



NATIONAL ASSOCIATION OF  
COMMUNITY HEALTH CENTERS®

# Heat-Related Illness Management in EHR Systems



*A Comprehensive Guide for Community Health Centers Implementing  
EHR Alerts and Notifications for Heat-Related Illnesses*

## EXECUTIVE SUMMARY

This guide presents a detailed methodology for integrating heat-related illness alerts into Electronic Health Record (EHR) systems, aimed at enhancing patient care during extreme heat events. It encompasses the evaluation of data quality, understanding EHR capabilities, and using tools like the HeatRisk Tool and Air Quality Index (AQI) to plan preventive measures. The guide also outlines patient identification techniques using the CHILL'D-Out Questionnaire to assess risks for conditions exacerbated by heat, such as asthma and cardiovascular disease. Additionally, it covers the importation of clinical heat value sets to manage high-risk patient registries, improve patient communication through API integration, and the step-by-step deployment process. A case study of La Clinica's heat alert program demonstrates the practical application and impact of these strategies. This comprehensive approach ensures that health centers can effectively protect vulnerable populations and manage resources during heat-related health emergencies, adhering to the 5 Rights of Clinical Communication: Right Person, Right Message, Right Method, Right Time, and Right Priority. This guide can also be viewed on NACHC's Website. Any updates made to this document can be found there.

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# INTRODUCTION

This guide provides a comprehensive process for integrating heat-related illness alerts into your EHR system. By exploring available resources, evaluating data quality, addressing data gaps, and understanding your EHR's capabilities, you can effectively safeguard patients from heat and air quality risks while efficiently allocating resources during environmental events.

You will learn about the importance of the HeatRisk Tool and Air Quality Index (AQI) in planning preventive measures and advising vulnerable populations. Utilizing these tools, along with clinical heat value sets, allows health centers to identify high-risk patients and implement appropriate interventions. The guide also covers developing Heat Action Plans and securing stakeholder buy-in, supported by funding from organizations like the CDC, NIH, and others.

Accurate patient identification using tools like the [CHILL'D-Out Questionnaire](#) provides a comprehensive risk assessment by covering various aspects of a patient's environment and health. Addressing specific concerns such as asthma, cardiovascular disease, and pregnancy during hot weather ensures tailored care for vulnerable groups. You'll learn how to use clinical heat value sets and import them into the EHR system to create and manage patient registries that track vulnerable populations and set reminders for addressing heat risks. Effective patient communication tools and API integration further enhance patient engagement and care management.

The guide also details the steps for deploying, evaluating, and continuously improving the messaging system. This involves:

- Finalizing configurations
- Obtaining necessary approvals
- Educating users
- Planning the timeline for deployment
- Providing immediate support post-deployment
- Ongoing monitoring to ensure system effectiveness
- Establishing evaluation metrics
- Addressing alert fatigue
- Documenting and reporting on the intervention's effectiveness
- Implementing iterative enhancements based on data and feedback
- Ensuring the system meets the needs of patients and clinicians in managing heat-related health risks

The ultimate goal of this guide is to prepare you to send out heat messaging that meet the [5 Rights of Clinical Communication](#). These include:

- Right Person
- Right Message
- Right Method
- Right Time
- Right Priority

## HOW TO USE THIS GUIDE

This guide is designed to help Community Health Centers integrate heat-related illness alerts into their Electronic Health Record (EHR) systems. By following the outlined steps, you can effectively safeguard patients from heat and air quality risks and allocate resources efficiently during environmental events. This guide is as EHR agnostic as possible, referencing the four most popular EHRs used by health centers: Epic, AthenaHealth, NextGen, and eClinicalWorks.

Please note that this guide does not offer specific clinical advice. For clinical questions, refer to your care team. Additionally, while this guide includes information on APIs, it does not provide targeted advice on how to integrate them with your EHR.

## HEALTH CENTER SPOTLIGHT: LA CLINICA

La Clinica, founded in 1971, serves 81,000 patients annually across 35 locations in the San Francisco Bay Area. These locations include stand-alone primary care facilities, clustered campus settings, school-based health centers, and mixed-use complexes. The region's varied climate—hot inland areas and cool coastal regions—presents distinct health risks.

Recognizing the vulnerability of a population accustomed to cooler temperatures, La Clinica received a grant from CalEPA to send text message-based alerts to high-risk patients during extreme heat events, defined as two or more consecutive days with temperatures exceeding 95°F.

During the summers of 2022 and 2023, La Clinica sent heat alerts to thousands of patients in Contra Costa and Solano counties. The alerts provided critical information on how to stay safe during extreme heat events, particularly for high-risk groups like the elderly, children, pregnant people, and those with chronic health conditions. In 2023, La Clinica signed up for heat alerts from Harvard C-CHANGE, tailored to the local climate.

La Clinica adopted both proactive and reactive prevention strategies to mitigate the health impacts of extreme heat. Starting in late spring, patients were advised on how to prepare for summer heat, including checking air quality, staying hydrated, and modifying activities. Individualized action plans were developed to address specific health risks. During clinic visits, “health shock” events were used as teachable moments to motivate behavior changes. Patients were explicitly informed about the risks of dehydration and given practical advice on staying cool and hydrated.

The text alerts sent during the summers of 2022 and 2023 had a significant impact on patient safety and awareness. In the first summer, 2,608 recipients in Eastern Contra Costa County received alerts during extreme heat events. By the second summer, the program expanded to include Contra Costa and Solano counties, reaching 5,871 and 5,664 recipients, respectively. Feedback from these alerts was overwhelmingly positive. Recipients expressed trust in La Clinica over government or other authorities, found the language and reading level of the messages appropriate, and appreciated the useful information they were previously unaware of. Although in-person focus groups had low attendance, pivoting to phone calls for feedback proved more successful. La Clinica also advertised the initiative through posters and educational materials distributed at clinics, enhancing community engagement and awareness.

La Clinica's comprehensive approach to managing health risks during extreme heat events sets a commendable example for other health centers looking to enhance patient care and safety. By integrating targeted text message alerts with practical education on heat preparedness, La Clinica has effectively raised awareness and safeguarded its community against the dangers of heat-related illnesses. Their strategy of leveraging local climate data to deliver timely, personalized communications exemplifies how health centers can utilize technology to address specific regional health challenges.





## SETTING THE STAGE

To effectively integrate heat-related illness alerts into your Electronic Health Record (EHR) system, preparation is essential. This involves learning about available resources, identifying the available data, evaluating data quality and accessibility, addressing any gaps in data collection, and understanding the capabilities of your EHR and associated applications.

### Understanding HeatRisk and the Air Quality Index

Measuring air quality and heat risk is essential for safeguarding our patient populations, particularly as climate change increases the frequency and severity of poor air conditions and heatwaves. By accurately assessing these environmental factors, individuals can take preventive actions and health centers can better allocate resources. Two tools that alert us to heat and air quality events are the HeatRisk Tool (Centers for Disease Control and Prevention n.d.) and the Air Quality Index (AQI) (U.S. Environmental Protection Agency (EPA) n.d.), designed to inform patients about the risks associated with heat and air pollution, respectively. Understanding and effectively utilizing these tools can significantly enhance patient care and safety.

NACHC has created a Microlearning for those new to the correlation between heat and health. This is a great place to start if you are new to the topic. The microlearning can be found [here](#).

### HeatRisk Tool

The HeatRisk Tool offers a health-based heat forecast that integrates health and temperature data to deliver a 7-day outlook, highlighting potential heat risks using a 5-level, color-coded scale. Each level, from green (minimal risk) to magenta (extreme risk), indicates the severity of heat exposure risks, tailored to local conditions, times of the year, and humidity levels. This tool aids in planning and implementing preventive measures to protect vulnerable populations, including advising when to seek cooler environments or modify outdoor activities. To check your area's current risk score, please visit the [HeatRisk website](#).

### Accessing HeatRisk Notifications

There is an application to receive specific alerts based on your zip code. By signing up for notifications, your staff can receive timely, location-specific alerts about impending dangerous heat conditions. These alerts are developed through a collaboration between Harvard C-CHANGE and Climate Central, utilizing data from the National Weather Service (NWS) HeatRisk tool. Access the sign-up form by clicking [here](#).

## Air Quality Index

The **Air Quality Index (AQI)**, developed by the U.S. Environmental Protection Agency (EPA), measures the health quality of the air with a scale from 0 to 500, divided into six categories. This index helps identify days when the air quality could deteriorate to levels that pose health risks, especially for individuals with respiratory conditions like asthma. It covers common pollutants such as ozone and particulate matter, which can exacerbate health issues on hot days. The AQI enables healthcare providers to advise patients on appropriate actions to mitigate the effects of poor air quality, such as staying indoors, reducing physical activity, or using air purifiers. For more information and to check your area's AQI, please visit the [AirNow website](#).

## Clinical Heat Value Sets

Provided with this guide are value sets for identifying patients who may be at high risk for heat related illnesses. While these value sets are not exhaustive, they are a great starting point for creating triggers and queries of your patient population.

The provided value sets encompass three primary categories: **Heat Related Symptoms and Diagnoses (SSx and Dx)**, **Clinical Risk Factors**, and **Medication Risk Factors**. These sets include detailed coding from ICD-10-CM, SNOMED CT, and RxNorm systems. They are as follows:

- **Heat Related SSx and Dx:** This set can be used to flag patients who have previously suffered from heat-related illnesses or who are potentially at high risk due to their environmental exposures.
- **Clinical Risk Factors:** Identifies patients with underlying conditions such as alcohol abuse that may exacerbate the risk of heat-related illnesses, helping in tailoring preventative measures more effectively.
- **Medication Risk Factors:** Some medications can increase susceptibility to heat-related issues by impairing body temperature regulation or hydration status. This value set helps identify patients on such medications.

## How and why to use the value sets?

These value sets enable you to proactively screen and flag high-risk patients during routine medical appointments or in preparation for forecasted heatwaves. They help in adjusting medication regimens and implementing targeted educational interventions to manage risk factors during hot weather effectively. Public health officials can utilize these value sets for syndromic surveillance and trend analysis, enhancing the timeliness and specificity of their responses to heat-related health threats. Furthermore, analyzing broader data sets can help in identifying demographic groups at greater risk, assisting in resource allocation and tailoring of public health interventions.

The provided value sets are also pivotal for conducting clinical audits and quality improvements within your health center. They allow for the assessment of care protocols and patient outcomes related to heat-related conditions. Researchers can also use these sets to study the effectiveness of different treatment protocols and preventive measures across various populations. Historical data derived from these value sets can guide targeted public health campaigns, ensuring that interventions are culturally relevant and accessible.

## Heat Action Plans

It is important, especially for those at high risk for a heat related illness, to have a plan in place during high heat events. By integrating these plans into patient care routines, clinicians can help mitigate the risks associated with extreme heat, ensuring that patients stay safe and healthy during hot weather events. The CDC provides comprehensive resources to help healthcare providers develop effective heat

action plans tailored to their patients' needs. These includes pre-made heat plans for pregnant women, individuals with cardiovascular disease, and children and teens with asthma. The existing heat plans can be found at [CDC Heat & Health Toolkit](#). There are patient populations in our value sets or in your population who may benefit from a customized [Heat Action Plan](#). Below is an outline of the CVD Action Plan to use when creating a customized Heat Action Plan for your patients:

**1. Stay Cool:**

- Check local HeatRisk daily.
- Use air conditioning or visit a cooling center.
- Plan outdoor activities for early morning or late evening.

**2. Stay Hydrated:**

- Carry and drink water throughout the day.
- Avoid sugary, caffeinated, or alcoholic drinks.

**3. Monitor Symptoms:**

- Watch for signs of heat-related illness like excessive sweating, dizziness, or shortness of breath.

**4. Check Air Quality:**

- Use the HeatRisk Dashboard to monitor AQI.
- Limit outdoor activities if AQI is above 100.

**5. Medication Management:**

- Store medications properly.
- Have a plan for power outages to keep medications cool.

Additional guidance, including heat tip sheets that cover MS, Diabetes and CVD can be found from AmeriCares at their [website](#).

## Getting Buy-In from Key Stakeholders

Gaining buy-in from key stakeholders such as clinical staff, patients, and health center directors is essential for successfully implementing this project. Clinical staff, often experiencing project fatigue, need to see the direct benefits of their involvement, such as enhanced patient outcomes and reduced workload through more efficient processes. It's important to engage them early in the project by soliciting their input on the system's design and functionality, ensuring it meets their needs and addresses any potential concerns. For patients, emphasizing the personal health benefits and providing education on the risks of heat-related conditions can foster cooperation and participation. Directors and other higher-ups will be crucial in driving the project forward; presenting the initiative as aligned with the health center's broader business goals—such as improving patient care quality, meeting regulatory compliance, and increasing overall efficiency—will help secure their support. Securing funding is another critical aspect of ensuring the project's viability and success. Potential sources of funding include:

**1. CDC Climate and Health Program:** Supports local and state efforts to integrate health considerations into climate adaptation planning.

**2. NIH Environmental Influences on Health:** Funds research on environmental impacts on health outcomes.

**3. EPA Environmental Education Grants:** Provides resources to enhance community understanding and engagement regarding climate change and health.

**4. FEMA Hazard Mitigation Assistance Programs:** Offers financial support for public health measures and health impact assessments related to climate adaptation.



- 5. Health Impact Project (Robert Wood Johnson Foundation and The Pew Charitable Trusts):** Provides funding for conducting health impact assessments and related activities that evaluate the health consequences of climate change and other policy decisions.
- 6. NOAA Climate Program Office:** Funds initiatives that apply climate science to public health decision-making, supporting projects that improve climate resilience and inform policy.
- 7. State and Local Grants:** Many states and local communities, such as CalEPA, offer grants for improving climate related health.

## Identifying Health Center Capabilities

As you prepare to integrate systems for flagging patients at high risk for heat-related illnesses, effective use of existing data within the Electronic Health Record (EHR) system is paramount. Here is a structured approach to prepare for this integration:

### *Identify Available Data*

Begin with a thorough review of the types of data currently being collected within your EHR system. This includes demographic information, medical histories, environmental exposure records, and any prior heat-related incidents. Understanding the scope of available data is critical to leveraging it for patient risk assessments.

### *Data Quality and Accessibility*

Evaluate how this data is captured, focusing on the distinction between structured data (e.g., coded diagnosis, medication lists) and unstructured data (e.g., clinician notes). Assess the accuracy and completeness of the data, how easily it can be accessed, and how easily it can be used for analysis. This step will help identify any limitations in your current data system that may affect the implementation of heat-related illness alerts.

### *Identify Missing Data*

It's crucial to determine if there are relevant data not currently being collected that are essential for identifying at-risk individuals. This could include specific environmental or occupational exposures that are not routinely recorded but are critical in assessing heat-related illness risks.

### *Plan to Address Gaps*

Develop strategies to integrate necessary data collection into routine healthcare processes and addressing care gaps. This might include:

- Adding specific screening questions about exposure to heat during patient registration or check-ups
- Ensuring that home or work environments conducive to heat risks are documented
- Communicating with Pediatric [Environmental Health Specialty Units](#) (PEHSUs) about recommendations for your region
- Implementing referrals to programs like [LIHEAP](#) for patients at risk of losing their electricity
- Build bridges with local utility companies to communicate the health importance of patients retaining access to electricity

## Identifying EHR and Application Capabilities

### *Existing Functionalities*

#### **Registry Functions**

Begin by examining the existing capabilities of your EHR to manage patient registries. Many EHRs allow

the creation of patient registries that track various health conditions, which can be crucial for identifying and managing vulnerable populations. Check if these registries can be expanded or customized to include patients at high risk for heat-related illnesses, such as the elderly, those with chronic conditions like cardiovascular or respiratory diseases, or individuals taking medications that affect body temperature regulation.

### **Health Maintenance Tracking**

Review the current health maintenance tracking tools in your EHR. These tools typically enable healthcare providers to set reminders and manage care protocols for their patients. Determine if these features can be leveraged to include reminders or checklists specifically for addressing the risks associated with high temperatures during patient visits. This could involve setting up alerts for clinicians to discuss hydration strategies, heat avoidance, and the signs of heat-related illnesses with at-risk patients.

### **Risk Scoring Tools**

Investigate whether your EHR system includes built-in or customizable risk scoring tools. These tools can be pivotal in quantitatively assessing the risk levels of patients based on a variety of data points such as age, underlying health conditions, medication usage, and previous heat-related issues. If such tools are not currently available, consider the feasibility of integrating third-party solutions or developing bespoke risk assessment models.

### **Patient Communication Tools**

Many EHRs are equipped with tools designed for direct communication with patients, such as automated messaging systems, patient portals, and mobile app integrations. These tools are instrumental for engaging patients in their own care, particularly for managing health alerts and preventive advice.

### **API Access**

An Application Programming Interface (API) is a set of protocols and tools that allow different software applications to communicate with each other. APIs enable an EHR system to access external services and data, which can be crucial for accessing local weather data. Electronic Health Records (EHRs) vary widely in their capabilities and the extent to which they can be integrated with other systems, such as third-party applications and data sources through APIs. It is important to be in communication with your vendor and your IT department if you want to include this automation into your work flow.

### **Differences Between EHRs in API Utilization**

Each EHR has different mechanisms for providing alerts, integrating with APIs and creating registries. Epic and AthenaHealth excel in their comprehensive functionalities tailored for managing at-risk populations, including those susceptible to heat-related illnesses. Epic's integrated approach, particularly with its Healthy Planet module, allows for sophisticated registry functions and health maintenance tracking directly within clinical workflows, coupled with advanced risk scoring tools that can incorporate environmental data. This integration is beneficial for timely, proactive patient management. AthenaHealth, while slightly less extensive in registry capabilities, provides robust patient communication through its patient engagement platform and effective health maintenance reminders that can be customized to include specific alerts related to heat risks.

In contrast, eClinicalWorks and NextGen offer solid baseline functionalities but may require more customization to specifically address heat-related health management. eClinicalWorks features comprehensive registry management and customizable risk scoring, yet integrating specific environmental data like high temperatures might need additional configuration. NextGen provides functional health maintenance tracking and patient communication tools, though adapting these systems to include detailed heat-related risk factors generally demands more hands-on setup.

## Other Options

Many Health Centers choose to supplement their EHR capabilities with external applications that specialize in patient engagement and communication. These applications, such as CareMessage or Artera WELL, provide targeted services like automated phone calls and text messaging, which can enhance patient outreach and improve clinical outcomes. External applications often offer more sophisticated and flexible communication tools compared to traditional EHR systems. While these applications can function independently, many are designed to integrate seamlessly with existing EHR systems. This integration ensures that patient communications are not only more effective but also meticulously documented within the patient's health record. CareMessage, for instance, works with major EHR platforms like Athenahealth, Epic, and NextGen.

## *Workflow Considerations Before Beginning*

### Custom Alerts and Flags

Explore the potential to modify existing alert systems within your EHR to include specific triggers related to heat-related illness risk factors. This could involve setting up high-priority notifications that alert clinicians when a patient who is at high risk due to environmental heat conditions checks in for an appointment.

### Integration into Existing Clinical Workflows

It is crucial that any modifications or new tools introduced do not disrupt existing clinical workflows. Seamless integration is key to ensuring that clinicians can easily utilize these new functionalities without it interfering with patient care. Consider the process design in detail, perhaps by mapping out current workflows and identifying where new elements can be added without adding undue complexity or steps.

### Engage Key Stakeholders

The development and refinement of these tools should involve a collaborative effort with IT specialists, clinical informaticians, and frontline healthcare providers. Their expertise will ensure that the functionalities not only meet the clinical needs but are also technically feasible and user-friendly. Also, engage in discussions with your EHR vendor to explore capabilities they may offer which are not mentioned in this guide.

### Communication Preferences for Alerts

Understanding how patients prefer to be contacted is key to ensuring that alerts are received and acted upon. This might involve analyzing existing data on communication preferences or conducting surveys to gather this information. Similarly, determine how clinicians prefer to receive alerts about their patients' risks. Some may prefer direct alerts through the EHR system, while others might prefer email or mobile notifications.

### Patient-Centered Approach

Focus on a patient-centered approach in all aspects of communication. This means tailoring messages to be clear, actionable, and respectful of the patient's needs and preferences. Alerts should provide patients with specific instructions on what actions to take and whom to contact if they are experiencing symptoms. It is important to take into consideration language and cultural backgrounds when creating your patient messaging. La Clinica, in their implementation of heat-related messaging saw great success by offering messages in multiple languages. For clinicians, alerts should include concise, relevant information that aids in clinical decision-making without overwhelming them with unnecessary data.

# IDENTIFYING YOUR PATIENTS

Accurately identifying patients at high risk for heat-related illnesses is essential for effective intervention and care.



## CHILL'D-Out

A great place to start when identifying patients, potential value sets and populations that might be at higher risk is the CHILL'D-Out Questionnaire (Centers for Disease Control and Prevention 2024) provided by the National Center for Environmental Health at the CDC. Health informaticists can use the CHILL'D-Out Questionnaire to pinpoint key areas of risk of their patients that may not be routinely captured through standard EHR data or the value sets we provided. Additionally, health center staff may think about where this questionnaire could be added to their workflow. For instance, a clinician, community health worker, or medical assistant may consider adding this to screening for social drivers of health or social risk. The questionnaire is as follows:

### Cooling

- **Does your patient have working air conditioning?**
  - Can they check and control indoor temperatures where they live?
  - Do they have an electric fan?
  - Do they know how to locate a cooling center if needed?

### Housing

- **Does your patient have stable housing?**
  - Do they live on a higher floor of a multi-story building where they may be exposed to more heat?
  - Are they regularly exposed to indoor air pollutants such as secondhand smoke or mold?
  - Do they have a portable air purifier or a filter in their HVAC system?

### Isolation & mobility

- **Does your patient have a neighbor, friend, or family member who can check on them during hot days?**
  - Does their mobility limit their ability to seek cooling in their home or elsewhere?

### eLectricity

- **If heat leads to a power outage**, does your patient have a plan for refrigerated medications and/or electric medical devices?

### Learning

- **Does your patient check the daily and hourly weather forecast to know the hottest time of the day? Can they access the HeatRisk tool?**
  - Where does your patient get information about how to protect their health from heat? What measures do they take to do so?

### Drugs

- **Does your patient take medications that increase risk from heat exposure?**

### Outside

- **How much time does your patient spend outdoors on hot days for work, sports, or recreation?**
  - Are they exposed to outdoor air pollution at home, work, or elsewhere, such as a major roadway, construction site, industrial facility, or frequent wildfire smoke?
  - Do they have allergies to grass, weeds, and tree pollens?

Asking these questions about your patient population may shed light on factors relevant to your community. You know your patients and the communities in which they live. These questions are just a starting point on your journey to find what factors are relevant to your patients.

## **Other Areas of Concern**

In addition to the insights provided by the questionnaire, there are areas of specific concern identified by the CDC. Many of these areas are included in the value sets provided. The CDC Areas of Concern are detailed below.

### ***Children with Asthma***

The “Clinical Guidance for Heat and Children with Asthma” provided by the National Center for Environmental Health highlights the importance of daily monitoring of the HeatRisk forecast and air quality index (AQI) during warmer months, especially when the AQI is above 100, as these conditions can trigger asthma symptoms and attacks. It advises healthcare providers to work with patients and caregivers to create Heat Action Plans and Asthma Action Plans that include strategies to manage heat exposure. This might involve discussing medication adjustments, the importance of staying hydrated, recognizing signs of overheating, and ensuring medications like inhalers are not stored in hot environments to prevent them from becoming less effective or bursting. For detailed guidance and further information, you can visit the CDC’s page on this topic: [Clinical Guidance for Heat and Children with Asthma](#).

### ***Cardiovascular Disease***

The “Clinical Guidance for Heat and Cardiovascular Disease” from the CDC provides crucial advice for managing patients with cardiovascular disease (CVD) during hot weather. Heat exacerbates cardiovascular problems, potentially leading to heart attacks, strokes, and worsening heart failure due to increased levels of air pollutants on hot days. The guidance advises creating a Heat Action Plan for patients with CVD, which includes daily monitoring of heat and air quality levels, medication review particularly for those that may increase heat sensitivity such as certain antihypertensives, and patient education on recognizing and managing the signs of heat stress and poor air quality effects. To effectively identify patients who might fall under this category, clinicians should assess their baseline cardiovascular health, current medication regimens that might interact with heat, and their living conditions that may increase their heat exposure. Many of these considerations are covered in our value sets. For detailed guidance and further information, you can visit the CDC’s page on this topic: [Clinical Guidance for Heat and Cardiovascular Disease](#).

### ***Pregnancy***

The CDC provides “Clinical Guidance for Heat and Pregnancy” to assist healthcare professionals in supporting pregnant people during hot weather. Exposure to high temperatures and poor air quality can exacerbate health risks for pregnant women, including hypertensive disorders and other pregnancy complications. The guidance recommends creating a Heat Action Plan and reviewing medications that may increase heat sensitivity, such as antihistamines or antihypertensive drugs. For further details and comprehensive guidelines, please visit the CDC’s guidance on this topic: [Clinical Guidance for Heat and Pregnancy](#).

### ***Medications That Increase Heat Risk***

The “Heat and Medications – Guidance for Clinicians” provided by the CDC highlights the significant impacts of ambient heat on patients taking various medications. This guidance is crucial for clinicians to understand how heat affects drug efficacy and patient safety, particularly for those on medications

that can impair thermoregulation or fluid balance such as diuretics, certain psychiatric medications, and antihypertensives. It also addresses the risks associated with medication degradation due to high temperatures, such as damage to inhalers and EpiPens, and increased skin sensitivity to the sun from certain drugs like antifungals and some antibiotics. Clinicians are advised to review and possibly adjust medication regimens before and during the hot season, considering the unique risks each patient faces due to their specific treatments. For more detailed guidance, please visit the CDC's page on this topic: [Heat and Medications – Guidance for Clinicians](#).

## Using Your EHR to Identify Patients

The provided Clinical Heat Value Sets are essential tools for identifying patients vulnerable to heat-related illnesses during adverse weather conditions, using a structured coding system that includes ICD-10-CM and SNOMED CT. These sets will provide a basis for your registries and additional values can be added to as you determine what factors are relevant to your population.

### Preparing the Value Sets to Import

The Value Sets included with this implementation guide have already been prepared to import into most EHRs through VSAC. The Value Set Authority Center (VSAC) is a resource provided by the National Library of Medicine for authoring, sharing, and accessing value sets used in healthcare settings. Access to VSAC requires registration with NLM's Unified Medical Language System® (UMLS) Metathesaurus License.

### Accessing the Value Sets from VSAC

Accessing standardized and curated value sets, a group of codes representing a concept related to non-exertional (classic) heat stroke and heat-related illnesses, is crucial for accurate data segmentation, cohort identification, and data analysis in public health. The National Library of Medicine's Value Set Authority Center (VSAC) provides a centralized repository for these value sets and other concepts. Here are the steps to access these value sets on VSAC:

1. Go to <https://uts.nlm.nih.gov> and click "Request a License" to create a free UMLS Terminology Services (UTS) account using your preferred identity provider.
2. Complete and submit the online license request form. NLM will email you a license approval within 5 business days.
3. After receiving approval, sign in to UTS using your identity provider credentials.
4. Visit <https://vsac.nlm.nih.gov> and sign in with your UTS account.
5. On the VSAC homepage, enter "NACHC" in the Steward/Author filter.
6. Browse or search for the desired heat stroke and heat-related illness value sets created by NACHC.
7. View value set details, export files, and access downloadable resources as needed.

By following these steps, you can obtain a free UMLS license, use a UTS account to access VSAC, and locate the NACHC-created value sets for use in public and population health surveillance and data analysis.

### Mapping the Excel Sheets for Value Set Import

If you do not have the resources to pull the value sets from VSAC, the excel sheets of the value sets can be found [here](#).

- 1. Code Alignment:** Begin by aligning the codes from the value sets with the coding system used by your EHR, such as ICD-10 or SNOMED. This involves verifying that each code in the value sets correctly corresponds to the disease, symptom, or condition it represents, and is recognizable within the EHR's database.
- 2. Format Standardization:** Ensure that the format of the codes matches the format required

by the EHR. This may involve converting codes into a string format, prefixing zeros, or other modifications. For example, if your EHR uses a specific version of SNOMED codes with a certain digit length or format, the codes from the value sets must be adjusted to match this requirement.

- 3. Metadata Inclusion:** Include necessary metadata for each code. This typically includes descriptions of each code, which help users (e.g., clinicians, data analysts) understand what each code represents without needing to reference external documentation. Additionally, specify the code type for each entry to clarify whether it is an ICD-10 code, a SNOMED code, or another type. This classification is crucial for the EHR's data processing and reporting functions.
- 4. Linkage to Clinical Concepts:** Map the codes from the value sets to relevant clinical terms or concepts already present in the EHR. This linkage is vital for ensuring that the imported codes integrate seamlessly into the EHR's existing clinical workflows and decision support systems. For example, a code for dehydration might be linked to broader concepts of fluid balance management or to specific alert protocols for elderly patients in heatwaves.
- 5. Testing and Validation:** Before fully integrating the value sets into your EHR, conduct thorough testing to verify that the codes are correctly mapped and that the system can accurately recognize and utilize them. This testing should include checking the triggering of alerts based on the codes, the correct appearance of information in patient records, and the functionality of data reporting tools using these codes.

### ***Importing the Value Sets***

In EHRs, there are two main methods to import the Value Sets: Direct Database Entry and EHR-Specific Import tools. Your use of either of these methods will depend on your EHR and the technological skillsets of your team. Most organizations will prefer to use their EHRs import tools. Regardless of the system, it is crucial to thoroughly test and validate the imported value sets in a test environment before deploying them to the live system.

#### **Direct Database Entry**

Direct database entry involves manipulating the database to import the value sets and is typically managed by database administrators or IT personnel with advanced access, using SQL scripts or other database tools. Epic requires a controlled environment for database changes due to its complex and interlinked data structures; direct database entry is often restricted and needs to pass through Epic's proprietary configuration processes or be guided during system updates. In contrast, direct entry into the AthenaHealth database is uncommon because its cloud-based architecture limits direct access to the underlying database for security and integrity reasons. Meanwhile, NextGen and eClinicalWorks may permit more direct database interactions, particularly in client-hosted server environments, but it is crucial to adhere to each system's data standards and integration protocols to prevent data corruption or other issues.

#### **EHR-Specific Tools**

Each EHR system typically offers its own set of tools or modules designed to facilitate the import and management of clinical data, including value sets. Epic utilizes specific administrative tools such as the EpicCare Link and Chronicles to manage and import clinical vocabularies. The process involves using these tools to ensure that new data aligns with existing data structures and workflows, allowing for integration of clinical data sets that can then be utilized across various modules for patient management. As a cloud-based EHR, AthenaHealth provides modules via its user interface that allow for the import and management of clinical data sets, involving navigation through administrative settings where value sets can be uploaded and configured according to clinical needs. NextGen offers a mix of database access

and user interface tools for data management; its Template Editor and other administrative tools can be used to import and configure value sets, allowing for customization based on specific health center needs. Lastly, eClinicalWorks provides a comprehensive data import module accessible through its administrative interface, where users can upload value sets in specific formats, and the system guides them through mapping and integration steps to ensure the data is correctly incorporated into the clinical workflow.

### ***Creating a Registry***

In Electronic Health Records (EHRs), registries are organized systems for managing patient data that allow healthcare providers to track and monitor specific groups of patients based on predefined criteria. These criteria could include clinical conditions, treatment responses, demographic details, or risk factors. The way you create a registry will depend on your EHR, but most will follow the process below:

#### **Access the Registry Management Tool:**

For Epic users, this is done through Epic's Population Management tool. AthenaHealth users should navigate to the clinical reporting or population health section, whereas eClinicalWorks users will open the Registry Management module. NextGen users will utilize the Population Health dashboard.

#### **Define the Registry and Input Data Criteria:**

In Epic, eClinicalWorks and NextGen, users should create a new registry, give it a name such as "High Risk for Heat-Related Illness," and input basic inclusion criteria. AthenaHealth users will start a new report and configure it to function as a registry by inputting the same parameters.

#### **Set Parameters and Filters:**

All EHR users should ensure the registry is configured with parameters that include specific diagnostic or procedural codes included in the value sets.

#### **Validation and Implementation:**

You should test the registry with a small set of data to ensure it accurately identifies the targeted patient group. The focus should be on integrating the registry into the daily workflow to ensure it is functional and visible to healthcare providers during patient interactions.

## **SETTING UP A MESSAGE**

When implementing a system to notify patients and clinicians about heat-related risks, it's crucial to understand the available messaging options and how they fit into your clinical workflows. This section will guide you through choosing and setting up clinician-focused and patient messaging in your EHR system.

### **Choosing Your Message**

This section explores the options available for clinician-focused messaging and patient messaging in Electronic Health Record (EHR) systems. Understanding the different tools and how they fit into your clinical workflows can help you select the best approach for your health center.

#### ***Clinician Focused Messaging***

There are two main forms of clinician focused messaging in EHRs: Health Maintenance Topics and Best Practice Alerts (BPAs). Each has their own strengths and functionalities. Understanding your clinical workflows and what your clinicians prefer will be the best way to determine which will work for your health center.

#### **Health Maintenance Topics**

Health Maintenance Topics primarily focus on preventive care, guiding providers to ensure that patients adhere to necessary wellness activities and medical screenings based on predetermined criteria.



These topics help healthcare providers by reminding them about routine care such as screenings and vaccinations scheduled according to evidence-based guidelines. They are configured based on specific criteria. Additionally, they facilitate systematic documentation and tracking of these preventive measures to maintain consistency in patient care over time. Most EHRs (including NextGen, Epic, AthenaOne, and eClinicalWorks) offer distinctive health maintenance systems.

### **Best Practice Alerts (BPAs)**

Best Practice Alerts (BPAs) offer real-time clinical decision support during patient encounters, providing healthcare providers with critical information or recommended actions based on the patient's current data and context. These alerts, which pop up during patient interactions, are designed to offer immediate advice or warnings, such as drug interaction alerts or recommendations for specific tests. They are context-sensitive, triggered by specific conditions within a patient encounter, like abnormal lab results, and require a response from the healthcare provider, such as acknowledging the alert or taking a recommended action. EHR systems like NextGen, Epic, AthenaOne, and eClinicalWorks each utilize BPAs.

### **Which should you choose?**

The key differences between Health Maintenance and Best Practice Alerts (BPAs) lie in their usage context, focus, and interaction. Health Maintenance is utilized for long-term, routine care planning, focusing on preventive care based on set schedules and guidelines. It functions primarily as reminders and trackers for due care, supporting ongoing health management. In contrast, BPAs are used for making immediate clinical decisions and actions during patient care, focusing on specific clinical situations that arise during care. BPAs require more immediate interaction from providers during patient encounters, often demanding quick responses to alerts. The choice between using Health Maintenance or BPAs will depend on the specific needs of your health center and the clinical workflows you have in place, ensuring that either tool is used effectively to enhance patient care and clinical efficiency. Both can be used in tandem, but it is important to consult with your care team to make sure they are not experiencing message fatigue. For the purposes of this guide, we will use BPAs to explain the clinician messaging process.

### **Patient Messaging**

Most EHRs offer unique patient messaging systems through their EHR patient portals, enhancing communication during heat-related events. Many EHRs also offer automated text messaging and phone calls as part of its offerings. This is important as it is a more direct way to reach many patients. Epic's MyChart supports automated text messaging and phone calls for appointment reminders, health alerts, and other notifications. AthenaHealth's AthenaCommunicator allows healthcare providers to send important notifications via SMS or automated calls. eClinicalWorks, through the Healow app, provides automated appointment and preventive care reminders via text and phone calls. Similarly, NextGen enables healthcare providers to send automated messages for appointment reminders, medication notifications, and health alerts. For those whose EHRs do not have access to automated text messaging, tools like CareMessage that provide automated text messaging can be setup for their health workflows.

### **Message Fatigue**

Message fatigue occurs when individuals are overwhelmed by the volume or frequency of notifications, leading to desensitization, decreased response rates, and potential disregard of critical alerts. To effectively manage this, it's important to be cognizant of how many notifications you are sending and make sure they are truly needed. You should also consider the following principals:

#### **Timing**

Notifications should be timely and relevant, particularly for heat-related illnesses. Sending alerts during colder months or seasons when the risk of heat-related illness is low can contribute to message fatigue.

Therefore, notifications should be activated only during periods of high heat risk, ensuring that they are pertinent and actionable when the threat is imminent.

### **Specificity**

The specificity of the notifications plays a crucial role in preventing fatigue. Generic alerts are more likely to be ignored. Instead, messages should include specific details such as the patient's name, their particular risk factors, and clear instructions on the actions that need to be taken.

### **Involve Clinicians**

Clinicians should be actively involved in the development and implementation of the notification system. Their insights can help tailor the notifications to be clinically relevant and actionable. Additionally, having clinicians participate in the process can increase their buy-in and trust in the system, reducing the perception of the notifications as mere nuisances.

### **Context**

Including context in notifications helps recipients understand why they are receiving the alert and what the implications are. Contextual information might include current weather conditions, specific heat advisories, and the potential health impacts on the flagged patient.

## **Sample Messages**

### **BPA**

**Title:** Heat-Related Illness Risk Alert

#### **Message Content:**

This patient has been identified as at risk for heat-related illnesses based on current environmental conditions and their health profile. Please review the Heat Action Plan and consider the following:

- Ensure the patient has access to a cool environment.
- Review and adjust medications prone to causing heat sensitivity.
- Educate the patient and caregivers on recognizing signs of heat exhaustion and heat stroke.
- Discuss hydration strategies and the importance of avoiding alcohol and caffeine.
- Schedule follow-up during peak heat season to reassess risk.

**Severity:** High priority (disruptive alert)

#### **Potential Actions Offered:**

1. Acknowledge Alert: Confirm reading and understanding the alert.
2. View Heat Action Plan: Access a detailed plan in the patient's record.
3. Order Heat-Related Lab Tests: Quick link to order labs such as electrolytes and renal function tests.
4. Schedule Follow-Up: Shortcut to schedule a follow-up appointment during the heat season.
5. Educational Material: Link to patient education resources on heat-related illness prevention to print or email to the patient.

### **Patient Text Message**

Below are sample messages used by La Clinica in their implementation of heat-related messaging for different populations. These are based on the patient's preferred language as listed in their EHR.

#### **1. Patients with CKD, age 65+, DM, CHF, CAD, Hx MI, Hx of CVA:**

Health Alert from La Clinica: Due to your medical condition, today's extreme heat increases your risk of dehydration and heat-related illness.

La Clinica recommends you drink plenty of water.

Avoid sugary beverages and alcohol.

Stay cool in an air-conditioned home or cooling shelter, and cover windows with curtains or reflective material.

## 2. Children < 5 years old:

...Do not bundle or sleep with fluffy or heavy blankets. If younger than 6 months, do NOT give your baby water. Ensure your baby drinks enough breastmilk or formula. Breastfeeding mothers should drink plenty of water. Keep your child cool with wet towels. Stay in an air-conditioned home or cooling shelter. You may also cover windows with curtains or reflective material.

## 3. Pregnant women:

...Due to being pregnant, today's high temperatures increase your risk of dehydration, preterm contractions, and heat-related illness. To protect you and your baby...

La Clinica will also send out additional messages for heat events that last more than one day:

Today is another day of extreme heat.

Look out for signs of heat exhaustion, which include: Heavy sweating, paleness, muscle cramps, dizziness, headache, fainting, nausea, vomiting.

If you have signs of heat exhaustion, go to a cooler location.

Cool down by removing excess clothing, taking sips of water, taking a cool bath or shower, or cooling with wet towels.

For additional patient message examples, please refer to this guide from [Americares](#).

Note: You may want to include information on local cooling centers. Look for your state on the [National Center for Healthy Housing](#) for more information on cooling centers near your patients.

## Sending your message

Effectively communicating with patients and clinicians about heat-related risks involves timely and well-coordinated messages. Here's how to approach this:

### *When to send a text message*

#### **Sending Notifications to Patients**

If your health center is signed up for HeatRisk notifications or actively checks the site, collaborate with your team to decide what should be done at each level of heat risk. This can range from moderate to extreme risk levels. If your EHR supports API integration, you can set automated triggers for heat, humidity, and air quality levels. Establish thresholds for these environmental factors to automatically send notifications when conditions reach potentially dangerous levels. For guidance on heat risk calculations, refer to the [NOAA HeatRisk Tool](#), [Weather API](#), and [Air Quality API](#).

#### **Sending BPAs to Clinicians**

Set BPAs to trigger at the beginning of the hot season (this is dependent on your area but could be as wide as April-September), reminding clinicians to discuss heat-related risks with patients during appointments. Schedule BPAs to appear during annual physical exams or routine check-ups, ensuring that heat-related illness prevention is part of the patient care discussion. Use the EHR's decision support tools to configure BPAs based on environmental data thresholds or specific patient conditions that increase risk.

Example BPA triggers include setting alerts when local heat, humidity, or air quality levels exceed safe thresholds, or for patients with chronic conditions that make them more susceptible to heat-related illnesses.

## ***Sending a Patient Notification***

### **Manual Patient Notifications**

The following instructions outline the steps for accessing the registry of high-risk patients, composing a health alert message, and sending this message through both text messaging and patient portal systems. By following these steps, health centers can ensure that their patients receive critical information during high heat events, helping to protect their health and well-being. These steps assume that you have already drafted the message you want sent to your patients.

#### **Step 1: Identify the Registry**

- **Access the Registry:** Log in to your EHR system and navigate to the registry management section.
- **Select the Registry:** Identify and select the registry containing patients at high risk for heat-related illnesses. Ensure the list is up-to-date and accurate.

#### **Step 2: Send the Text Message**

- **Access Messaging Tools:** Navigate to the messaging or communication tools in your EHR system.
  - **Epic (MyChart):** Use Epic's Communication Management module.
  - **NextGen:** Use NextGen's Patient Engagement suite.
  - **eClinicalWorks (Healow):** Access the Healow messaging system.
  - **AthenaHealth (AthenaCommunicator):** Go to AthenaCommunicator.
- **Select Text Messaging:** Choose the option to send an SMS message.
- **Filter the Recipients:** Filter the recipients to include only those in the high-risk registry.
- **Paste and Send:** Paste the drafted message into the text messaging interface and send the alert.

#### **Step 3: Send the Patient Portal Message**

- **Navigate to Patient Portal Messaging:** Access the patient portal messaging section in your EHR.
  - **Epic (MyChart):** Access MyChart Admin.
  - **NextGen:** Navigate to the NextGen Patient Portal admin section.
  - **eClinicalWorks (Healow):** Log in to the Healow admin interface.
  - **AthenaHealth (AthenaCommunicator):** Use the patient messaging feature in AthenaHealth.
- **Compose the Message:** Use the same health alert message, ensuring it is formatted correctly for the portal.
- **Filter the Recipients:** Filter the recipients to include only those in the high-risk registry.
- **Send the Alert:** Send the message through the patient portal.

### **Automated Patient Messaging**

The process for setting up automated triggers is more robust and technical. This process involves several steps, from identifying reliable data sources and setting up API access to defining alert triggers and automating the messaging system. Below, we outline a general approach to setting up this communication:

#### **Step 1: Integrate Environmental Data Sources**

- **Identify Data Sources:** Choose reliable sources for heat, humidity, and air quality data. Examples include:
  - [National Weather Service \(NWS\)](#)
  - [Environmental Protection Agency \(EPA\) for air quality](#)
- **API Access:** Ensure that these data sources provide API access for real-time data retrieval. Register for API keys if required.

- **Connect to EHR:** Work with your EHR's technical team to integrate these APIs into your EHR system. This may involve setting up web services or using middleware to fetch and process the data.

## Step 2: Configure Triggers for Alerts

- **Define Thresholds:** Set specific thresholds for heat, humidity, and air quality that will trigger alerts.
- **Create Logic for Triggers:** Use the EHR's decision support tools to create logic that checks these thresholds regularly. If the thresholds are exceeded, an alert should be triggered.
  - **Epic (MyChart):** Use the Decision Support and Rules Engine.
  - **NextGen:** Utilize the Population Health and Alert Management tools.
  - **eClinicalWorks (Healow):** Configure rules in the Registry and Alerts settings.
  - **AthenaHealth (AthenaCommunicator):** Set up automated rules in the Communicator module.

## Step 3: Automate the Messaging Workflow

- **Draft the Message:** Create a template for the automated message. Ensure it includes:
- **Set Up Automated Messaging:**
  - **Epic (MyChart):**
    - > Use the Communication Management module to create and schedule automated messages.
    - > Link the triggers to the message template.
  - **NextGen:**
    - > Utilize the Patient Engagement suite to automate the sending of messages based on the defined triggers.
  - **eClinicalWorks (Healow):**
    - > Configure the Healow messaging system to send SMS alerts automatically when the thresholds are exceeded.
  - **AthenaHealth (AthenaCommunicator):**
    - > Use AthenaCommunicator to set up automated outreach campaigns triggered by environmental data.
- **Filter Recipients:** Ensure that messages are sent only to patients flagged in the high-risk registry.

## *Sending a BPA*

Below is a step-by-step guide to creating a BPA for the registry of high-risk patients in various EHR systems.

### Step 1: Define the Criteria for the BPA

1. **Identify High-Risk Patients:** Use the registry created by your team.
2. **Set Environmental Triggers:** Determine the environmental conditions (e.g., high heat index, humidity levels, and poor air quality) that will trigger the BPA. For more information on this step, please see the previous section on how to set up automated patient messaging.

### Step 2: Configure the BPA in the EHR System

1. **Access BPA Configuration:** Log in to Epic and navigate to the BPA configuration section within the Decision Support and Rules Engine.
  - **Epic (MyChart):** Log in to Epic and navigate to the BPA configuration section within the Decision Support and Rules Engine.
  - **NextGen:** Log in to NextGen and navigate to the Population Health and Alert Management tools.
  - **eClinicalWorks:** Log in to eClinicalWorks and access the Registry and Alerts settings.
  - **AthenaHealth:** Log in to AthenaHealth and navigate to the Communicator module.

- 2. Create New BPA:** Select the option to create a new BPA.
- 3. Define Criteria:** Set the criteria for the alert, linking it to the high-risk registry and environmental triggers.
- 4. Compose BPA Message:** Draft the alert message.
- 5. Set Alert Conditions:** Define when the alert should be triggered, such as during patient check-ins or annual physical exams.

## DEPLOYING, EVALUATING AND TRACKING YOUR MESSAGING

Deploying your message involves several key steps to ensure smooth integration and effective communication.

### Preparing to Deploy

Deploying a system requires preemptive steps to ensure a smooth integration of the messaging. The process begins with finalizing the configuration, ensuring all settings are correctly applied and thoroughly tested. Obtaining necessary approvals from clinical, IT, and legal departments ensures compliance and readiness. Educating users through appropriate training ensures everyone is comfortable with the new system. Finally, planning and communicating a detailed go-live timeline guarantees a smooth deployment and addresses any issues promptly.

#### *Finalizing the Configuration*

To finalize the configuration for your messages, review the BPA and patient message configurations to ensure all criteria and triggers are correctly set, and validate the message templates for clarity and accuracy. Verify the accuracy of the patient registry, ensuring there are no data inconsistencies or errors, and perform a final test to confirm the proper function of the system.

#### *Obtain Necessary Approvals*

To obtain approval for the change, present the final configuration to clinical leadership to obtain feedback, incorporate necessary changes, and secure official approval from clinical directors. Review the technical aspects with the IT department to confirm all technical requirements and security protocols are met and obtain IT sign-off on the deployment plan. Ensure compliance with patient privacy regulations such as HIPAA, review messaging content for legal appropriateness, and obtain approval from the legal team. It is much easier to obtain approval for the deployment if you have met with stakeholders to receive buy-in earlier and involved them in the process.

#### *Educate Your Users*

To educate users, determine the necessary trainings based on the complexity of the new system, ensuring that all relevant staff, including clinicians, administrative staff, and IT personnel, receive appropriate training. Discuss with clinical stakeholders whether a simple email is sufficient or if more comprehensive training sessions are required. Develop detailed training materials, conduct hands-on sessions, and offer office hours for feedback and support to ensure all users are comfortable with the new BPA and patient messaging system.

#### *Final Steps*

To deploy the new system, the team will need to plan the timeline by establishing a clear go-live date and developing a detailed timeline of pre-launch, launch, and post-launch activities. Communicate this timeline to all stakeholders, providing regular updates leading up to the go-live date, and ensure that support teams are available on launch day to address any issues that may arise.

## Deploying Your Message

To deploy your message into production, start by conducting a final review and validation of the message and messaging system in a test environment to ensure everything works correctly. Confirm that all training has been successful. On the established go-live date, deploy the BPA and patient messaging system into the production environment, closely monitoring the process to ensure it functions as expected. Post-launch, provide immediate support to users, addressing any issues or concerns that arise promptly. Continue to monitor the system's performance, gathering feedback from users to identify and make any necessary adjustments or improvements.

## Evaluating Your Message

To effectively manage and evaluate the implementation of heat-related illness notifications, it is crucial to establish a comprehensive evaluation process. This involves defining specific evaluation metrics, gathering user feedback, assessing clinical outcomes, addressing alert fatigue, and documenting and reporting on the intervention's effectiveness. By systematically tracking and analyzing data, we can ensure that the system not only meets clinical needs but also continuously improves based on user experiences and clinical results. This structured approach will help in optimizing the intervention, ensuring that it effectively supports clinicians and protects at-risk patients during high heat events.

### *Define Evaluation Process*

To define evaluation metrics for your message, you should identify key clinical outcomes to measure, such as reduced heat-related incidents, and determine benchmarks for success. Track system performance by monitoring alert response times, message delivery rates, system stability, and error rates. Additionally, develop tools for collecting user feedback, such as surveys and suggestion boxes, to gather insights on user experience and identify areas for improvement.

### **User Surveys**

To monitor user interaction, create and distribute surveys to both clinicians and patients to gauge their satisfaction with the system, and analyze the survey results for actionable insights. Additionally, one-on-one interviews with key users to gather qualitative feedback on the system can be insightful.

### **Clinical Outcomes**

To assess clinical outcomes, start by linking to specific outcome measures related to heat-related illnesses. Track specific health outcomes such as:

- Heat-related illnesses
- Emergency department visits
- Hospital admissions
- Mortality rates
- Hydration status
- Usage of cooling centers
- Heat-related symptom reporting
- Healthcare utilization

Compare pre- and post-implementation data to evaluate changes in these outcomes. It is important to measure the impact of the message on clinical decision-making by linking messaging to actions led to improved patient outcomes.

### *Addressing Alert Fatigue*

To assess and address alert fatigue, start by monitoring alert frequency. Track the number of alerts generated per day and analyze patterns in alert dismissals and responses. This data will help identify

if there are excessive alerts contributing to fatigue. Next, assess dismissals by identifying reasons why clinicians are dismissing alerts. This could involve reviewing feedback from users or analyzing the context in which alerts are dismissed. Based on these insights, adjust the frequency and criteria of alerts to minimize unnecessary notifications, ensuring that only the most critical alerts are generated to maintain clinician engagement and response effectiveness.

### **Documenting and Reporting on Your Message**

To document and report on the effectiveness of their message as an intervention, it is essential to maintain comprehensive records. Document all configuration settings and any changes made throughout the implementation process to ensure transparency and traceability. Keep detailed records of training sessions, including attendance and participant feedback, to assess the effectiveness of user education. Additionally, log all feedback from users and note any iterations or improvements made based on this feedback. This thorough documentation will provide a clear history of the project and support continuous improvement efforts.

For regular reporting, generate detailed reports on system performance, including alert response times, message delivery rates, and any technical issues encountered. Track clinical outcomes such as the incidence of heat-related illnesses, emergency department visits, and other relevant metrics. Share these reports with key stakeholders, including clinical leadership, IT, and administrative teams, to keep them informed of the intervention's impact. Use the data from these reports to inform strategic decisions, identify areas for improvement, and make necessary adjustments to the system to enhance its effectiveness in managing heat-related health risks.

### **Continuous Improvement**

To continuously improve messaging and response to heat-related events, it is crucial to iterate based on data and feedback. Regularly analyze data on system performance, clinical outcomes, and user feedback from both clinicians and patients to identify areas for enhancement. Specific data to track should include usability metrics such as scheduled follow-ups, link tracking, and response rates to patient and provider messaging. Use this information to make iterative improvements to the messaging system, ensuring that the alerts and notifications remain relevant and effective.

Update messaging templates as needed to reflect the latest best practices and ensure clarity and impact. Implement any changes in a controlled and systematic manner, testing them thoroughly in a test environment before full deployment to minimize disruptions. Engage with stakeholders throughout this process to ensure that updates meet their needs and improve overall system functionality, leading to better patient outcomes and more efficient heat-related health management.

## **CONCLUSION**

This guide has walked you through the comprehensive process of integrating heat-related illness alerts into your EHR system. By understanding available resources, evaluating data quality, addressing data gaps, and understanding your EHR's capabilities, you can effectively safeguard patients from heat and air quality risks while efficiently allocating resources during environmental events.

You have learned about the importance of the HeatRisk Tool and Air Quality Index (AQI) in planning preventive measures and advising vulnerable populations. Utilizing these tools, along with clinical heat value sets, allows health centers to identify high-risk patients and implement appropriate interventions. Developing Heat Action Plans and securing buy-in from stakeholders are crucial for successful implementation, supported by funding from organizations like the CDC, NIH, and others.



Accurate patient identification using tools like the CHILL'D-Out Questionnaire provides a comprehensive risk assessment by covering various aspects of a patient's environment and health. Addressing specific concerns such as asthma, cardiovascular disease, and pregnancy during hot weather ensures tailored care for vulnerable groups. Utilizing clinical heat value sets and importing them into the EHR system helps create and manage patient registries, which track vulnerable populations and set reminders for addressing heat risks. Effective patient communication tools and API integration further enhance patient engagement and care management.

Deploying, evaluating, and continuously improving the messaging system involves finalizing configurations, obtaining necessary approvals, educating users, and planning the timeline for deployment. Post-deployment, immediate support and ongoing monitoring ensure the system functions effectively. Establishing evaluation metrics, addressing alert fatigue, and documenting and reporting on the intervention's effectiveness are vital for ongoing improvements. Iterative enhancements based on data and feedback will help refine the system, ensuring it meets the needs of both patients and clinicians in managing heat-related health risks.

Thank you for utilizing this guide and for your dedication to caring for your patients. Your efforts in implementing these measures will significantly contribute to the health and safety of your community during high heat events.

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