Pinal County Public Health Services District Implementation and Monitoring Strategy (IMS) For: **Heat-Related Illness**



This IMS is a living document. It outlines a plan of action for Pinal County Public Health Services District to implement 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 IMSes over time will satisfy performance measure K of the CDC-RFA-EH16-1602.

INTRODUCTION

Climate and Health in Pinal 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 Pinal 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, injuries such as heat-related illness, and infectious diseases such as coccidioidomycosis and vector-borne diseases.

Heat-Related Illness

Pinal County Public Health Services District (PCPHSD) 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 150-250 heat-related emergency room or hospital admissions annually (48 cases per 100,000 residents). In order to build resilience against extreme heat and reduce morbidity and mortality, PCPHSD plans to increase collaboration with key stakeholders to determine what interventions would be most effective and appropriate for the people of Pinal County. This starts with a baseline epidemiological assessment of the burden of heat-related illness (HRI) and routine surveillance. While assessments have been performed in the past, this more robust and systematic data collection and analysis is necessary to accurately project the disease burden of HRI in Pinal County. Epidemiological analyses, surveillance, and risk factor analysis once performed can be translated into action plans for effective interventions based on Pinal County's unique populations and the specific vulnerabilities we face from extreme heat.

BRACE Framework and Implementation and Monitoring Strategy

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

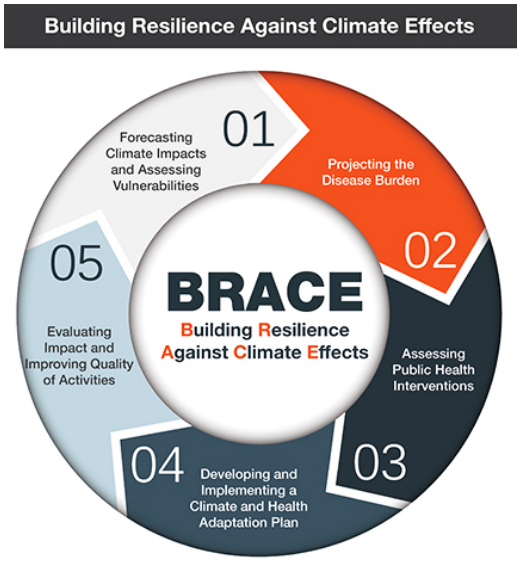
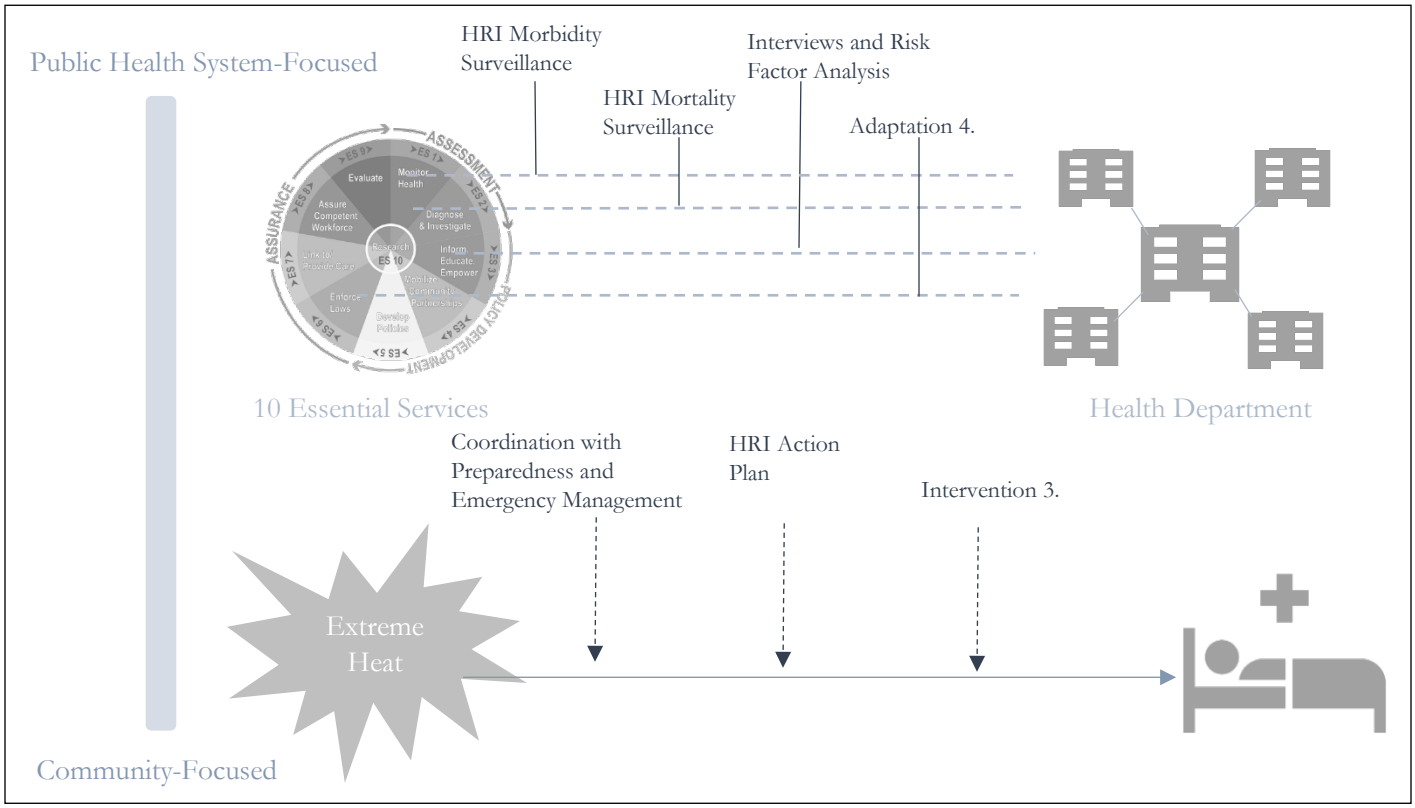


Figure 1: 5 Steps of the BRACE Framework (https://www.cdc.gov/climateandhealth/brace.htm)

SELECTED EXPOSURE-RESPONSE ADAPTATIONS AND INTERVENTIONS

Figure 1: Exposure Response Pathway



Adaptation: Surveillance and Risk Factor Analysis of Heat-Related Illness

Description of Adaptation

As adaptations to the increasing rates of heat-related illness (HRI) in Arizona and at the county-level, Pinal County Public Health Services District (PCPHSD) 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. These activities include:

1. Descriptive epidemiological analysis of HRI cases using historical Hospital Discharge Data
2. Syndromic surveillance of HRI cases among County residents from May-September of each year using the ESSENCE platform
3. Mortality surveillance of HRI cases among County residents from May-September of each year using data from the Medical Examiner's Office
4. Interviews with patients who visit an emergency room or are admitted to a hospital with HRI to collect contextual and risk factor data (conducted as needed to correctly classify HRI incidents as confirmed cases)

Surveillance conducted at a minimum of 2 days per week will result in a line list and case counts as well as cumulative year-to-date aggregate totals. Descriptive analysis of surveillance and mortality data will be provided with each report showing trends of interest such as age, sex, geography, and risk factors. In addition to historical analysis of disease trends and ongoing syndromic surveillance reports, PCPHSD staff will conduct phone interviews (as needed) with HRI patients to collect information on the patients' health status and medical history, previous knowledge and experience with heat-related illness, potential risk factors (e.g. heat exposure, home cooling system), as well characterize the events related to the illness event (e.g. occupational, recreational). These interviews will provide a rich source of data which will help to characterize the population at risk, providing a risk profile for targeted interventions and public health prevention. These data will be collected for the purpose of program improvement and case management/follow-up with patients (e.g. providing educational materials).

Site locations

Surveillance activities will primarily be performed by PCPHSD staff in partnership with the Medical Examiner's Office in Florence, Arizona. Pinal County HRI cases from Banner Health and any other hospitals participating in ongoing syndromic surveillance will be collected in a centralized database for review. Sites contributing syndromic surveillance include hospitals throughout the state of Arizona, including Pinal County facilities Banner Casa Grande, Banner Ironwood, and Banner Goldfield which contribute the majority of surveillance data for Pinal County residents.

Methodology

Hospital Discharge Data will be analyzed for the incidence of admissions due to heat-related illness by searching records for ICD codes consistent with HRI (ICD-9 codes 992, ICD-9 e-codes E900, or ICD-10 codes T67 and X30). The Pinal County Medical Examiner will provide monthly summaries of deaths being investigated as heat-related. These will be summarized by year, age group, sex, ethnicity, and geography to identify demographic patterns in the incidence of morbidity and mortality. All surveillance and analysis results disseminated to stakeholders outside Pinal County Public Health will be sufficiently aggregated and de-identified to ensure that protected health information is not shared.

Data from the National Syndromic Surveillance Program (NSSP) will be used to identify emergency department visits and hospital admissions which are consistent with heat-related illness by adapting a standardized algorithm published by the Council for State and Territorial Epidemiologists (CSTE) for the ESSENCE electronic syndromic surveillance platform. During the May-September heat season, these data will be combined with mortality data from the Medical Examiner Office as well as climate data from local weather stations and summarized on a monthly basis to monitor HRI in the community and provide stakeholders consistent and accurate reports on the scope and nature of the disease burden.

In order to collect additional risk factor information unavailable through conventional data sources, a standardized survey instrument will be developed to interview patients who visit an emergency department or are admitted to the hospital for HRI. The survey instrument will be developed by PCPHSD in collaboration with stakeholders from Arizona Department of Health Services, Arizona State University, and the University of Arizona and include questions regarding health and medical history, the nature and location of the HRI event, risk factors, and knowledge and preventive practices for HRIs. Cases will be identified and selected from the electronic syndromic surveillance protocols outlined above, and phone interviews of HRI cases will be performed (as needed) by PCPHSD staff and interns. Interview data will be entered and stored in a HIPPA compliant online Qualtrics database. The data will be used for case management, program quality improvement, and improving targeted messaging for health education opportunities on prevention activities.

Local Data

Real-time data reported by Arizona hospitals and emergency rooms is captured in the ESSENCE database (a platform of the National Syndromic Surveillance Program – NSSP) and analyzed using a standardized query for HRI outlined in the guidance document provided by CSTE. Additionally the Pinal County Medical Examiner's Office will provide weekly summaries of HRI case investigations and follow up with records for additional review of deaths where heat was a contributing cause of death.

Stakeholder and Team Roster and Responsibilities

Data analysis and interviews will be performed by the PCPHSD staff with support from interns as necessary.

Timeline with Milestones and Deadlines

Year 1

- Jan – Feb
  - Perform epidemiological analysis of historical mortality and hospital discharge data and prepare report or presentation on findings
- April - May
  - Determine interview logistics and protocols for phone interviews and develop survey instrument.
- June – September
  - Query ESSENCE weekly to identify cases of HRI admissions and Perform phone interviews with HRI cases
  - Summarize HRI cases in report with descriptive epidemiology, distribute reports internally on ongoing basis and to stakeholders as appropriate
  - Participate in phone conferences, workshops and in-person meetings related to syndromic surveillance, heat-related illness, and climate health
  - Develop Implementation and Monitoring Strategy in coordination with ADHS and University of Arizona, including communication plan and evaluation plan.

- September-October
  - Analysis and findings from syndromic surveillance and interview data, as well as Medical Examiner report. Develop report or presentation on the results of surveillance and interview data for distribution internally and for external stakeholders, as outlined in the Communication Plan.

Years 2-5

Continue enhanced surveillance activities and evaluate as needed.

Needed Resources

Project as planned will require 0.25 FTE epidemiologist or data analyst, as well as access to AMC/ESSENCE syndromic surveillance platform, Banner Health Cerner Power Chart EMR software, and Pinal County Medical Examiners database. MPH student intern may be utilized to assist with analysis and reporting. SAS will be used for data analyses. Qualtrics will be used for interview data entry. Pinal County's Public Health Dashboard will be used as the platform for online updates and an email directory of Heat Relief Network Partners and stakeholders will be used for dissemination of information to stakeholders via email. While student interns may be involved in the activities outlined in this scope of work, IRB approval will not be required for any portion of the data collection or analysis performed as part of the adaptations or interventions included in the IMS.

Objective

The communication strategy seeks to inform the public health community, medical providers, and the public about the steps PCPHSD is taking to address extreme heat and HRI in Pinal County.

Activities

1. Activity Name – Participation in Climate Health and Syndromic Surveillance Workgroups
    a. Description: PCPHSD will participate on state-wide and national workgroups and collaborative platforms to inform the public health community about the methods and outcome of HRI surveillance. Specifically, PCPHSD will participate regularly in meetings and conference calls of the Arizona Biosense Workgroup, Council of State and Territorial Epidemiologists Heat Syndrome Workgroup, Arizona Syndromic Surveillance Exploratory Analysis subgroup, and community forums on the International Society for Disease Surveillance (ISDS) website.
    b. Stakeholders: Arizona Department of Health Services, ISDS
    c. Target audience: Public Health professionals in other jurisdictions
    d. Timeline: Monthly, as meetings and conference calls are scheduled
    e. Number and description of all materials used: a minimum of 12 meetings

2. Activity Name- Internal Surveillance Reporting
    a. Description: Monthly surveillance reports will be provided to PCPHSD management
    b. Stakeholders: Arizona Department of Health Services, PCPHSD
    c. Target audience: Pinal County Public Health Services District management
    d. Timeline: Monthly, ongoing
    e. Number and description of all materials used: a minimum of 5 reports

3. Activity Name- HRI Information on PCPHSD Public Health Dashboard
    a. Description: Information may be made available on the County Public Health Dashboard during HRI peak season from May-September, including aggregate statistics on heat morbidity in Pinal County, as well as guidelines for preventing HRI in English and in Spanish.
    b. Stakeholders
    c. Target audience: General Public, Medical Providers, Partners
    d. Timeline: Ongoing
    e. Number and description of all materials used: A minimum of monthly updates to Pinal County Public Health Dashboard

Evaluation Purpose

Evaluation of syndromic surveillance and mortality data will help characterize the burden of HRI in Pinal County, with a focus on describing the population whose health outcomes are most affected by extreme heat during summer months and what risk factors contribute to heat illness and death.

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
Arizona Biosense Workgroup, Exploratory Analysis Subgroup	Secondary	Improving surveillance systems and epidemiological methods	Collaborate/feedback on surveillance, interview, reporting methods, interpret findings and receive results
ISDS Surveillance CoP, CSTE Heat Syndrome Workgroup	Secondary	Improving surveillance systems and epidemiological methods	Collaborate/feedback on surveillance, interview, reporting methods, interpret findings and receive results
Pinal County Emergency Management, Public Health Preparedness and Response	Secondary	Coordination of information, resources, and activities	Receive results, provide feedback
Empowerment Systems, BJB Consultants, Central Arizona Governments, CAHRA, Heat Relief Network and community partner agencies	Secondary	Use information to improve services	Receive results, assist with/distribute Heat Relief Network client and partner evaluations
General public	Primary	Understand the risk and health impacts of heat in Arizona	Receive results
Evaluation workgroup (County and State Health Dept staff, County Public Health intern, BJB Consultants, CAHRA, Extreme Heat & Preparedness Workgroup, Heat Relief Network partners)	Secondary	Understand impact and accessibility of the Heat Relief Network/Stations on Pinal County residents; Improve Heat Relief Network/Stations	Complete evaluation activities and report

Cultural competence

Pinal 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, 30.4% of whom are of Hispanic or Latino descent, educational materials in Spanish will be made available and included in the communication plan. Other languages may be included as needed.

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, 150-250 Pinal County residents visit the emergency room or are admitted to the hospital due to heat-related illness, or 48 cases per 100,000 residents. Pinal County is a large geographic area with diverse populations, and while the data available to the Health Department allow for basic descriptive epidemiology, more information is needed to identify the specific populations affected and risk factors involved in order to implement and evaluate effective interventions for public health and safety.

Context

Surveillance is based on emergency department visits, hospital admissions, and availability of information from Pinal County's Medical Examiner. These cases represent the "tip of the iceberg" of HRI, but help assess the burden and distribution of morbidity and mortality among county residents. Interview data will provide additional information on risk factors and categorization of vulnerable populations. The data will also help inform future direction for intervention targeting and health messaging delivery.

Population addressed

Extreme heat affects all residents of central and southern Arizona. Therefore all residents of Pinal County are considered a population at risk for Heat-Related Illness.

Logic model

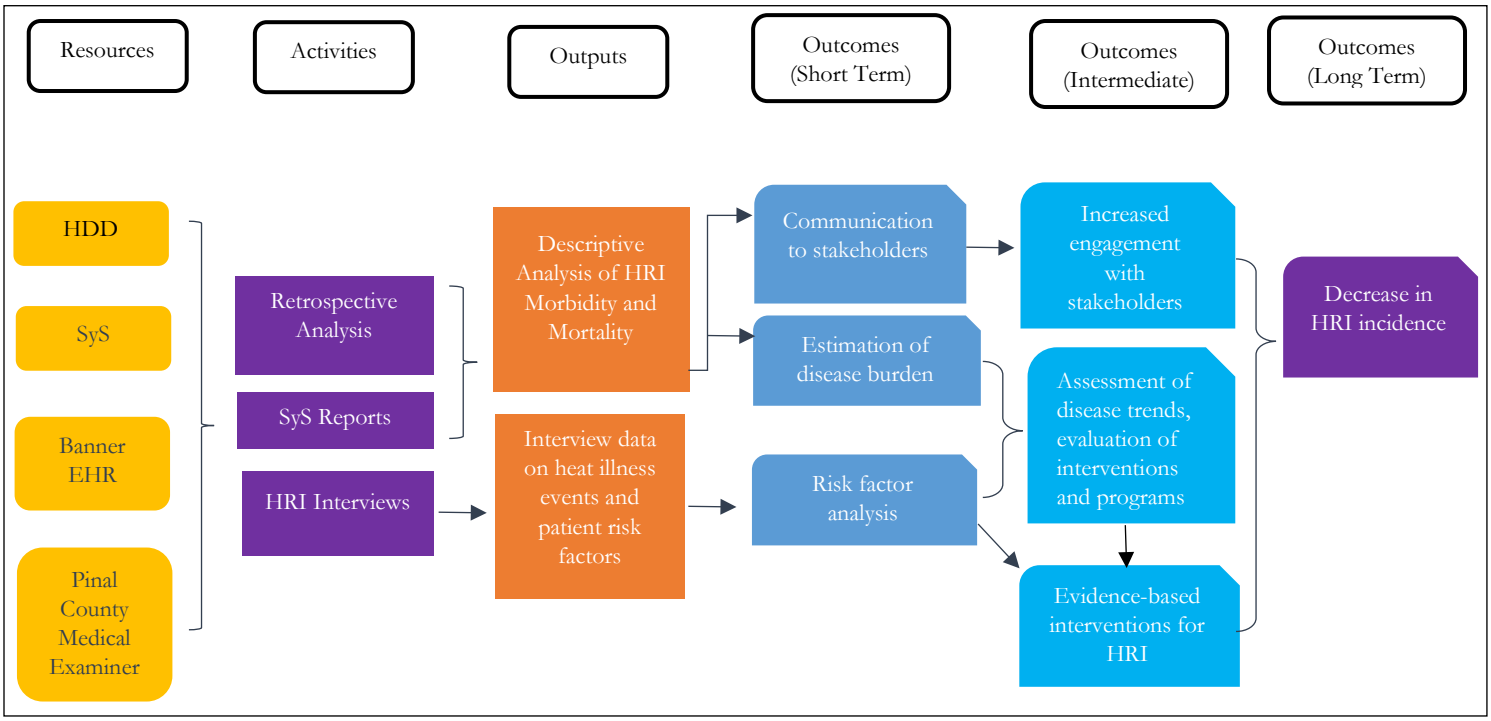
The logic model, which includes outputs and short-, intermediate-, and long-term outcomes, is provided below in both text and figure form.

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

Resources/Inputs	Activities		Outputs	Outcomes		
	Initial	Subsequent		Short-Term	Intermediate	Long-term
Hospital Discharge Data (HDD)	Descriptive analysis of heat-related morbidity and mortality among Pinal County residents	Annual reports based on descriptive statistics	Incidence of HRI by age, sex, race, and geography	Understanding of historical trends and population at risk, evaluation and validation of electronic syndromic surveillance	Assessment of morbidity and mortality trends over time, evaluation and improvement of HRI interventions	Decrease in HRI morbidity and mortality
Syndromic Surveillance (SyS) Data from ESSENCE	Ongoing descriptive analyses of heat-related morbidity at ESSENCE sentinel sites and case identification for HRI interviews	Continued surveillance, evaluation and improvement of SyS algorithms	HRI morbidity reports and case identification	Ongoing SyS reports during heat season, communication to stakeholders	Ongoing improvement of SyS algorithms and methods	Monitoring of future HRI interventions

Banner EHR	Perform standardized telephone interviews with HRI patients (as needed) after discharge from hospital/ER	Distribute educational materials on HRI prevention	Data on risk factors for HRI patients	Description of population-at-risk including risk factors	Evidence-based interventions for specific populations at risk for HRI	Decrease in HRI incidence
Pinal County Medical Examiner	Provide monthly summary of HRI case investigations	Follow up with exporting records where HRI was contributing cause of death	Data on risk factors of HRI deaths	Description of population-at-risk including risk factors	Evidence-based interventions for specific populations at risk for HRI deaths	Decrease in HRI deaths

Figure 2. Enhanced Syndromic Surveillance of Heat-Related Illness Logic Model



Evaluation Questions, Indicators, Data Collection Table (Methods) and Results 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
2018 Evaluation and Results	1. Does the county have a baseline assessment of heat-related illness?	Available data and data dictionary	Data is complete with little missing data	Automated daily data drop	HDD, Population Data (ACS), Mortality data	Once	Pinal County Program Staff	January 2018
		Analysis plan	Thorough analysis plan and code for data analysis	Statistical software	HDD, Population Data (ACS), Mortality data	Once	Pinal County Program Staff	February 2018
		Data analysis	Report of epidemiological analysis with findings	Written summary	HDD, Population Data (ACS), Mortality data	Once, updated as needed	Pinal County Program Staff	March 2018
		Evaluation results: baseline data, incidence, and morbidity of HRI in Pinal County was assessed and information was shared in written reports, a poster presentation, and oral presentations with partners/stakeholders.						
	2. Do follow-up phone interviews for HRI risk factor analysis provide value?	Interview logistics	Protocol with logistics for phone interviews is created	Written protocol	Interview Data, ESSENCE Data	Once	Pinal County Program Staff	April, 2018
		Survey instrument	Survey is developed with input from various stakeholders and is relevant to project goals	Qualtrics Survey	Qualtrics Survey	Ongoing	Pinal County Program Staff	June-September, 2018
		Interview data	Interviews were completed and resulting data quality is sufficient for analysis	Telephone interviews with Qualtrics survey instrument	Phone Interview Data	Ongoing	Pinal County Program Staff	June-September, 2018
		Results of data analysis	Data analysis provides information on risk factor prevalence and vulnerable populations	Summary at end of heat season	Phone interview data	Once, at end of heat season	Pinal County Program Staff	September, 2018
		Evaluation results: an interview protocol was developed, along with reference documents including an interview script, voicemail script, and Spanish interview translation resources. A standard survey was developed and utilized to conduct interviews from May-Sept 2018. Interview data was analyzed and results helped determine risk factors and risk populations for HRI in Pinal County. Following data analysis, written reports were developed and distributed; and oral presentations were given to increase HRI awareness among stakeholders and partners.						
	3. Are syndromic surveillance reports utilized and effective?	Report generation	Syndromic surveillance report is created	Written report	ESSENCE	Once	Pinal County Program Staff	May 2018
		Distribution of report	Reports are sent internally and to stakeholders; reports are reviewed and utilized to inform strategies	Written report	ESSENCE	Monthly	Pinal County Program Staff	June-September, 2018
		Participation in climate and health workgroups	Pinal County shares and distributes reports to collaborative workgroups on results	Presentations, online postings	ESSENCE	Periodically	Pinal County Program Staff	January – October, 2018
		Evaluation results: syndromic surveillance reports were updated and shared with public health leadership, stakeholders, and partners, monthly. In addition, PCPHSD program staff participated in monthly NSSP BioSense workgroups, International Society for Disease Surveillance forums, online groups, and in-person conference; and presented surveillance data and best practices in web-based meetings.						

	4. Does the PCPHSD Website on HRI provide value?	Website content generation	Website prevention information is up to date and relevant	Website	ESSENCE, internal communication	Weekly	Pinal County Program Staff	June-September, 2018
		Website views	Website is viewed by X amount of people each week	Website	Google Website Tracking	Weekly	Pinal County Program Staff	June-September, 2018
		Evaluation results: weekly postings to the PCPHSD website was not feasible; therefore, social media postings regarding HRI, the Heat Relief Network, and statistics were utilized instead. Social media postings are more likely to be viewed and shared, and were posted to multiple social media accounts by different organizations (including Pinal County Public Health, United Way of Pinal County, and others who may have shared original posts).						
2019 Evaluation and Results	1. Is the county maintaining current and past HRI data records and analyses?	Available data and data dictionary	Data is internally accessible and complete with little missing data	Database and data hard drive management	Mortality data, Interview data, ESSENCE data	Ongoing	Pinal County Program Staff	May-Sept 2019
		Analysis plan	Thorough analysis plan and code for data analysis	Statistical software	Mortality data, Interview data, ESSENCE data	Once	Pinal County Program Staff	May 2019
		Data analysis	Report of epidemiological analysis with findings	Written summary, presentations	Mortality data, Interview data, ESSENCE data	Monthly	Pinal County Program Staff	May-Sept 2019
		Evaluation results: data is currently being stored on a restricted data drive, accessible internally by select program staff. Code and analysis methods were developed, and monthly trending reports of HRI data are shared monthly with public health leadership.						
	2. Do follow-up phone interviews for HRI risk factor analysis and HRI incident details provide value?	Interview logistics	Protocol with logistics for phone interviews is created	Shared protocol	Interview Data, ESSENCE Data	Once	Pinal County Program Staff	Apr 2019
		Survey instrument	Survey is developed with input from key partners and is relevant to project goals	Qualtrics Survey	Qualtrics Survey	Ongoing	Pinal County Program Staff	May-Sept 2019
		Interview data	Interviews were completed as needed, resulting in correct classification of cases and data quality is sufficient for analysis	Telephone interviews with Qualtrics survey instrument	Phone Interview Data	Ongoing	Pinal County Program Staff	May-Sept 2019
		Results of data analysts	Data analysis provides information on risk factor prevalence and vulnerable populations	Summary at end of heat season	Phone interview data	Once, at end of heat season	Pinal County Program Staff	Sept-Oct 2019
		Evaluation results: an interview protocol for May-Sept 2019 was developed and the previously developed Qualtrics survey was used as an interview guide. The previous interview protocol was modified so that interviews were conducted (only as needed) to correctly classify cases as true HRI cases. Complete interviews were not conducted this year since risk factors and risk groups were determined from summer 2018 data. Analysis of 2019 interview data is pending/in progress.						
	3. Are syndromic surveillance reports continuing to be utilized and do they continue to be effective?	Distribution of report	Reports are sent internally and to stakeholders; reports are reviewed and utilized to inform strategies	Written report	ESSENCE	Monthly	Pinal County Program Staff	May-Sept 2019
		Participation in climate and health workgroups	Pinal County shares and distributes reports to collaborative workgroups on results	Presentations, online postings	ESSENCE	Monthly	Pinal County Program Staff	May-Oct 2019
		Evaluation results: surveillance reports are updated and shared monthly with internal staff. Modified reports of current data are also shared with stakeholders and Heat Relief Network partners. Data and HRI surveillance best practices have also been shared with the SyS Community of Practice during an oral web presentation and in statewide ESSENCE and SyS workgroups.						
	4.	Social media content generation	Social media prevention postings information	Facebook and Twitter	ESSENCE, internal communication	1-2 times/ month	Pinal County Program Staff, United Way of	May-Sept 2019

	Do PCPHSD HRI social media postings provide value?		are up to date and relevant				Pinal County, Partners	
		Posting views	Social media postings are viewed, liked, or shared by followers	Facebook and Twitter	Available social media stats (eg. views, likes, shares)	1-2 posts /month	Pinal County Program Staff, United Way of Pinal County, Partners	May-Sept 2019
		Evaluation results: social media views/likes/shares have not been quantified at this time. However, HRI postings have gone to Twitter and Facebook at least 1 time per month. United Way of Pinal County also posted HRI stats and heat safety tips for the duration of summer 2019. These postings reach a greater network of individuals, as there is greater potential for sharing than there would be if this information was only posted on the PCPHSD website.						
	5. As interventions, are the Heat Relief Network and Relief Stations effective and accessible for Pinal County residents?	Functionality of the Heat Relief Network and Relief Stations	Client and partner survey results	Evaluation surveys	HRN clients and partners	Weekly	Pinal County Staff & Intern, United Way of Pinal County, Central Arizona Governments	May-Sept 2019
		Number and location of Heat Relief Network partners and resources	Location and number of new partners/Heat Relief Stations	Heat Relief Station sign-up list	HRN partners	Monthly	Pinal County Staff & Intern, United Way of Pinal County, Central Arizona Governments	May-Sept 2019
		Results of survey analysis	Report of survey findings	Evaluation surveys	Completed surveys from HRN clients and partners	Once, at end of surveillance season	Pinal County Staff & Intern	Sept-Oct 2019
		Preparedness of Heat Relief Stations	Awareness of Excessive Heat Warnings	Outgoing Excessive Heat Warnings	NWS alert emails	Periodically, during all Excessive Heat Warnings	Pinal County Program Staff	May-Sept 2019
		Evaluation results: three surveys were developed to assess the effectiveness and accessibility of the Heat Relief Network; one survey for Heat Relief Network partners, one for clients who visited a Heat Relief Station, and one for the general public (social media) to gain an idea of how many people have heard of the Heat Relief Network. The survey was distributed in May 2019 and partners emailed completed surveys to PCPHSDs intern. Results from survey analyses are pending/in progress. New Heat Relief Network partner sign-ups were shared with PCPHSD staff from Central Arizona Governments and United Way of Pinal County so that new partners and Heat Relief Station locations could be identified, included in evaluation efforts, and added to the directory of agencies who receive HRI updates over the length of the summer. 15 Excessive Heat Warnings were sent out to Heat Relief Network partners after PCPHSD staff received excessive heat email alerts from NWS.						
	6. As interventions, are HRI educational materials beneficial to Heat Relief Network partners and the general public?	Usefulness of HRI educational materials	Development and distribution of HRI educational materials	Compilation of online and phone resources	Online	Ongoing, during heat alerts and HRI interviews	Pinal County Staff & Intern	May-Sept 2019
		Evaluation results: A Heat Relief Community Resource Guide was developed at the end of heat surveillance season in 2018. This HRI prevention and resource page was distributed at the beginning of the 2019 heat surveillance season to all partners and individuals who were interviewed last summer. It was sent to these individuals to remind them of the education they received last summer, so that it would be fresh in their mind as temperatures increased. Also, heat safety tips and information are posted to social media and sent to Heat Relief Network partners with each outgoing Excessive Heat Warning email. This information helps partners and the general public remain informed and prepared for excessively hot days before they occur.						

2020 Evaluation and Results	1. Is the county maintaining current and past HRI data records and analyses?	Available data and data dictionary	Data is internally accessible and complete with little missing data	Database and data hard drive management	Mortality data, Interview data, ESSENCE data	Ongoing	Pinal County Program Staff	May-Sept 2020
		Analysis plan	Thorough analysis plan and code for data analysis	Statistical software	Mortality data, Interview data, ESSENCE data	Once	Pinal County Program Staff	May 2020
		Data analysis	Report of epidemiological analysis with findings	Written summary, presentations	Mortality data, Interview data, ESSENCE data	Monthly	Pinal County Program Staff	May-Sept 2020
		Evaluation results: data is currently being stored on a restricted data drive, accessible internally by select program staff. Code and analysis methods were developed, and monthly reports of heat-related illnesses and deaths are shared with workgroups and key stakeholders.						
	2. Do follow-up phone interviews for HRI risk factor analysis and HRI incident details provide value?	Interview logistics	Protocol with logistics for phone interviews is created	Shared protocol	Interview Data, ESSENCE Data	Once	Pinal County Program Staff	*Apr 2020
		Survey instrument	Survey is developed with input from key partners and is relevant to project goals	Qualtrics Survey	Qualtrics Survey	Ongoing	Pinal County Program Staff	*May-Sept 2020
		Interview data	Interviews were completed as needed, resulting in correct classification of cases and data quality is sufficient for analysis	Telephone interviews with Qualtrics survey instrument	Phone Interview Data	Ongoing	Pinal County Program Staff	*May-Sept 2020
		Results of data analysts	Data analysis provides information on risk factor prevalence and vulnerable populations	Summary at end of heat season	Phone interview data	Once, at end of heat season	Pinal County Program Staff	*Sept-Oct 2020
		Evaluation results: *interviews and associated tasks were not completed due to personnel time restrictions during COVID-19 outbreak & response activities.						
	3. Are syndromic surveillance reports continuing to be utilized and do they continue to be effective?	Distribution of report	Reports are sent internally and to stakeholders; reports are reviewed and utilized to inform strategies	Written report	ESSENCE	Monthly	Pinal County Program Staff	May-Sept 2020
		Participation in climate and health workgroups	Pinal County shares and distributes reports to collaborative workgroups on results	Presentations, online postings	ESSENCE	Monthly	Pinal County Program Staff	May-Oct 2020
		Evaluation results: Surveillance reports of current year heat-related illnesses and deaths are shared with key partners and stakeholders. Personnel time and staffing limitations due to COVID-19 outbreak and response activities have limited some reporting and distributions of HRI surveillance data.						
	4. Do PCPHSD HRI social media postings and emails provide value?	Social media content generation	Social media prevention postings information are up to date and relevant	Facebook and Twitter	ESSENCE, internal communication	1-2 times/ month	Pinal County Program Staff, United Way of Pinal County, Partners	May-Sept 2020
		Posting views	Social media postings are viewed, liked, or shared by followers	Facebook and Twitter	Available social media stats (eg. views, likes, shares)	1-2 posts /month	Pinal County Program Staff, United Way of Pinal County, Partners	May-Sept 2020
		Evaluation results: HRI postings have gone to Twitter and Facebook at least 1 time per month. Newsletter-style emails with Excessive Heat Warnings and heat safety tips are also sent to partners and stakeholders; and sent to the community when emails are forwarded to agency email lists. These social media postings and emails allow HRI						

		prevention information to reach a greater network of individuals than it would if this information was only posted on the PCPHSD website.					
	5. As interventions, are the Heat Relief Network and Relief Stations effective and accessible for Pinal County residents?	Functionality of the Heat Relief Network and Relief Stations	Client and partner survey results	Evaluation surveys	HRN clients and partners	Weekly	Pinal County Staff & Intern, United Way of Pinal County, Central Arizona Governments	May-Sept 2020
		Number and location of Heat Relief Network partners and resources	Location and number of new partners/Heat Relief Stations	Heat Relief Station sign-up list	HRN partners	Monthly	Pinal County Staff & Intern, United Way of Pinal County, Central Arizona Governments	May-Sept 2020
		Results of survey analysis	Report of survey findings	Evaluation surveys	Completed surveys from HRN clients and partners	Once, at end of surveillance season	Pinal County Staff & Intern	Sept-Oct 2020
		Preparedness of Heat Relief Stations	Awareness of Excessive Heat Warnings	Outgoing Excessive Heat Warnings	NWS alert emails	Periodically, during all Excessive Heat Warnings	Pinal County Program Staff	May-Sept 2020
		Evaluation results: a cost-analysis survey was developed to identify cost-related burdens associated with running a heat relief station, and to collect information that may help justify additional funding for heat-related illness prevention efforts. This result is pending. Results of the survey will be shared with the Extreme Heat and Preparedness Workgroup (organized by Arizona State University and comprised of multiple jurisdictions including counties, cities, and agencies across Arizona). The survey period began in July 2020. Survey close period is pending additional responses. ***As of July 31, 2020, 7 NWS Excessive Heat Warnings have been sent out to Heat Relief Network partners and stakeholders.***						
	6. As interventions, are HRI educational materials beneficial to Heat Relief Network partners and the general public?	Usefulness of HRI educational materials	Development and distribution of HRI educational materials	Compilation of online and phone resources	Online	Ongoing, during heat alerts and HRI interviews	Pinal County Staff	May-Sept 2020
		Evaluation results: The Heat Relief Community Resource Guide continues to be the primary resource shared with partners and the public. Also, heat-relief station information was updated with 211. Currently, there are 8 stations listed on 211. Typically there are 44 stations, but many are voluntarily closed due to COVID-19. All 44 stations will be updated with 211 once they open and/or once the COVID-19 outbreak ends. ***Excessive Heat Warning emails, including heat safety tips and information, are sent to partners when excessively hot weather is predicted by the National Weather Service. Heat safety tips are also posted to social media. This information helps partners and the general public remain informed and prepared for excessively hot days before they occur.***						

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, risk factors, and recommendations for public health action	Understanding impact of HRI on public health, and strategic planning and decision making	Written reports and presentations	Ongoing, duration of 2020 heat season, summary information in Dec 2020	Pinal County Program Staff and ADHS
Partner health jurisdictions and workgroups	Surveillance performance measures	Improving surveillance systems and epidemiological methods	Reports, conference calls, participation in workshops, presentations	Apr-Sept 2020	Pinal County Program Staff and ADHS
Community partner agencies	Assessment of disease burden and risk factors	Use information to improve services	Summary reports, fact sheets	May-Sept 2020	Pinal County Program Staff, ADHS, UA
Public Health Preparedness and Emergency Management	Assessment of disease burden and risk factors	Use information to improve and coordinate preparedness efforts	Presentation with surveillance and assessment findings	Dec 2020	Pinal County Program Staff
General public	Summary of disease burden and risk factors, HRI prevention and resources	Understand the risk and health impacts of heat in Arizona	HRI resource guide, social media postings	Ongoing, duration of 2020 heat season, summary information in Dec 2020	Pinal County Program Staff, PIO, ADHS

Table 4. Current Year Timeline of Activities (9/1/2019 – 8/31/2020)

Date of delivery	Activity	Person responsible
Mar-Apr 2020	Coordination and planning of 2020 heat surveillance and activities	Pinal County Program Staff, Empowerment Systems/BJB Consultants (Braden Biggs), Central Arizona Governments, CAHRA, ADHS
Apr 2020	Summer kickoff meeting with partners and Heat Relief Network agencies	Pinal County Program Staff, Empowerment Systems/BJB Consultants (Braden Biggs), Central Arizona Governments, CAHRA, Heat Relief Network partners
May-Sept 2020	HRI surveillance using ESSENCE platform	Pinal County Program Staff
May-Sept 2020	Reports to public health leadership, partners, Heat Relief Network, and general public	Pinal County Program Staff , ADHS
May-Sept 2020	Ongoing HRI data analysis for monthly reports	Pinal County Program Staff
June-July 2020	Development of Heat Relief Network cost analysis survey	Pinal County Program Staff, BJB Consulting (Braden Biggs), Central Arizona Governments, CAHRA, ADHS
Dec 2020	Final data analyses, report writing, evaluation, and distribution of results	Pinal County Program Staff, BJB Consulting (Braden Biggs), Central Arizona Governments, CAHRA, ADHS