Supplement publicly available data on hiker morbidity and mortality with external stakeholder data as available

- Develop recommendations for public health messaging at trailheads based on trailhead assessment
- Provide recommendations to PCHD for messaging by December for decision making before the next heat season

Year 2 (2021)

Continue enhanced assessment of cooling centers and trailheads as needed for the summer 2021 heat season.

Needed Resources

The project as planned will require a public health intern and the continued support for BRACE projects by 0.125 FTE epidemiologist and a 0.05 FTE epidemiologist for project management split between the three IMS projects UA supports. Most data utilized will be publicly available, but data from external stakeholder will supplement the activities. Access to ArcGIS for mapping, current Pima County trailhead maps and Excel for data collection will be needed to complete the activities. The MPH student intern will be supervised by the UA team. All dissemination of information to PCHD will occur over e-mail. IRB approval will not be required for any portion of the activities.

Objective

The communication strategy seeks to inform the public health community, PCHD, and the public about the steps PCHD is taking to address extreme heat and HRI in Pima County.

Activities

1. Activity Name – Participation in Cooling Center and HRI Workgroups
 - a. Description: the UA team on behalf of PCHD will participate in local and statewide workgroups and collaborative platforms to inform the public health community about the methods and outcomes of the activities. Specifically, the UA team on behalf of PCHD will participate regularly in meetings and conference calls of the ASU Cooling Center Workgroup, Council of State and Territorial Epidemiologists heat workgroups
 - b. Stakeholders: UA, PCHD, ASU, CSTE
 - c. Target audience: Public Health professionals and city planners/managers in other jurisdictions
 - d. Timeline: Weekly, and as meetings and conference calls are scheduled
 - e. Number and description of all materials used: a minimum of 12 meetings

2. Activity Name – Cooling Center and Heat-Health Information on PCHD and Partner Websites
 - a. Description: Information may be made available on the County website during HRI peak season from June-September, including aggregate statistics on heat morbidity in Pima County, as well as guidelines for preventing HRI in English and in Spanish. The UA will provide information to PCHD for cooling centers and trailheads with a high morbidity/mortality for hikers. This information may be made available based on the discretion of PCHD. Information may also be posted on the ADHS Extreme Weather and Public Health page.
 - b. Stakeholders: general public
 - c. Target audience: General Public, Medical Providers
 - d. Timeline: Ongoing
 - e. Number and description of all materials used: A minimum of one update to the website as determined by PCHD. English and Spanish materials developed. Hot Spot assessment? Heat Relief Assessment? Report on cooling centers? GIS maps?

Evaluation Purpose

Evaluation of cooling centers and hiking trails will help characterize the burden of HRI in Pima County to investigate the usefulness of cooling center products, as well as hiking trail risk information, in increasing the awareness and use of cooled spaces, as well as the avoidance of high-risk trails.

Table 1. Stakeholder Engagement

Stakeholder name or group	Stakeholder category	Interest of perspective	Role in evaluation
County and State Health Department Leadership	Secondary	Understanding health impact on population, developing programs and messaging	Receive results
Local and State Cooling Center Workgroups	Secondary	Improving methods and sharing results of activities for best practices	Collaborate/feedback on cooling center best practices, interpret findings and receive results
Community partner agencies	Secondary	Use information to improve services	Receive results and provide additional data to supplement publicly available data if appropriate
General public	Primary	Understand the risk and health impacts of heat in Arizona	Receive results
Evaluation team	Primary	Improving public health	Complete evaluation activities and report

Cultural competence

Pima County is home to diverse populations and communities, some of which are more vulnerable to the potential risks of climate and extreme weather than others. In order to reach all residents within our jurisdiction, recommendations will be provided to PCHD about providing educational materials in Spanish. Vulnerable populations, such as correctional populations and residents of Tribal jurisdictions, are outside the scope of these activities.

Need

Extreme heat is a significant health risk in Arizona. Each year, around 300 Pima County residents visit the emergency room or are admitted to the hospital due to heat-related illness, or 28 cases per 100,000 residents. Pima County is a large geographic area with diverse populations, and is an outdoor recreation destination for hikers. Each summer hundreds of search and rescue calls are made for hikers, and some result in death. While the data is available to the Health department, more information is needed to summarize the data on hiking-related HRI to communicate the public health risks to the general population.

Context

These activities are based on availability of information from public sources. This information represents the “tip of the iceberg” of HRI and can represent more severe cases (e.g. hiker death), but synthesizing this information will help PCHD assess the burden and distribution of morbidity and mortality among county residents. Data on cooling centers and splash pads will provide information to residents on alternative cooling locations and will help guide future decision making for cooling center locations in subsequent summers. The recommendations will also help PCHD to develop targeted public health messaging for hiking trails in Pima County.

Population addressed

Extreme heat affects all residents of central and southern Arizona. Therefore all residents of Pima County are considered a population at risk for Heat-Related Illness. From previous work within the county, HRI occurred most often in outdoor workers, residents doing outdoor recreation like hiking, and those persons experiencing a triad of homelessness, substance abuse, and mental illness. For this project, we will focus on the vulnerable group of outdoor recreation hikers and the population which utilizes the cooling centers. Future work within the county should address these other vulnerable groups as well as take into account risk factors and underlying conditions that might make some residents more at risk than others.

Logic model

The logic model, including outputs and short-, intermediate and long-term outcomes is provided below in both tabular and graphic form.

Table 2. Logic Model for Surveillance and Descriptive Analysis of Heat-Related Illness in Pima County

Resources/Inputs	Activities		Outputs	Outcomes		
	Initial	Subsequent		Short-Term	Intermediate	Long-term
UA, publicly available data on cooling centers	Descriptive Analysis of heat-relief sites, cooling center survey	Annual reports based on cooling center and splash pad locations, communication to stakeholders	Descriptive Analysis of heat-relief sites and GIS map, push of publication to stakeholders through PCHD listserv*, internal report on cooling center survey	Increased engagement with stakeholders and use of GIS map website*	Assessment of disease trends, evaluation of interventions and programs	Decrease in HRI morbidity and mortality
UA, publicly available data on hiking trails and hiker HRI and deaths	Descriptive Analysis of hot-spot hiking trails	Recommendations for public health messaging, annual data collection on	High-risk hiking map for public health	PCHD internal review of assessment to determine future interventions for outdoor	Evidence-based interventions for HRI, Assessment of disease	Decrease in HRI morbidity and mortality

		hiker HRI and deaths	messaging intervention	recreation and heat*	trends, evaluation of interventions and programs	
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*Dependent on PCHD availability

Figure 1. Logic Model for Heat-Related Illness Adaptations

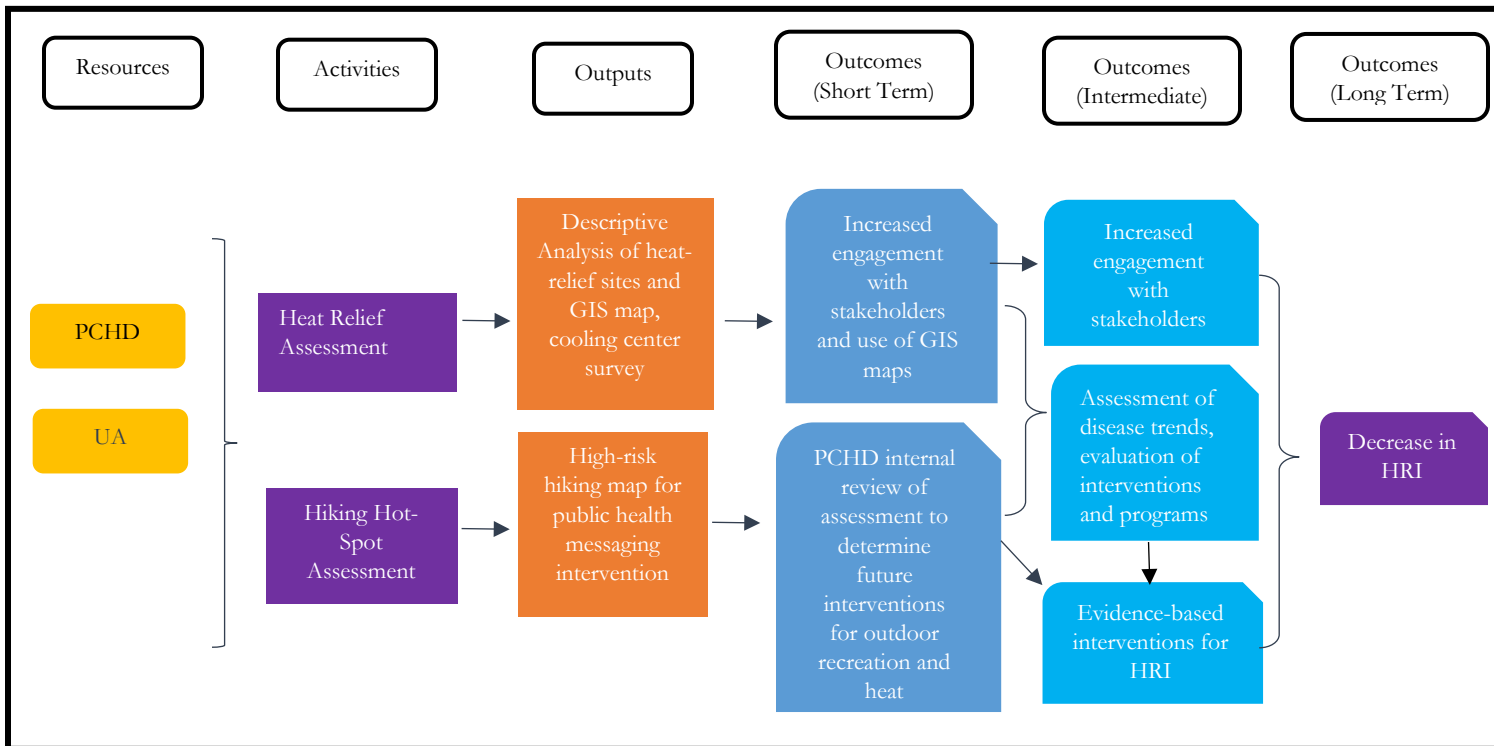


Table 3. Evaluation Questions, Indicators, Data Collection Table (Methods) for adaptations

Evaluation Question	Indicator	Standards (What Constitutes “Success”?)	Data collection method	Source of data	Frequency of data collection	Person responsible for collection	Due Date
1. Are cooling centers meeting the needs of Pima County residents?	Available data from previous cooling center lists	Data is complete with little missing data	E-mail request, website searches	PCHD, TCPH, Online	Once	UA Staff	June 2020, yearly
	Cooling center list	Thorough data collection instrument	Excel	UA	Once, updated yearly	UA Staff	July 2020, yearly
	ArcGIS Map	ArcGIS map of cooling centers	Excel and ArcGIS	UA	Once, updated yearly	UA Staff	July 2020, yearly
2. Does signage at Pima County trailheads improve hiker HRI?	Available data from previous work	Data is complete with little missing data	HDD medical record extraction, online news searches	PCHD	Once	UA Staff	August 2020
	Hiking trail list	Thorough data collection instrument	Excel	UA	Once, updated as needed	UA Staff	August 2020, yearly
	ArcGIS Map	ArcGIS map of hiking trails	Excel and ArcGIS	UA	Once, updated yearly	UA Staff	September 2020, as needed
	Results of data analysts	Data on HRI and deaths from available data correlated with hiking trails	Excel	PCHD, News sources	Once, at end of heat season	UA Staff	September 2020, yearly
3. Are cooling center and hiking trail reports utilized and effective?	Report generation	Summary reports from project completed, reports are used to generate future interventions	Internal written report	UA	Quarterly	UA Staff to PCHD Staff	Once per quarter

	Cooling center survey	Summary report of cooling center survey responses to generate future intervention work	Internal written report	UA	Once, August, 2020	UA Staff to PCHD Staff	September, 2020
4. Does the PCHD posting online provide value?	Website views	Website is receiving traffic, website users vary geographically and by population demographics each quarter	Website, Google user analytics dashboard	Google Website Tracking	Quarterly after cooling center list is provided online	PCHD Staff	June-September, yearly

Table 3. Plan of action for dissemination

Audience for evaluation findings	Evaluation information of interest	Purpose of communicating to this audience	Potential dissemination formats	Month and year of planned dissemination	Person(s) responsible for dissemination
Health Department Leadership	Summary of disease burden, and recommendations for public health action	Understanding impact of HRI on public health in outdoor recreation, and strategic planning and decision making	Reports and presentations	Ongoing after 2020 heat season in preparation for subsequent summers	UA Staff
Partner health jurisdictions and workgroups	Project performance measures	Improving heat surveillance systems and epidemiological methods	Reports, conference calls, participation in workshops, presentations, webinars	June – ongoing, 2020	UA Staff
General public	Summary of disease burden and risk factors, preventive measures	Understand the risk and health impacts of heat in Arizona	ArcGIS Maps, reports, *Website updates, Bilingual (English, Spanish)	*Dependent on PCHD posting	PCHD Staff, PIO