TEMPLATE: MUNICIPAL EXTREME HEAT & AIR QUALITY RESPONSE PLAN

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# ABOUT THIS TEMPLATE

## Usage Guide

**Guiding resource:** This template is intended to serve as a guiding resource for Connecticut local health departments, including *but not limited to* those receiving Connecticut Department of Public Health (CDPH) Pilot Grants for Local Heat and Air Quality Preparedness and Response Planning. The contents of this template are based upon the analysis and synthesis of nearly 20 extreme heat and air quality response plans across the U.S., including municipalities in California, Maine, Connecticut, and Colorado. This template should be viewed not as a comprehensive or prescriptive guide, but rather as a compilation of potential components of the municipality’s Extreme Heat and Air Quality Response Plan that will ultimately be devised and implemented by a chosen municipality.

**Living document:** This template is meant to be a living document that will be periodically updated based on feedback gathered from its usage. Revised versions can be accessed from the website of the Yale Center on Climate Change and Health’s Program on Climate Change and Health in Connecticut: <https://ysph.yale.edu/climate/policy_practice/connecticut/>.

**Feedback and assistance:** Please direct any questions, suggestions, or requests for assistance to Jennifer Wang (jen.wang@yale.edu), Executive Director of the Yale Center on Climate Change and Health.

## Acknowledgements

This template was originally developed by the individuals listed below. It was updated and expanded in Fall 2024 by Yanjia Li (MPH Candidate, Yale School of Public Health), Reece Pauling (MEM Candidate, Yale School of the Environment), and Sena Wazer (MEM Candidate, Yale School of the Environment), as part of the Clinic in Climate Justice and Public Health course, with supervision by Jennifer Wang, MS (Executive Director, Yale Center on Climate Change and Health), and additional input provided by members of the Connecticut Climate and Health Equity Coalition and staff from local health departments in Connecticut.

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# EXECUTIVE SUMMARY

**Example:** This Extreme Heat and Air Quality Response Plan provides a comprehensive overview of [MUNICIPALITY’s] approach to climate change adaptation, with a particular focus on local preparedness and response to extreme heat, PM2.5, and elevated ground-level ozone conditions. Within the delineated activation phases — pre-seasonal, seasonal, heat emergency, air quality emergency, and post-event — as well as throughout the year, stakeholder roles and responsibilities are detailed, ranging from planning and implementing trainings about plan operationalization to conducting welfare checks on vulnerable residents such as the aging population, children, and those experiencing homelessness or respiratory issues.

Coordinated cross-sector action is critical to successful community adaptation to rising temperatures and worsening ground-level ozone and PM2.5 conditions. As extreme heat, PM2.5, and air quality events increase in both frequency and intensity across the country, municipalities must adapt their operations to reflect the prioritization of the health and well-being of their residents, especially those most vulnerable to these co-occurring consequences of climate change, including homeless populations and communities that have been traditionally marginalized and currently face a higher level of environmental injustices.

Plan maintenance and internal and external communication strategies are among the tactics reviewed within the plan that are essential to its efficacy. This Extreme Heat and Air Quality Response Plan not only addresses actions taken to prepare for and respond to extreme heat and air quality alerts, but also reviews municipality-level climate adaptation commitments and strategies. Interventions including implementing and expanding cooling centers and increasing municipal walkability are among the many actions that [MUNICIPALITY] is committed to pursuing to foster community resilience and equity amidst the escalation of climate change.

# PURPOSE

**Example:** The purpose of [MUNICIPALITY’s] Extreme Heat and Air Quality Response Plan is to outline the actions taken by [MUNICIPALITY] to prepare for, mitigate, and respond to incidents of extreme heat and impaired air quality (high levels of ground-level ozone and/or PM2.5), which frequently co-occur and pose significant risks to the health and well-being of [MUNICIPALITY's] residents and beyond. This plan outlines the roles and actions of local agencies, community partners, nongovernmental organizations, and other identified stakeholders dedicated to preventing and mitigating morbidity and mortality from extreme heat and impaired air quality events.

With recognition that climate change is causing more intense and frequent extreme heat events and poor air quality days, the plan also identifies short- and long-term strategies that foster community resilience and climate adaptation in a changing environmental landscape. The plan is guided by the following goals:

[SAMPLE GOALS]

1. Protect the health and well-being of [MUNICIPALITY] residents
2. Identify conditions that warrant activation of the Extreme Heat and Air Quality Response Plan
3. Identify actions that can be taken year-round to mitigate poor air quality
4. Provide a framework for coordinating the efforts of municipal departments, direct service providers, and other (non-profit) partners
5. Foster community resilience to the short- and long-term effects of extreme heat and impaired air quality on [MUNICIPALITY] residents’ health and well-being
6. Ensure that all [MUNICIPALITY] residents’ health and well-being are equitably protected and prioritized

# SCOPE

**Example:** In accordance with federal, state, and local policies and procedures, this Extreme Heat and Air Quality Response Plan identifies the roles and responsibilities of [MUNICIPALITY’s] agencies, departments, and other identified (community) partners in deploying extreme heat and air quality responses during the activation phases outlined within this plan (i.e., pre-seasonal, seasonal, heat emergency, air quality emergency, and post-event), as well as steps that can be taken year-round to mitigate and address less severe but still dangerous levels of heat, ozone, and PM2.5, especially to vulnerable populations.

# BACKGROUND

1. **Articulate the relationship between temperature, ground-level ozone, and PM2.5, and why they will be addressed within the same plan**

**Example:** Heat, ground-level ozone, and PM2.5 are being addressed within the same plan because of **commonalities in their sources, occurrence, and response measures**.

* *About ground-level ozone:* Ground-level ozone is a pollutant that forms in the lower atmosphere when nitrogen oxides (NOX) and volatile organic compounds (VOCs) react in the presence of heat and sunlight. These emissions originate from sources such as gasoline- and diesel-powered cars, power plants, and industrial factories.
* *About PM2.5:* Particle pollution, or particulate matter (PM), is an air pollutant that is comprised of tiny particles suspended in the air. The smallest of these, PM2.5 (particles with diameters of 2.5 micrometers of smaller) are of greatest health concern. PM2.5 has both natural and anthropogenic sources. Natural sources include pollen and wildfire smoke, and anthropogenic sources include fossil fuel combustion and heavy industry activities.[[1]](#footnote-1) While PM2.5 levels have decreased in CT, they continue to present a danger to residents.[[2]](#footnote-2) This is especially true due to climate change and worsening wildfire smoke impacting Connecticut from fires within the state, nearby states, and as far away as Canada and the Western U.S.
* *Relationship between ground-level ozone and heat:* Given that ground-level ozone formation thrives in warm, sunny, and stagnant-air days, extreme heat events create the conditions for the acceleration of ozone production.[[3]](#footnote-3),[[4]](#footnote-4)
* *Relationship between ground-level ozone and PM2.5:* Whether emitted directly (primary PM) or formed in complex atmospheric reactions (secondary PM), PM pollution shares many of the same sources as ozone pollution.
* *Relationship between PM2.5, ground-level ozone, and heat:* There is evidence that PM2.5 levels are positively associated with higher temperatures and ozone concentrations[[5]](#footnote-5), and that heat mortality risk is heightened during days with elevated levels of ozone and PM.[[6]](#footnote-6) The wildfire season also coincides with the most dangerous heat and ozone season.

For these reasons, all three risks will be addressed in the same plan, enabling the necessary collaboration and coordination to most efficiently protect and promote [MUNICIPALITY] residents’ health and well-being.

1. **Provide a brief overview of the relationship between climate change, air quality, PM2.5 and extreme heat**

**Example:** Climate change and air quality are closely related. The primary source of air pollution is the burning of fossil fuels such as coal, oil, and natural gas, which build up in the atmosphere and release carbon dioxide (CO2) — leading to a corresponding rise in Earth’s temperature. Air pollutants of particular concern are ground-level ozone and PM2.5. Ground-level ozone (also referred to as “tropospheric ozone” and “smog”) forms when nitrogen oxides (NOX) and volatile organic compounds (VOCs) undergo a reaction due to heat and sunlight exposure. Common sources of ground-level ozone include gas- and diesel- powered vehicles and other modes of transportation, electricity production, and out-of-state emissions that cross state lines.[[7]](#footnote-7) Similarly, PM2.5 is produced through the burning of fossil fuels. Major sources include diesel powered vehicles, power plants, industrial activities, and more.[[8]](#footnote-8) Additionally, of increasing concern are the high PM2.5 levels produced during wildfire smoke events, which are increasing in frequency and severity due to climate change.

Existing research proves that global average temperature continues to rise because of the atmospheric accumulation of greenhouse gases (i.e., CO2, methane (CH4), nitrous oxide (N2O), and fluorinated gases). As temperatures increase, communities will — and do — experience hotter nights, more intense and severe heat waves, and worsened and more frequent ground-level ozone days. Wildfires are also becoming more frequent and stronger and tend to occur during the worst extreme heat and air quality season. Since 1880, the National Aeronautics and Space Administration’s (NASA) Goddard Institute for Space Studies has reported a 1.9°F rise in Earth’s average temperature as anthropogenic action continues to take a global environmental toll.[[9]](#footnote-9),[[10]](#footnote-10),[[11]](#footnote-11)

Finally, along with worsening summer extreme heat and air quality, climate change is also heightening heat and air quality risks in the spring and fall. While some of these threats may be less extreme, they can still create significant threats to vulnerable populations.

1. **Provide a brief overview of the relationship between indoor and outdoor air quality**

**Example:** Indoor air quality in Connecticut is primarily affected by pollutants such as PM2.5, carbon monoxide (CO), formaldehyde, and nitrogen dioxide (NO2). These pollutants come from both indoor sources (e.g., cooking, heating, and smoking) and from infiltration of outdoor air, especially when outdoor pollution is high. Connecticut's outdoor air quality is monitored by a statewide network of air quality monitoring stations managed by the Connecticut Department of Energy and Environmental Protection (DEEP). These stations track PM2.5, ozone, nitrogen dioxide, and other major pollutants. Average PM2.5 levels in 2023 in the Connecticut cities of Bridgeport (7.5 µg/m3) and Hartford (7.0 µg/m3) were below the National Ambient Air Quality Standard (NAAQS) of 9.0 µg/m3. However, ozone concentrations remain high in parts of Connecticut, with locations such as Stratford and Westport recording 82 ppb, exceeding the 70 ppb standard.

Both indoor and outdoor air quality are also negatively affected during winter months by wood burning. For example, woodstoveshave been tied to higher indoor levels of PM2.5 and child respiratory infections.[[12]](#footnote-12) This is especially relevant in rural communities where wood burning is more common as a primary or supplemental heat source. Different heat source types have different average emissions, with fireplaces, uncertified woodstoves, and EPA certified woodstoves having the highest average emissions.[[13]](#footnote-13)

Thus, indoor air quality is closely tied to outdoor air conditions, especially in buildings with inadequate natural ventilation or filtration systems. On high pollution days, especially when PM2.5 and ozone levels are elevated, outdoor air can seep into the indoor environment and worsen indoor air quality. Connecticut's air quality monitoring systems and community programs provide real-time data to help residents reduce exposure by staying indoors, using air purifiers, or other protective measures during times of high pollution.

1. **Present and discuss the most recently reported data on ground-level ozone, PM2.5, and extreme heat in Connecticut, [COUNTY], and [MUNICIPALITY] (if available)**

**Example:**

**Table I: The 2024** [**State of the Air Report**](https://www.lung.org/research/sota/city-rankings/states/connecticut)**: High Ozone Days in Connecticut**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| County | Score | Annual weighted average number of high ozone days | Orange Days (Unhealthy for Sensitive Groups) | Red Days (Unhealthy) |
| Fairfield | F | 17.7 | 41 | 8 |
| Hartford | C | 1.7 | 5 | 0 |
| Litchfield | C | 1.3 | 4 | 0 |
| Middlesex | F | 6.5 | 18 | 1 |
| New Haven | F | 10.8 | 28 | 3 |
| New London | F | 4.8 | 13 | 1 |
| Tolland | C | 1.0 | 3 | 0 |
| Windham | B | 0.3 | 1 | 0 |

While the annual number of days that ground-level ozone exceeded safe levels has followed a decreasing trend in all 8 Connecticut counties over the past several decades — owing to changing environmental regulations — Connecticut continues to perform poorly in relation to high ozone days across the state.Ground-level ozone poses deleterious consequences for health and well-being, including the exacerbation of preexisting respiratory conditions such as asthma and premature death — the urgency of which is conveyed by Connecticut's poor ground-level ozone ratings as reported in Table I: The 2024 State of the Air Report: High Ozone Days in Connecticut.

**Table II: The 2024** [**State of the Air Report**](https://www.lung.org/research/sota/city-rankings/states/connecticut)**: High PM2.5 Days in Connecticut**

|  |  |  |  |
| --- | --- | --- | --- |
| County | Score | Weighted Average | Orange Days(Unhealthy for Sensitive Groups) |
| Fairfield | C | 1.7 | 5 |
| Hartford | B | 0.7 | 2 |
| Litchfield | B | 0.7 | 2 |
| Middlesex | No Data | N/A | N/A |
| New Haven | C | 1.0 | 3 |
| New London | B | 0.3 | 1 |
| Tolland | No Data | N/A | N/A |
| Windham | No Data | N/A | N/A |

While Connecticut counties receive “passing” grades for weighted average PM2.5 levels, it is important to recognize the health risks from higher levels of PM2.5 exposure that people may experience due to their location (e.g., homes and workplaces located near highways and waste incinerators), housing status and occupation (e.g., poorly sealed older homes, people experiencing homelessness, and outdoor workers), and acute episodes of PM2.5 pollution from wildfires burning within the state, in neighboring states, and through long-range atmospheric transport (e.g. from Western U.S. states and Canada).

**Table III: CDC** [**Heat & Health Tracker**](https://ephtracking.cdc.gov/Applications/heatTracker/)**: 2023 Extreme Heat Days in Connecticut**

|  |  |  |
| --- | --- | --- |
| County | Days where Maximum Daily Temperature exceeded 90th Percentile | Social Vulnerability Index (SVI) Level |
| Fairfield | 20 | Low - Moderate |
| Hartford | 21 | Moderate - High |
| Litchfield | 22 | Low |
| Middlesex | 23 | Low |
| New Haven | 22 | Moderate - High |
| New London | 18 | Low - Moderate |
| Tolland | 19 | Low |
| Windham | 15 | Low - Moderate |

The elevated number of extreme heat days across the state — especially amongst counties with the highest SVI levels such as Hartford and New Haven as displayed in Table III: CDC Heat and Health Tracker: 2022 Extreme Heat Days in Connecticut — indicate the preeminence of addressing the health-related consequences of heat events, such as heat stroke and heat exhaustion.

**Sources of data on state and local extreme heat and air quality:**

**Air Quality**

|  |  |
| --- | --- |
| Data Source | Reported Values / Variables |
| [Annual State of the Air Report](https://www.lung.org/research/sota/city-rankings/states/connecticut) [American Lung Association] | [by County]* Grades applied to:
	+ Ozone (A-F)
	+ Particle pollution 24-hour (A-F)
	+ Particle pollution annual (Pass/Fail)
* Weighted average of high ozone days
* Weighted average of particle pollution-24 hour
* Design value of particle pollution - annual
* Count of groups at risk
 |
| [AirCompare](https://www3.epa.gov/aircompare/) [AirNow] | [by County]* Trends for pollutants that affect people with asthma or other lung diseases
 |
| [Air Quality Statistics Report](https://www.epa.gov/outdoor-air-quality-data/air-quality-statistics-report) [EPA] | [by CBSA or County]* CO 1-hour 2nd maximum
* CO 8-hour 2nd maximum
* NO2 98th percentile
* NO2 annual mean
* O3 l-hour 2nd maximum
* O3 8-hour 2nd maximum
* SO2 99th percentile
* SO2 24-hour 2nd maximum
* SO2 annual mean
* PM2.5 98th percentile
* PM2.5 weighted mean
* PM10 24-hour 2nd maximum
* PM10 annual mean
* Lead maximum 3-month average
 |
| [National Environmental Public Health Tracking Network](https://ephtracking.cdc.gov/DataExplorer/?c=11&i=81&m=-1) [CDC] | [State by County]* Forecasted air quality [daily]:
	+ CO
	+ NO2
	+ O3
	+ PM2.5
	+ SO2
* Historical air quality:
	+ PM2.5 annual average concentration (monitor + modeled data)
	+ PM2.5 annual average concentration (monitor only)
* National Ambient Air Quality Standards (NAAQS):
	+ O3: Number of days over air quality standard (monitor + modeled data)
	+ O3: Number of days over air quality standard (monitor only)
	+ PM2.5: Percent of days over air quality standard (monitor + modeled data)
	+ PM2.5: Percent of days over air quality standard (monitor only)
 |
| [State AQI](https://www.airnow.gov/state/?name=connecticut) [AirNow] | [State by Town]* Current air quality:
	+ Current
	+ Today
	+ Tomorrow
* Historical air quality [by day]
 |

**Extreme Heat**

|  |  |
| --- | --- |
| Data Source | Reported Values / Variables |
| [Climate Change Vulnerability Index: Heat Viewer](https://connecticut.maps.arcgis.com/apps/webappviewer/index.html?id=e0de6c1d51234f899e4e1599bbc41701) [CIRCA & UCONN] | [by Town]* Heat sensitivity
* Heat exposure
* Heat adaptive capacity
 |
| [Climate Prediction Center Probabilistic Extremes Forecast](https://www.cpc.ncep.noaa.gov/products/predictions/threats/extremesTool.php) [NOAA] | [by State]Model guidance tool that applies statistical adjustments to raw Global Ensemble Forecast System (GEFS) model forecasts |
| [Extreme Heat Vulnerability Mapping Tool](https://geoxc-apps2.bd.esri.com/Climate/HeatVulnerability/index.html) [NOAA and CDC] | [by County]Overlay NOAA projected heat events and CDC's Social Vulnerability Index (SVI)  |
| [Heat & Health Tracker](https://ephtracking.cdc.gov/Applications/heatTracker/) [CDC] | [by Zip Code or County]* Today’s *HeatRisk*
* Recommendations based on today’s *HeatRisk*
* *HeatRisk* Forecast for next 6 days (for county)
* Today’s “feels like” temperature (for county)
* Days of extreme heat forecasted for the month
* Social Vulnerability index (of county)
* Daily maximum apparent temperature for current season compared to historical average (1979-2020)
* Annual number of days with a daily maximum temperature above the 95th percentile between 1979–2019
* Current temperatures
* Rate of emergency department (ED) visits associated with heat-related illness by week and by day
* Expected number of days in the next month at or above a dangerous level of heat based on climatological norms
* Change in number of days above 90°F anticipated in the time periods 2016–2045, 2036–2065, and 2070–2099, compared to the historical period of 1976–2005, based on a low emissions scenario (RCP4.5)
* Heat Health Index Data Explorer, including:
	+ Overall Heat and Health Index Rank
	+ Historical Heat and Health Burden Percentile Rank
	+ Natural & Built Environment Percentile Rank
	+ Sensitivity Percentile Rank
	+ Sociodemographic Percentile Rank
* Population Characteristics and comparison to National Median:
	+ Percentage of population that is a minority
	+ Percentage of population without health insurance
	+ Percentage of population with limited English-speaking ability
	+ Percentage of population living in poverty
	+ Population age breakdown
 |
| [LIHEAP and Extreme Heat](https://liheap-and-extreme-heat-hhs-acf.hub.arcgis.com/) [HHS] | [by State]* Data visualizations on extreme heat days over time (1979-2019)
* Extreme heat-related deaths, hospitalizations, and emergency room visits (by year)
* Impact LIHEAP has on reducing energy burden
 |
| [National Environmental Public Health Tracking Network](https://ephtracking.cdc.gov/DataExplorer/?c=11&i=81&m=-1) [CDC] | [State by County]* Emergency department visits for HRI:
	+ Age-adjusted rate of emergency department visits for HRI per 100,000 population
	+ Annual number of emergency department visits for HRI
	+ Crude rate of emergency department visits for HRI per 100,000 population
* Historical temperature and heat index:
	+ Annual number of extreme heat days from May to September
	+ Annual number of extreme heat events from May to September
	+ Daily maximum heat index from May to September
	+ Daily maximum temperature from May to September
	+ Weekly average maximum temperature
* Hospitalizations for HRI:
	+ Age-adjusted rate of hospitalizations for HRI per 100,000 population
	+ Annual number of hospitalizations for HRI
	+ Crude rate of hospitalizations for HRI per 100,000 population
* Mortality from HRI:
	+ Annual average number of heat-related deaths over a 5-year period
	+ Annual number of heat-related deaths
* Projected temperature and heat:
	+ Climate Prediction Center (CPC) monthly temperature forecast category
	+ Monthly projected average heat wave count
	+ Monthly projected average heat wave duration
	+ Monthly projected average heat wave intensity
	+ Monthly projected maximum minimum (nightly) temperature during a heat wave
	+ Monthly projected maximum temperature during a heat wave
	+ Monthly projected number of heat exceedance days
	+ Projected differences in extreme heat nights as compared to the historical period
	+ Projected differences in extreme heat days as compared to the historical period
* Vulnerability and preparedness: Heat:
	+ Age-adjusted rate of hospitalizations for heart attack among people ≥35 years of age per 10,000 population
	+ Annual median household income
	+ Annual number of people living in poverty
	+ Number of hospital beds
	+ Number of hospital beds per 10,000 population
	+ Number of hospitals
	+ Number of hospitals per 100,000 population
	+ Percent of land covered by forest
	+ Percent of land used for development
	+ Percent of population ≥65 years of age living along in a non-family household
	+ Percent of population living in poverty
	+ Percent of population of a race other than white
	+ Rate of hospitalization for heart disease among Medicare beneficiaries ≥65 years of age
 |
| [National Risk Index](https://hazards.fema.gov/nri/map) [FEMA] | [by County or Census Tract]Online mapping application that identifies communities most at risk to 18 natural hazards* Visualizes natural hazard risk metrics and includes data about expected annual losses from natural hazards, social vulnerability and community resilience
 |
| [State Climate Summaries 2022](https://statesummaries.ncics.org/chapter/ct/) [NOAA National Centers for Environmental Information] | [State-level]* Observed and projected temperature change, 1900-2100
* Observed number of hot days, 1900-2014
* Observed number of warm nights, 1900-2014
 |

1. **Detail groups that are vulnerable to the effects of ground-level ozone, PM2.5, and extreme heat exposure**

**Example:** Populations most at risk for the adverse effects of ground-level ozone and PM2.5 exposure include children and teenagers, older adults (i.e., 65+ years of age), people with pre-existing medical conditions (e.g., lung or heart disease, including asthma, chronic obstructive pulmonary disease, and lung cancer), people of color, low-income communities, people experiencing homelessness, and pregnant people and their newborns.[[14]](#footnote-14) Similarly, those most vulnerable to the effects of extreme heat include older adults, low-income communities, pregnant people, and children in addition to outdoor workers, urban residents, and people experiencing homelessness or those who are underhoused.[[15]](#footnote-15),[[16]](#footnote-16) These vulnerabilities frequently intersect—for example, the 2024 point-in-time count of people experiencing homelessness in Connecticut showed not only worsening homelessness for the third year in a row (3,410 people in January 2024, a 32% increase since January 2021), but also that nearly 20% are children under 18 and 68% are people of color.[[17]](#footnote-17)

It is critical to ensure that the Extreme Heat and Air Quality Response Plan equitably addresses the health and well-being of the aforementioned groups, given their disproportionate exposure and vulnerability to the adverse effects of extreme heat and air pollution.

For more information on climate vulnerable communities and levels of vulnerability in Connecticut, refer to:

* **Table IV: Social Vulnerability Index (SVI) Levels in Connecticut.** SVI is an indicator constructed by the CDC based on 15 variables from the U.S. Census that reflects a given community’s vulnerability to climate-related disasters. This figure provides insight into the vulnerability of all 9 Connecticut planning regions to extreme weather conditions and events, including heat and ground-level ozone exposure.
* **The** [**Connecticut Environmental Justice Mapping Tool**](https://connecticut.maps.arcgis.com/apps/webappviewer/index.html?id=5adac07c27db40bbabc193af58634e5a)**.** Connecticut Environmental Justice Mapping Tool is a Geographic Information Systems (GIS) mapping tool for identifying communities with disproportionate potential impacts of pollution on vulnerable populations who are impacted by chronic health conditions and social stressors. The tool was developed by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) in partnership with and funded by the CT Department of Energy and Environmental Protection.

**Table IV:** [**Social Vulnerability Index**](https://www.atsdr.cdc.gov/place-health/php/svi/svi-interactive-map.html) **(SVI) Levels in Connecticut**

|  |  |  |
| --- | --- | --- |
| **Planning Region\*** | **SVI Score\*\*** | **SVI Level** |
| Capitol  | 0.625 | Medium - High |
| Greater Bridgeport | 1 | High |
| Lower Connecticut River Valley | 0 | Low |
| Naugatuck Valley | 0.75 | High |
| Northeastern Connecticut | 0.25 | Low - Medium |
| Northwest Hills | 0.125 | Low |
| South Central Connecticut | 1 | High |
| Southeastern Connecticut | 0.5 | Medium - High |
| Western Connecticut | 0.375 | Low - Medium |

\* In 2022 the U.S. Census Bureau adopted Connecticut’s nine planning regions as county-equivalent geographic units for purposes of collecting, tabulating, and disseminating statistical data, replacing the eight counties which ceased to function as governmental and administrative entities in 1960. (Source: <https://www.federalregister.gov/documents/2022/06/06/2022-12063/change-to-county-equivalents-in-the-state-of-connecticut>)

\*\* Possible scores range from 0 (lowest vulnerability) to 1 (highest vulnerability)

# ASSUMPTIONS

**Articulate central considerations of the Extreme Heat and Air Quality Response Plan.**

**Examples:**

**Community Considerations:** This Extreme Heat and Air Quality Response Plan centralizes the needs and experiences of the [MUNICIPALITY] community, equitably prioritizing residents’ health and well-being and leveraging community partnerships in the process.

**Implications of Climate Change:** This Extreme Heat and Air Quality Response Plan acknowledges the legitimacy and severity of the global threats posed by climate change. For the purposes of this plan, a specific focus is placed upon the risks posed by rising temperatures and worsening PM2.5 and ground-level ozone conditions to Connecticut residents.

**Roles and Responsibilities of Stakeholders:** Stakeholders identified within this Extreme Heat and Air Quality Response Plan will play an active role in supporting [MUNICIPALITY] and the broader State of Connecticut in adapting and responding to extreme heat, PM2.5 and ground-level ozone pollution.

# GENERAL STAKEHOLDER ROLES & RESPONSIBILITIES

## Federal Government

**Example:** The National Weather Service (NWS) and State of Connecticut — through the Division of Emergency Management and Homeland Security (DEMHS) — track the weather and notify municipalities of harmful weather conditions as warranted, triggering state and local action accordingly. See Figure I: NWS Oversight in Connecticut to see the locales charged with dictating heat conditions and terminology in Connecticut.

**Figure I: NWS Oversight in Connecticut**



The Environmental Protection Agency (EPA)’s Air Quality Index (AQI) serves as the primary resource for discerning levels of different air pollutants (i.e., ground-level ozone (O3), particle pollution (PM2.5 and PM10), carbon monoxide (CO), sulfur dioxide (SO2), and nitrogen dioxide (NO2)) and their corresponding health implications. As the values of index increase, so do levels of concern and the breadth and severity of adverse health complications associated with pollutant exposure. See Figure II: AQI Basics for Ozone and Particle Pollution sourced from [AirNow](https://www.airnow.gov/aqi/aqi-basics/).gov for details on the different AQI levels.

**Figure II: AQI Basics for Ozone and Particle Pollution**



## State Government

**Example:** As outlined within DEMHS’ [Extreme Hot Weather Protocol](https://portal.ct.gov/demhs/emergency-management/resources-for-individuals/summer-weather-awareness/extreme-hot-weather-protocol), DEMHS routinely monitors weather conditions, and whenever a heat wave (i.e., three consecutive days with temperatures above 90℉) is projected, state agencies such as the Governor’s office are contacted. Following this notification, DEMHS will initiate actions that may include the following:

* Issue notices to towns throughout the state
* Create and monitor WebEOC incident with requests that towns submit information regarding cooling center operations
* Deploy social media alerts
* Contact 211 to streamline information provided to the community about cooling center availability and operations

## Local Government

**Example:** [MUNICIPALITY] will serve as the primary initiator and coordinator of the Extreme Heat and Air Quality Response Plan.

## Community-based / Local Services & Non-governmental Organizations

**Example:** Identified community-based organizations (CBOs) and non-governmental organizations (NGOs) will play a critical role in supporting service provision and plan operationalization based on [MUNICIPALITY] guidance.

# ACTIVATION PHASES & ACTIVITIES+

**List of potential stakeholders to charge as responsible for tasks / serve as additional resources in the activation phases and activities detailed below:**

State Government, Departments & Agencies:

* Connecticut Department of Economic and Community Development
* Connecticut Department of Energy and Environmental Protection
* Connecticut Department of Transportation
* Connecticut State Connecticut Office of Early Childhood
* Connecticut State Council on Developmental Disabilities
* Connecticut State Council on Environmental Quality
* Connecticut State Department of Aging and Disability Services
* Connecticut State Department of Children and Families
* Connecticut State Department of Education
* Connecticut State Department of Emergency Services and Public Protection
* Connecticut State Department of Housing
* Connecticut State Department of Mental Health and Addiction Services
* Connecticut State Department of Motor Vehicles
* Connecticut State Department of Public Health
* Connecticut State Department of Social Services
* Connecticut State Division of Emergency Management and Homeland Security
* Connecticut State Emergency Response Commission
* Connecticut State Office of Health Strategy
* Connecticut State Office of the Healthcare Advocate
* Office of Governmental Accountability, Office of the Child Advocate
* State of Connecticut Department of Developmental Services
* State of Connecticut Office of Policy and Management

Local Government, Departments & Agencies:

* Equity Office
* Fire Department
* Health Department
* Housing Authority
* Human Resources/Services
* Mayor’s Office
* Office of Emergency Management
* Parks & Recreation
* Police Department
* Public Works
* Social Services
* Transit Department
* Sustainability Office (where applicable)
* Public schools/Local Boards of Education

Community-based / Local Services & Non-governmental Organizations:

* 2-1-1 Connecticut
* Community entities (e.g., places of worship, community centers, local organizations)
* Direct service organizations (e.g., food, shelter, clothing, housing)
* Emergency and routine medical services
* Public libraries
* Red Cross
* The Salvation Army
* Senior centers

*+Tasks and Responsible Stakeholders are based on those articulated in existing response plans and mapped to offices in municipalities in Connecticut (i.e., New Haven, Stamford) and as a result, may not reflect offices in all Connecticut municipalities. Please use the tasks, agencies, and entities listed above and in the tables below as a guiding resource to aid in determining the activities and responsibilities of adjacent agencies and departments in each municipality.*

## Pre-seasonal

**Outline preparatory work that will take place in the colder months, intensifying around March and April to prepare for heat season, elevated ground-level ozone conditions, and elevated PM2.5 conditions including wildfire smoke episodes.**

**Example:**

|  |  |  |  |
| --- | --- | --- | --- |
| Task | Office of Emergency Management | Health Department | Mayor’s Office |
| Annual review and revision of Extreme Heat and Air Quality Response Plan  | X |  |  |
| Determine activation criteria for emergency measures of the Extreme Heat and Air Quality Response Plan | X |  | X |
| Determine agency primarily responsible for activating and coordinating Extreme Heat and Air Quality Response Plan | X |  |  |
| Develop relationship with NWS offices (e.g., Albany, Boston, New York City) to ensure successful notification of upcoming heat, PM2.5, and ground-level ozone events |  |  | X |
| Review stakeholders and partners, especially community based, local service, and non-governmental organizations who have strong community ties and will be helpful to work with | X | X | X |
| Engage in proactive dialogue with partners to ensure preparation for seasonal and emergency response efforts | X | X | X |
| Finalize list of community resources offered during heat, PM2.5, and ground-level ozone events, including types of services and locations in which they will be offered | X |  | X |
| Ongoing review and revision of preventive and emergency response protocol, such as cooling center coordination and air pollutant emission suppression efforts | X |  | X |
| Plan and implement trainings surrounding plan operationalization | X | X | X |
| Prepare public communication materials on extreme heat, PM2.5, and ground-level ozone events, including, but not limited to, press release templates, newsletters, and social media campaigns and alerts | X | X | X |
| Assess the plan for equity and ensure that all communities have equitable access to information and services, including cooling centers | X |  | X |
| Work with partners to receive feedback from stakeholders, partners, and the public to incorporate additional community-responsive actions into the plan | X |  | X |
| Assess outreach materials for language accessibility based on the most spoken languages in [MUNICIPALITY] |  |  | X |

## Seasonal

**Outline actions taken during the season of primary heat extremes and poorest ground-level ozone and PM2.5 conditions (i.e., June - September)**

**Example:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task | Office of Emergency Management | Health Department | Mayor’s Office | Other |
| Activate Extreme Heat and Air Quality Response Plan as necessary based on predetermined, localized criteria | X |  | X |  |
| Finalize and disseminate public communication materials on extreme heat, PM2.5, and ground-level ozone events, including, but not limited to, press releases, public announcements of projected temperatures, PM2.5, and ground-level ozone conditions, and social media messaging | X | X | X | Work with local CBOs, NGOs, Direct service organizations, and others to further disseminate information via social media and other channels, especially targeting vulnerable populations |
| Maintain situational awareness and proactivity to ensure timely and efficient response to heat, PM2.5, and ground-level ozone events | X | X | X |  |
| Remain in frequent and transparent communication with local entities providing direct services to the community and what residents can do to stay safe | X | X | X | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Direct service organizations (e.g., food, water, shelter, welfare checks) |

## Heat Emergency

**Outline actions taken immediately before and during a heat emergency++**

**Example:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task | Office of Emergency Management | Health Department | Mayor’s Office | Other |
| Activate community cooling resources (e.g., cooling centers, pools, splash pads) and notify the city of any closures or other operational changes | X |  | X | 211 ConnecticutPlaces of worship, senior centers, and other community centersCommunity Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Parks & Public WorksPublic libraries |
| Boost public communication materials on safety and protective measures during periods of extreme heat | X | X | X | Public libraries; police, fire, and EMS; parks & public works; public schools; CBOs, NGOs, and Direct service organizations |
| Coordinate sheltering and additional services (e.g., food, water, shelter hotline) for houseless and underhoused community members |  | X | X | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Local shelters (e.g., Columbus House and Martha’s Place in New Haven, Pacific House in Stamford)Social ServicesLocal organizations serving underhoused populations and those experiencing homelessness  |
| Coordinate and verify direct service and other stakeholder response efforts, including service availability and staffing | X | X | X | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Social Services |
| Deploy neighborhood and welfare checks for vulnerable communities (e.g., pregnant people, children, individuals 65+ years of age, those experiencing homelessness, respiratory issues, or serious mental illness) |  | X |  | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Department on AgingDisability ServicesLocal aging and disability advocacy organizations (e.g., Agency on Aging of South Central Connecticut, Silver Source)Social ServicesPublic Libraries |
| Deploy public communication efforts in the most common languages articulating resources offered to the community (e.g., cooling centers, pools, splash pads) | X | X | X | CBOs, NGOs, and Direct service organizations |
| Explore the potential medical impacts of projected heat event and issue public communication efforts accordingly |  | X |  | Medical providers |
| Host press conference(s) and update municipal website to keep public and stakeholders informed of conditions and community response efforts | X |  | X |  |
| Identify and provide eligible residents with box fans and gas and electric bill support during extreme heat events | X |  | X | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Social Services |
| Identify and provide emergency medical services associated with extreme heat exposure |  | X |  | Medical providers  |
| Implement transportation plans to ensure service accessibility and heat respite and work with local CBOs, NGOs, and direct service organizations to identify any populations who are not able to access transportation |  |  | X | Transportation, Traffic, and ParkingLocal partnersCBOs, NGOs, and Direct service organizations |
| Municipality-wide notification of heat emergency / response | X |  | X |  |
| Remain in daily contact with stakeholders as event progresses | X | X | X |  |
| Send and field requests for mutual aid and state assistance |  |  | X | Work with CBOs, NGOs, and Direct service organizations who may be more directly in contact with residents |
| Track hospital admissions and overall medical impact of heat-related illnesses |  | X |  | Medical providers  |

++Connecticut NWS service areas (i.e., Albany, Boston, and New York City) vary slightly with regards to heat event definitions and criteria. Existing heat response plans across the U.S. reflect this sentiment, with variances in their articulation of preparedness and response activities based on different levels of heat emergency (e.g., heat warning vs. heat advisory, etc). This finding iterates a flexibility in the types of responses detailed during heat emergencies, whether that be broadly (i.e., for all extreme heat events) or by type (i.e., severity) of heat emergency.

## Air Quality Emergency

**Outline actions taken during periods of heightened PM2.5 and ground-level ozone values (i.e., Orange (Unhealthy for Sensitive Groups) - Maroon (Hazardous))**

**Example:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task | Office of Emergency Management | Health Department | Mayor’s Office | Other |
| Boost public communication materials on safety and protective measures during periods of elevated ground-level ozone values and/or heightened PM2.5 |  | X | X | CBOs, NGOs, and Direct service organizations |
| Coordinate sheltering and additional services (e.g., food, water, shelter hotline) for houseless and underhoused community members |  | X | X | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Local shelters (e.g., Columbus House and Martha’s Place in New Haven, Pacific House in Stamford)Social ServicesLocal organizations serving underhoused populations and those experiencing homelessness |
| Deploy neighborhood and welfare checks for vulnerable communities (e.g., pregnant people, children, individuals 65+ years of age, those experiencing homelessness, respiratory issues, or serious mental illness) |  | X | X | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Department on AgingDisability ServicesSocial Services |
| Explore the potential medical impacts of projected air quality event and issue public communication efforts accordingly |  | X |  | Medical providers |
| Host press conference(s) and update municipal website to keep public and stakeholders informed of conditions and community response efforts | X |  | X |  |
| Identify and provide emergency medical services associated with ground-level ozone exposure and/or heightened PM2.5 |  | X |  | Medical providers  |
| Municipality-wide notification of AQI level and embed AQI information on municipal website | X |  | X |  |
| Remain in daily contact with stakeholders as the event progresses | X | X | X |  |
| Send and field requests for mutual aid and state assistance |  |  | X | Work with CBOs, NGOs, and Direct service organizations who may be more directly in contact with residents |
| Track hospital admissions for respiratory symptoms and conditions |  | X |  | Medical providers |
| Provide personal protective equipment (PPE), especially N95 masks, to vulnerable communities, especially those with pre-existing health conditions | X | X |  | Medical Providers Local organizations working with those who are most vulnerable |

## Post-event

**Outline actions taken after a heat and / or air quality emergency has concluded**

**Example:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task | Office of Emergency Management | Health Department | Mayor’s Office | Other |
| Conduct stakeholder follow-up and internal performance review | X | X | X |  |
| Continued welfare and neighborhood checks |  | X |  | Community Services Administration (i.e., department or office dedicated to addressing residential health and social well-being)Department on AgingDisability ServicesLocal aging and disability advocacy and support centers (e.g., Agency on Aging of South Central Connecticut, Silver Source)Social Services |
| Engage communities, and CBOs in experiential review of services provided and communication efforts pursued before, during, and after the event(s) to guide emergency response revision as necessary | X | X | X |  |

# PLAN MAINTENANCE

[LOCAL DEPARTMENT (e.g., Health Department or Office of Emergency Management)] will be charged with reviewing and updating the Extreme Heat and Air Quality Response Plan on an annual basis. Said revision process will be accomplished in the following ways:

[SAMPLE STRATEGIES]

* Gather stakeholder and community feedback through town meetings, surveys, interviews, conversations with direct service organizations, CBOs, etc.
* Conduct internal review of all stakeholders identified within the plan and their assigned responsibilities and activities
* Evaluate resources offered to the community during extreme heat and poor air quality events to reform service provision as necessary to optimize accessibility and efficiency
* Identify additional resources needed from the state or federal government to be better prepared for and respond to future extreme heat and air quality events

# CLIMATE CHANGE RESILIENCE

## Short-term

**Outline short-term actions taken by stakeholders to promote and protect [MUNICIPALITY] residents’ health and well-being and environmental resilience**

**Example:**

|  |  |  |
| --- | --- | --- |
| Intervention | Description | Examples & Guidance+++ |
| Comprehensive heat emergency response planning | Develop a comprehensive heat response plan [such as this plan] that includes both individual and structural climate adaptation strategies  | [BC Centre for Disease Control: Developing a Municipal Heat Response Plan: A Guide for Medium-sized Municipalities](http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Health-Environment/Developing%20a%20municipal%20heat%20response%20plan.pdf)[CDC: Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation](https://www.cdc.gov/climateandhealth/docs/HeatResponsePlans_508.pdf)[EPA: Excessive Heat Events Guidebook](https://www.epa.gov/sites/default/files/2016-03/documents/eheguide_final.pdf)[WHO: Heat-Health Action Plans Guidance](https://www.who.int/publications/i/item/9789289071918)[HEAT.gov](https://www.heat.gov/)[White House: Planning Tools for Combatting Extreme Heat](https://www.whitehouse.gov/cleanenergy/clean-energy-updates/2023/04/12/planning-tools-for-combatting-extreme-heat/) |
| Conduct neighborhood outreach and welfare checks on vulnerable communities | During periods of extreme heat and poor PM2.5 and ground-level ozone conditions for sensitive groups (and beyond), conduct virtual and in-person neighborhood outreach and welfare checks on vulnerable communities (e.g., aging population, children, individuals with pre-existing respiratory conditions, those experiencing homelessness, etc.) | [Butte County Sheriff’s Office STARS Unit: Wellness Check Program](https://www.buttecounty.net/Portals/24/Brochures/Stars%20Wellness%20checks%20brochure.pdf)[Maryland.gov: Senior Call Check Program](https://aging.maryland.gov/pages/senior-call-check.aspx)[Solano County, CA: A Script for Conducting Well Checks on Older Adults and those Living with Disabilities](https://www.solanocounty.com/civicax/filebank/blobdload.aspx?BlobID=32180) |
| Enact consistent weather forecasting and monitoring | Ensure city officials warn planning agencies and citizens of heat waves and elevated ground-level ozone conditions in a timely manner | [EPA: Meteorological Monitoring Guidance for Regulatory Modeling Applications](https://www.epa.gov/sites/default/files/2020-10/documents/mmgrma_0.pdf)[NOAA: The Challenges and Complexities of Weather Forecasting, by Mark Bloomer](https://www.weather.gov/car/weatherforecasting)[WMO: Innovations and New Technology for Improved Weather Services](https://public.wmo.int/en/bulletin/innovations-and-new-technology-improved-weather-services)[FEMA: FEMA’s Hazard Mitigation Assistance (HMA) programs help local governments plan and implement strategies for mitigating risks associated with heat waves and poor air quality.](https://www.fema.gov/grants/mitigation)  |
| Ensure proper functioning of water systems | Confirm that water systems are fully functioning and in a conservative and environmentally conscious fashion (e.g., expand the use of recycled water, establish retrofit programs, enact outdoor watering ordinances), especially during the summer season when droughts are more likely to occur, worsening the impacts of heat waves | [DOD: Industrial, Landscaping, and Agriculture Water Use Guidance](https://www.acq.osd.mil/eie/Downloads/IE/ILA%20Water%20Guidance_4%20Dec%202015.pdf)[Energy.gov: Planning for Home Renewable Energy Systems](https://www.energy.gov/energysaver/planning-home-renewable-energy-systems)[EPA: Energy Efficiency for Water Utilities](https://www.epa.gov/sustainable-water-infrastructure/energy-efficiency-water-utilities)[Texas Living Waters Project: Common-sense measures that would help municipalities conserve water](https://texaslivingwaters.org/water-conservation/common-sense-measures-that-would-help-municipalities-conserve-water/) |
| Establish hotlines that provide (vulnerable) residents with the ability to communicate needs and concerns to public health officials | Ensure hotlines are promoted and accessible to individuals most vulnerable to the adverse effects of heat, PM2.5, and ozone exposure to ensure service accessibility and support | [DialMyCalls: How to Set Up an Emergency Hotline](https://www.dialmycalls.com/emergency-notification/emergency-hotline)[SAMHSA: Disaster Distress Helpline](https://www.samhsa.gov/find-help/disaster-distress-helpline)[WHO: Setup and management of COVID-19 hotlines](https://cities4health.org/assets/library-assets/who-euro-2020-1206-40956-55530-eng.pdf) |
| Expand canopy and vegetative cover, prioritizing neighborhoods prone to the Urban Heat Island effect | Enhance the presence of greenery (i.e., plants, trees, shrubs, etc) | [ICLEI - Local Governments for Sustainability: Talking Trees: An Urban Forestry Toolkit for Local Governments](https://www.milliontreesnyc.org/downloads/pdf/talking_trees_urban_forestry_toolkit.pdf)[IADB: Good Practices for Urban Greening](https://publications.iadb.org/publications/english/document/Good-Practices-for-Urban-Greening.pdf)[USDA: Urban Tree Canopy Assessment: A Community’s Path to Understanding and Managing the Urban Forest](https://www.fs.usda.gov/sites/default/files/fs_media/fs_document/Urban%20Tree%20Canopy%20paper.pdf)[Tree Equity Score: Interactive Map](https://www.treeequityscore.org/map#2.99/37.22/-98.75)[Google Environmental Insight Explorer: Tree Canopy](https://insights.sustainability.google/) |
| Implement energy conservation initiatives  | Encourage energy conservation to reduce electricity system demand and usage within municipal government buildings, and encourage residents and businesses to take advantage of federal and state electrification funding | [Energy Star: Checklists of Energy-Saving Measures](https://www.energystar.gov/buildings/save_energy_commercial_buildings/ways_save/checklists)[EPA: National Action Plan for Energy Efficiency](https://www.epa.gov/energy/national-action-plan-energy-efficiency)[IEA: Accelerating energy efficiency: What governments can do now to deliver energy savings](https://www.iea.org/commentaries/accelerating-energy-efficiency-what-governments-can-do-now-to-deliver-energy-savings)[Sustainable CT: Support for your town](https://sustainablect.org/)[CT Green Bank: Community Solutions](https://www.ctgreenbank.com/community-solutions/)[Energize CT; Resources for Local Government](https://energizect.com/resources-for/local-government) |
| Implement and expand cooling centers and have proper signage for each cooling center for public communication use.  | Ensure equitable access to public spaces where air conditioning and respite from extreme heat and poor air quality is available (i.e., public libraries, senior centers, etc) | [CDC: COVID-19 and Cooling Centers](https://www.cdc.gov/coronavirus/2019-ncov/php/cooling-center.html)[CDC: The Use of Cooling Centers to Prevent Heat-Related Illness: Summary of Evidence and Strategies for Implementation](https://www.cdc.gov/climateandhealth/docs/UseOfCoolingCenters.pdf)[Cuyahoga County, OH: Warming and Cooling Centers Operations Guide](https://ready.cuyahogacounty.us/pdf_ready/en-US/COAD/WarmingCoolingCenterOperationsGuide.pdf) |
| Include heat, PM2.5 and ozone vulnerable communities in participatory visioning processes  | Engage the community in preparedness, action, and response efforts to extreme heat and poor PM2.5 and ground-level ozone conditions to ensure equitable access to and maximum efficacy of services | [Agenda for International Development: Engaging local communities for climate change adaptation](https://www.a-id.org/wp-content/uploads/2018/12/aid-commentary-omukuti-201218.pdf)[Department of Planning and Community Development, Victorian Government: Community Engagement and Climate Change: Benefits, Challenges, and Strategies](https://silo.tips/download/community-engagement-and-climate-change-benefits-challenges-and-strategies)[Federal Reserve Bank of San Francisco: Promoting Equitable Climate Adaptation through Community Engagement](https://www.frbsf.org/community-development/publications/community-development-investment-review/2019/october/promoting-equitable-climate-adaptation-through-community-engagement/) |
| Raise awareness of ways to effectively prepare for extreme heat, PM2.5, and ground-level ozone exposure | Engage in public (risk) communication efforts regarding how to best prepare for, respond to, and recover from extreme heat, PM2.5, and ground-level ozone exposure and events | [AQMD: Public Awareness and Education: Suggested Goal, Objectives, and Policies/Strategies](http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/chapter-7---public-awareness-and-education.pdf)[Green Apple Day of Service: Raise Awareness of Outdoor Air Risks](https://greenapple.org/raise-awareness-outdoor-air-risks)[Ready.gov: Extreme Heat](https://www.ready.gov/heat)[Red Cross: Heat Wave Safety](https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/heat-wave-safety.html)[NOAA: NOAA works with local governments to integrate heat forecasts into public communication systems, ensuring timely alerts are issued when dangerous heat conditions are expected](https://www.noaa.gov/media-advisory/extreme-heat-media-resource-guide) |
| Provide education and assistance to improve indoor air quality | Engage in public education around what residents, including homeowners, renters, and landlords, can do to improve indoor air quality. | [EPA: EPA provides resources for homeowners, tenants, and building managers to address common indoor air quality problems](https://www.epa.gov/indoor-air-quality-iaq)[CDC: CDC provides resources for state and local health departments, schools, and healthcare providers to educate the public on how to improve indoor environments.](https://www.cdc.gov/niosh/ventilation/guidelines/index.html)[HUD: HUD’s Healthy Homes Program provides funding and technical assistance to local governments, housing authorities, and non-profit organizations to improve indoor air quality in low-income housing.](https://www.hud.gov/program_offices/healthy_homes/hhi)[American Lung Association: The American Lung Association works to improve indoor air quality through public education campaigns that focus on reducing exposure to air pollutants like smoke, mold, and allergens.](https://www.lung.org/clean-air/indoor-air) |

## Long-term

**Outline long-term actions taken by stakeholders to promote and protect [MUNICIPALITY] residents’ health and well-being and environmental resilience**

**Example:**

|  |  |  |
| --- | --- | --- |
| Intervention | Description | Examples & Guidance\*\*\* |
| Engage in traffic flow reform efforts to reduce vehicle emissions and engine idling | Invest in municipality-wide efforts to create and manage new and existing roadways to reduce traffic and engine idling, particularly in times of elevated travel. | [EPA: Smart Growth and Transportation](https://www.epa.gov/smartgrowth/smart-growth-and-transportation)[ITDP: Building Momentum: Reform Parking, Reduce Traffic](https://www.itdp.org/event/building-momentum-reform-parking-reduce-traffic/)[UN: Sustainable Transport, Sustainable Development](https://sdgs.un.org/sites/default/files/2021-10/Transportation%20Report%202021_FullReport_Digital.pdf)[FHWA: The CMAQ program funds transportation projects that aims to improve air quality and reduce congestion](https://www.fhwa.dot.gov/environMent/air_quality/cmaq/reference/funding_process.cfm) |
| Improve bicycle infrastructure and city walkability | Invest in bicycle infrastructure and city walkability, which can reduce vehicle emissions and consequent pollution, improve mental health, and stimulate physical activity. | [ChangeLabSolutions: Move This Way: Making Neighborhoods More Walkable and More Bikeable](https://www.changelabsolutions.org/sites/default/files/MoveThisWay_FINAL-20130905.pdf)[Forbes:](https://www.forbes.com/sites/forbestechcouncil/2022/06/16/not-all-public-transportation-systems-are-sustainable-heres-how-they-can-be/?sh=2a030ec74746)[Not All Public Transportation Systems Are Sustainable—Here’s How They Can Be](https://www.forbes.com/sites/forbestechcouncil/2022/06/16/not-all-public-transportation-systems-are-sustainable-heres-how-they-can-be/?sh=2a030ec74746)[HHS: Transit Benefit Program Management](https://www.hhs.gov/about/agencies/asa/psc/transportation-services/transit-benefit-program-management/index.html#:~:text=PSC's%20Transit%20Benefit%20Program%20offers,a%20qualified%20means%20of%20transportation.)[HUD: Creating Walkable & Bikeable Communities](https://www.huduser.gov/portal/sites/default/files/pdf/Creating-Walkable-Bikeable-Communities.pdf)[Portland State University & Atla Planning + Design: Creating Walkable and Bikeable Communities: A user guide to developing pedestrian and bicycle master plans](https://ppms.trec.pdx.edu/media/project_files/IBPI%20Master%20Plan%20Handbook%20FINAL.pdf)[UITP: Advancing Public Transport: How to make public transport accessible and inclusive for all](https://www.uitp.org/news/how-to-make-public-transport-accessible-and-inclusive-for-all/) |
| Invest in sustainable public transportation  | To reduce traffic flow and vehicle usage, engage in reform efforts to improve the presence and accessibility of public transportation as well as incentivize public transportation usage through efforts such as commuter benefits programs. |
| Invest in structural renovation and construction using green materials (e.g., green / cool roofs, pavements), prioritizing communities experiencing the Urban Heat Island effect | Green Roofs (i.e., rooftop garden): layers include structural support (base), vapor barrier, thermal insulation, root barrier, drainage layer, filter membrane, growing medium, and vegetation (top)[[18]](#footnote-18)Cool Roofs: comprised of highly reflective and emissive materials (i.e., white or reflective colored surfaces)[[19]](#footnote-19)Cool Pavements: permeable and reflective pavement materials and coatings such as light-colored cement and porous asphalt19 | [EPA: Green Infrastructure Design and Implementation](https://www.epa.gov/green-infrastructure/green-infrastructure-design-and-implementation)[HUD: Green Infrastructure and the Sustainable Communities Initiative](https://www.hud.gov/sites/documents/GREENINFRASTRUCTSCI.PDF)[USAID: Green Infrastructure Resource Guide](https://pdf.usaid.gov/pdf_docs/PA00TDBD.pdf)CRRC: offers specifications and performance ratings for cool roofing materials  |
| Pass and sign into law more extreme heat and air quality bills that reflect climate change adaptation needs  | Create, advocate for, and support laws that reflect climate adaptation and mitigation priorities such as those articulated in federal and state laws and regulations such as:* [California Code of Regulations, Title 8, §3395](https://www.dir.ca.gov/title8/3395.html): outlines protective measures against heat-related illness among outdoor workers
* [City of Phoenix (Ordinance G-6008)](https://211arizona.org/crisis/heat-relief/heat-relief-arizona-tenant-rights-repairs/#:~:text=Rental%20units%20need%20to%20safely,if%20cooled%20by%20air%20conditioning.): sets a minimum temperature for cooling and ventilation in rental units
* [Clean Air Act](https://www.epa.gov/clean-air-act-overview): track local emissions inventories and implement control measures as necessary
* [Maine Legislature, Title 38, §584-F](http://www.mainelegislature.org/legis/statutes/38/title38sec584-F.html): ozone warnings must be disseminated to the public and telephone hotlines for public use must be made available
* [Preventing HEAT Illness and Deaths Act](https://www.congress.gov/bill/117th-congress/senate-bill/2510/text): fund heat awareness, education, and research initiatives
 | [Bloomberg Law: Local Governments Can Use Their Power to Combat Climate Change](https://news.bloomberglaw.com/environment-and-energy/local-governments-can-use-their-power-to-combat-climate-change-17)[Center for American Progress: Fighting Climate Change, From Capitol Hill to City Hall](https://www.americanprogress.org/article/fighting-climate-change-from-capitol-hill-to-city-hall/)[Center for American Progress: A Framework for Local Action on Climate Change](https://www.americanprogress.org/article/framework-local-action-climate-change/)[Climate Xchange: How municipalities are playing a part in solving the climate crisis](https://climate-xchange.org/2020/03/12/how-municipalities-are-playing-a-part-in-solving-the-climate-crisis/)[CT DEEP: Council on Equity and Environmental Justice](https://portal.ct.gov/deep-ceejac) |
| Engage at the state- and municipality- levels to create and improve existing policies and programs | Support the reform of state- and municipality-level action (e.g., enact partnerships with CBOs, expand cooling center implementation and accessibility) |
| Transition to renewable energy | Initiate and support the transition to renewable energy in municipal buildings and residential areas using strategies such as reducing energy use across all municipal buildings, benchmarking and tracking energy use, and developing a municipal energy plan in addition to general energy conservation education initiatives | [C40 Knowledge: How to create a roadmap for your city’s renewable energy transition](https://www.c40knowledgehub.org/s/article/How-to-create-a-roadmap-for-your-city-s-renewable-energy-transition?language=en_US)[ODI: How to put cities at the heart of the energy transition](https://odi.org/en/insights/how-to-put-cities-at-the-heart-of-the-energy-transition/)[RMI: Beyond Buying Renewables: How Cities Can Influence the Energy System](https://rmi.org/beyond-buying-renewables-how-cities-can-influence-the-energy-system/) |
| Increase educational programs regarding indoor appliances and energy efficiency | Provide educational programs to residents to increase awareness regarding home energy efficiency through upgraded appliances, better insulation, more efficient heating and cooling, and more. Prioritize this over the next few years while residents can access direct funding from the Inflation Reduction Act and state programs. | [DEEP: Energy Efficiency](https://portal.ct.gov/deep/energy/energy-efficiency)[IRS: Credits and deductions under the Inflation Reduction Act of 2022](https://www.irs.gov/credits-and-deductions-under-the-inflation-reduction-act-of-2022)[Rewiring America: Unlock your energy tax credits and incentives](https://homes.rewiringamerica.org/savings-calculator-email?gad_source=1&gclid=CjwKCAjw6c63BhAiEiwAF0EH1HrDlpoqQMnjSRMWJ6RTRPXYRSX72V2sSbSdJkSzWQfBZ5HO5avUoBoCp6kQAvD_BwE) |
| Oppose the construction or expansion of polluting infrastructure  | At a state and municipal level oppose the construction or expansion of polluting infrastructure, such as fossil fuel power plants, pipelines, and more, with a specific focus on proposed infrastructure in EJ communities. Consider how this can be done in accordance with [SB 1147](https://www.savethesound.org/2023/06/07/ct-coalition-for-climate-action-celebrates-passage-of-sb1147-for-enviro-justice/) (2023), which grants DEEP and the Siting Council authority to deny permits that would place additional burdens on already overburdened communities. | [SB 1147: Press release from the CT Coalition for Climate Action](https://www.savethesound.org/2023/06/07/ct-coalition-for-climate-action-celebrates-passage-of-sb1147-for-enviro-justice/)[EPA: Mapping power plants neighboring communities](https://www.epa.gov/power-sector/power-plants-and-neighboring-communities) |

*+++Please be advised that this is not a comprehensive list of all climate adaptation strategies. The interventions listed above merely serve as examples of evidence-based climate adaptation strategies related to extreme heat and ground-level ozone with published resources on how to execute them at the municipality level and/or examples of existing programs reflective of said interventions.*

# COMMUNICATION STRATEGIES

## Stakeholder / Internal Communication

**Outline communication strategies for contact between stakeholders during activation phases and activities**

**Examples:**

* Regularly scheduled meetings (virtual or in-person), the contents of which depend upon the stakeholder, season, and activation phase
* Meetings held with representatives from each stakeholder identified within the plan to ensure preparedness and response efforts are properly streamlined and coordinated
* Circulation of an internal progress report containing information, goals, and data from past, present, and future emergency response plans and service provision efforts

## Public Communication

**Outline public communication strategies for extreme heat events and ground-level ozone exposure, including sample materials and timelines of when said materials will be released to the public**

**Examples:**

|  |  |
| --- | --- |
| Material | Release / Publication Timeline |
| Flyers / fact sheets | Present in locations such as doctor’s offices, hospitals, community clinics and centers (pre-) seasonally, homeless shelters, and more.Before the emergency season provide students with either physical or digital notices for them and their families. |
| Newsletters | Circulated on a monthly basis, including heat, PM2.5, and ground-level ozone projections and warnings as necessary |
| Press releases | Immediately before and during extreme heat and ground-level ozone events |
| Website | Add seasonally relevant information regarding what residents can do to be prepared and safe to municipal websites |
| Social media campaigns / messaging | Published by city and CBOs (pre-) seasonally |

# APPENDICES

## Appendix A: Definitions & Acronyms

**Include definitions and acronyms used throughout the plan**

**Definitions:**

* **Acute respiratory distress syndrome (ARDS):** Acute respiratory distress syndrome (ARDS) is a life-threatening lung condition that prevents enough oxygen from getting to the lungs and into the blood. ARDS can be caused by any major direct or indirect injury to the lung [[MedlinePlus]](https://medlineplus.gov/ency/article/000103.htm#:~:text=Acute%20respiratory%20distress%20syndrome%20(ARDS,also%20have%20respiratory%20distress%20syndrome.)
* **Adaptive capacity:** The ability of a human or natural system to adjust to climate change (including climate variability and extremes) by moderating potential damages, taking advantage of opportunities, or coping with the consequences [[EPA]](https://www.epa.gov/climate-adaptation/climate-adaptation-and-epas-role#:~:text=Adaptive%20capacity%20is%20the%20ability,or%20coping%20with%20the%20consequences.)
* **Air quality index (AQI):** EPA’s index for reporting air quality [[AirNow]](https://www.airnow.gov/aqi/aqi-basics/)

|  |  |  |  |
| --- | --- | --- | --- |
| Daily AQI Color | Levels of Concern | Values of Index | Description of Air Quality |
| Green | Good | 0 to 50 | Air quality is satisfactory, and air pollution poses little or no risk |
| Yellow | Moderate | 51 to 100 | Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution |
| Orange | Unhealthy for Sensitive Groups | 101 to 150 | Members of sensitive groups may experience health effects. The general public is less likely to be affected |
| Red | Unhealthy | 151 to 200 | Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects |
| Purple | Very Unhealthy | 201 to 300 | Health alert: The risk of health effects is increased for everyone |
| Maroon | Hazardous | 301 and higher | Health warning of emergency conditions: everyone is more likely to be affected |

* **Alzheimer’s disease:** Alzheimer’s disease is a brain disorder that slowly destroys memory and thinking skills, and, eventually, the ability to carry out the simplest tasks. [[NIA]](https://www.nia.nih.gov/health/alzheimers-disease-fact-sheet#:~:text=Alzheimer's%20disease%20is%20a%20brain,first%20appear%20later%20in%20life.)
* **Anthropogenic:** Environmental change caused or influenced by people, either directly or indirectly [[USGS]](https://www.usgs.gov/news/earthword-anthropogenic)
* **Atherosclerosis:** Atherosclerosis is a common condition that develops when a sticky substance called plaque builds up inside your arteries. [[NHLBI]](https://www.nhlbi.nih.gov/health/atherosclerosis)
* **Carbon dioxide (CO2):** Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. [[EPA]](https://www.epa.gov/ghgemissions/overview-greenhouse-gases)
* **Carbon monoxide (CO):** Carbon monoxide (CO) is a colorless, practically odorless, and tasteless gas or liquid. It results from incomplete oxidation of carbon in combustion. [[EPA]](https://www.epa.gov/indoor-air-quality-iaq/what-carbon-monoxide#:~:text=Definition,oxidation%20of%20carbon%20in%20combustion.)
* **Cardiovascular disease:** Cardiovascular disease is the broad term for problems with the heart and blood vessels. These problems are often due to atherosclerosis. This condition occurs when fat and cholesterol build up in blood vessel (artery) walls. This buildup is called plaque. [[MedlinePlus]](https://medlineplus.gov/ency/patientinstructions/000759.htm#:~:text=Cardiovascular%20disease%20is%20the%20broad,This%20buildup%20is%20called%20plaque.)
* **Chronic bronchitis:** Chronic bronchitis is a type of COPD (chronic obstructive pulmonary disease). COPD is a group of lung diseases that make it hard to breathe and get worse over time. [[MedlinePlus]](https://medlineplus.gov/chronicbronchitis.html)
* **Chronic obstructive pulmonary disease (COPD):** Chronic obstructive pulmonary disease, or COPD, refers to a group of diseases that cause airflow blockage and breathing-related problems. It includes emphysema and chronic bronchitis. [[CDC]](https://www.cdc.gov/copd/index.html#:~:text=Chronic%20obstructive%20pulmonary%20disease%2C%20or,Americans%20who%20have%20this%20disease.)
* **Cooling centers:** A cooling center (or “cooling shelter”) is a location, typically an air-conditioned or cooled building that has been designated as a site to provide respite and safety during extreme heat. This may be a government-owned building such as a library or school, an existing community center, religious center, recreation center, or a private business such as a coffee shop, shopping mall, or movie theater. [[CDC]](https://www.cdc.gov/climateandhealth/docs/UseOfCoolingCenters.pdf)
* **Emphysema:** Emphysema is a type of COPD (chronic obstructive pulmonary disease). COPD is a group of lung diseases that make it hard to breathe and get worse over time. [[MedlinePlus]](https://medlineplus.gov/emphysema.html)
* **Excessive heat:** See Figure III
* **Excessive heat warning:** See Figure III
* **Excessive heat watch:** See Figure III
* **Fluorinated gases:** Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of household, commercial, and industrial applications and processes. Fluorinated gases (especially hydrofluorocarbons) are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). Fluorinated gases are typically emitted in smaller quantities than other greenhouse gases, but they are potent greenhouse gases. With global warming potentials (GWPs) that typically range from thousands to tens of thousands, they are sometimes referred to as high-GWP gases because, for a given amount of mass, they trap substantially more heat than CO2. [[EPA]](https://www.epa.gov/ghgemissions/overview-greenhouse-gases)
* **Fossil fuels:** An energy source formed in the Earth's crust from decayed organic material. The common fossil fuels are petroleum, coal, and natural gas. [[EIA]](https://www.eia.gov/tools/glossary/index.php?id=F#:~:text=Fossil%20fuel%3A%20An%20energy%20source,%2C%20coal%2C%20and%20natural%20gas.)
* **Global Ensemble Forecast System (GEFS):** The Global Ensemble Forecast System (GEFS) is a weather model created by the National Centers for Environmental Prediction (NCEP) that generates 21 separate forecasts (ensemble members) to address underlying uncertainties in the input data such limited coverage, instruments or observing systems biases, and the limitations of the model itself. GEFS quantifies these uncertainties by generating multiple forecasts, which in turn produce a range of potential outcomes based on differences or perturbations applied to the data after it has been incorporated into the model. Each forecast compensates for a different set of uncertainties. [[NOAA]](https://www.ncei.noaa.gov/products/weather-climate-models/global-ensemble-forecast)
* **Greenhouse gases:** gases that trap heat in the atmosphere [[EPA]](https://www.epa.gov/ghgemissions/overview-greenhouse-gases#:~:text=Gases%20that%20trap%20heat%20in,to%20and%20from%20the%20atmosphere.)
* **Ground-level zone:** Tropospheric, or ground level ozone, is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC). This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. [[EPA]](https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#:~:text=Tropospheric%2C%20or%20ground%20level%20ozone,volatile%20organic%20compounds%20(VOC).)
* **Heat advisory:** See Figure III
* **Heat cramps:** Muscle pains or spasms that happen during heavy exercise. You usually get them in your abdomen, arms, or legs. [[MedlinePlus]](https://medlineplus.gov/heatillness.html#:~:text=Heat%2Drelated%20illnesses%20include%3A,get%20medical%20help%20right%20away.)
* **Heat exhaustion:** An illness that can happen after several days of exposure to high temperatures and not enough fluids. Symptoms include heavy sweating, rapid breathing, and a fast, weak pulse. If it is not treated, it can turn into heat stroke. [[MedlinePlus]](https://medlineplus.gov/heatillness.html#:~:text=Heat%2Drelated%20illnesses%20include%3A,get%20medical%20help%20right%20away.)
* **Heat rash:** Skin irritation from excessive sweating. It is more common in young children. [[MedlinePlus]](https://medlineplus.gov/heatillness.html#:~:text=Heat%2Drelated%20illnesses%20include%3A,get%20medical%20help%20right%20away.)
* **Heat stroke:** A life-threatening illness in which body temperature may rise above 106 °F (41 °C) in minutes. Symptoms include dry skin, a rapid, strong pulse, dizziness, nausea, and confusion. If you see any of these signs, get medical help right away. [[MedlinePlus]](https://medlineplus.gov/heatillness.html#:~:text=Heat%2Drelated%20illnesses%20include%3A,get%20medical%20help%20right%20away.)
* **Heat syncope:** Heat syncope is a fainting (syncope) episode or dizziness that usually occurs when standing for too long or suddenly standing up after sitting or lying. Factors that may contribute to heat syncope include dehydration and lack of acclimatization. [[CDC]](https://www.cdc.gov/niosh/topics/heatstress/heatrelillness.html#:~:text=Heat%20syncope%20is%20a%20fainting,dehydration%20and%20lack%20of%20acclimatization.)
* **Heat wave:** see Figure III
* **Inflation Reduction Act (IRA):** The Inflation Reduction Act of 2022 is a federal law that includes provisions for states, municipalities, tribal governments, individuals, businesses, and others to reduce energy usage, upgrade appliances, switch to renewable energy, and more. [[White House](https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/)]
* **Methane (CH4):** Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. [[EPA]](https://www.epa.gov/ghgemissions/overview-greenhouse-gases)
* **Nitrogen dioxide (NO2):** Nitrogen Dioxide (NO2) is one of a group of highly reactive gases known as oxides of nitrogen or nitrogen oxides (NOx). Other nitrogen oxides include nitrous acid and nitric acid. NO2 is used as the indicator for the larger group of nitrogen oxides. [[EPA]](https://www.epa.gov/no2-pollution/basic-information-about-no2#:~:text=Nitrogen%20Dioxide%20(NO2)%20is,from%20the%20burning%20of%20fuel.)
* **Nitrogen oxides (NOX):** Nitrogen Oxides are afamily of poisonous, highly reactive gases. These gases form when fuel is burned at high temperatures. NOx pollution is emitted by automobiles, trucks and various non-road vehicles (e.g., construction equipment, boats, etc.) as well as industrial sources such as power plants, industrial boilers, cement kilns, and turbines. [[EPA]](https://www3.epa.gov/region1/airquality/nox.html)
* **Nitrous oxide (N2O):** Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater. [[EPA]](https://www.epa.gov/ghgemissions/overview-greenhouse-gases)
* **Parkinson’s disease:** Parkinson’s disease is a brain disorder that causes unintended or uncontrollable movements, such as shaking, stiffness, and difficulty with balance and coordination. [[NIA]](https://www.nia.nih.gov/health/parkinsons-disease#:~:text=Parkinson's%20disease%20is%20a%20brain,have%20difficulty%20walking%20and%20talking.)
* **Particle pollution:** PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope. Particle pollution includes:
	+ **PM2.5** : fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller
	+ **PM10** : inhalable particles, with diameters that are generally 10 micrometers and smaller [[EPA]](https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#:~:text=PM%20stands%20for%20particulate%20matter,seen%20with%20the%20naked%20eye.)
* **Rhabdomyolysis:** Rhabdomyolysis (rhabdo) isa medical condition associated with heat stress and prolonged physical exertion. Rhabdo causes the rapid breakdown, rupture, and death of muscle. When muscle tissue dies, electrolytes and large proteins are released into the bloodstream. This can cause irregular heart rhythms, seizures, and damage to the kidneys. [[CDC]](https://www.cdc.gov/niosh/topics/heatstress/heatrelillness.html#:~:text=Heat%20syncope%20is%20a%20fainting,dehydration%20and%20lack%20of%20acclimatization.)
* **State Implementation Plan (SIP):** A State Implementation Plan (SIP) is a collection of regulations and documents used by a state, territory, or local air district to implement, maintain, and enforce the National Ambient Air Quality Standards, or NAAQS, and to fulfill other requirements of the Clean Air Act. [[EPA]](https://www.epa.gov/air-quality-implementation-plans/basic-information-about-air-quality-sips)
* **Sulfur dioxide (SO2):** EPA’s national ambient air quality standards for sulfur dioxide (SO2) are designed to protect against exposure to the entire group of sulfur oxides (SOx). SO2 is the component of greatest concern and is used as the indicator for the larger group of gaseous SOx. [EPA]
* **Urban Heat Island Effect (UHI):** A measurable increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure. The heat island effect can result in significant temperature differences between rural and urban areas. [[EPA](https://www.epa.gov/heatislands)]
* **Volatile organic compounds (VOC):** Volatile organic compounds are compounds that havea high vapor pressure and low water solubility. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants. [[EPA]](https://www.epa.gov/indoor-air-quality-iaq/what-are-volatile-organic-compounds-vocs)
* **Vulnerable populations:** Vulnerable populations are groups and communities at a higher risk for poor health as a result of the barriers they experience to social, economic, political and environmental resources, as well as limitations due to illness or disability. [[National Collaborating Centre for Determinants of Health]](https://nccdh.ca/glossary/entry/vulnerable-populations)
* **WebEOC:** WebEOC is a web-based emergency management information system used by the State of Connecticut to document routine and emergency events/incidents. Web EOC provides a real-time common operating picture and resource request management tool for emergency managers at the local and state levels during exercises, drills, local or regional emergencies, and/or statewide emergencies. [[DEMHS]](https://portal.ct.gov/demhs/emergency-management/resources-for-officials/webeoc)

Figure III: Defining Extreme Heat Terminology in Connecticut NWS Service Areas

**Acronyms**

* ALA: American Lung Association
* AQI: Air quality index
* AQMD: South Coast Air Quality Management District
* ASPR: Administration for Strategic Preparedness and Response
* CBO: Community-based organization
* CDPH: Connecticut Department of Public Health
* CIRCA: Connecticut Institute for Resilience and Climate Adaptation
* COPD: Chronic obstructive pulmonary disease
* CPC: Climate Prediction Center
* DEEP: Department of Energy and Environmental Protection
* DEMHS: Division of Emergency Management and Homeland Security
* DOE: U.S. Department of Energy
* EPA: Environmental Protection Agency
* FBO: Faith-based organizations
* FEMA: Federal Emergency Management Agency
* GEFS: Global Ensemble Forecast System
* HHS: U.S. Department of Health and Human Services
* HRI: Heat-related illness(es)
* IRA: Inflation Reduction Act
* LHD: Local health department
* LIHEAP: Low-income Home Energy Assistance Program
* NAAQS: National Ambient Air Quality Standards
* NASA: National Aeronautics and Space Administration
* NCEP: National Centers for Environmental Prediction
* NGO: Non-governmental organization
* NHLBI: National Heart, Lung, and Blood Institute
* NIA: National Institute on Aging
* NIMS: National Incident Management System
* NOAA: National Oceanic and Atmospheric Administration
* NWS: National Weather Service
* SIP: State implementation plan
* SVI: Social vulnerability index
* URI: Urban Heat Island effect
* USGS: United States Geological Survey
* VOCs: Volatile organic compounds

## Appendix B: Contact Information

**Include relevant state and local departmental information**

### State Agencies

* [Connecticut Department of Economic and Community Development](https://portal.ct.gov/DECD)
* [Connecticut Department of Energy and Environmental Protection](https://portal.ct.gov/DEEP)
* [Connecticut Department of Transportation](https://portal.ct.gov/DOT)
* [Connecticut State Connecticut Office of Early Childhood](https://portal.ct.gov/oec)
* [Connecticut State Council on Developmental Disabilities](https://portal.ct.gov/ctcdd)
* [Connecticut State Council on Environmental Quality](https://portal.ct.gov/ceq)
* [Connecticut State Department of Aging and Disability Services](https://portal.ct.gov/aginganddisability)
* [Connecticut State Department of Children and Families](https://portal.ct.gov/dcf)
* [Connecticut State Department of Education](https://portal.ct.gov/SDE)
* [Connecticut State Department of Emergency Services and Public Protection](https://portal.ct.gov/DESPP)
* [Connecticut State Department of Housing](https://portal.ct.gov/doh)
* [Connecticut State Department of Mental Health and Addiction Services](https://portal.ct.gov/dmhas)
* [Connecticut State Department of Motor Vehicles](https://portal.ct.gov/DMV?language=en_US)
* [Connecticut State Department of Public Health](https://portal.ct.gov/DPH)
* [Connecticut State Department of Social Services](https://portal.ct.gov/dss)
* [Connecticut State Division of Emergency Management and Homeland Security](https://portal.ct.gov/demhs)
* [Connecticut State Emergency Response Commission](https://portal.ct.gov/SERC)
* [Connecticut State Office of Health Strategy](https://portal.ct.gov/OHS)
* [Connecticut State Office of the Healthcare Advocate](https://portal.ct.gov/OHA)
* [Office of Governmental Accountability, Office of the Child Advocate](https://portal.ct.gov/oca)
* [State of Connecticut Department of Developmental Services](https://portal.ct.gov/dds)
* [State of Connecticut Office of Policy and Management](https://portal.ct.gov/OPM)

### Local Agencies

**Insert relevant departments and offices in [MUNICIPALITY]**

**Example:** New Haven

* [Board of Alders](https://www.newhavenct.gov/government/departments-divisions/board-of-alders)
* [Board of Education](https://www.newhavenct.gov/government/departments-divisions/board-of-education)
* [Chief Administrator’s Office](https://www.newhavenct.gov/government/departments-divisions/chief-administrator-s-office)
* [City Plan](https://www.newhavenct.gov/government/departments-divisions/city-plan)
* [Community Services Administration](https://www.newhavenct.gov/government/departments-divisions/community-services-administration)
* [Disability Services](https://www.newhavenct.gov/government/departments-divisions/disability-services)
* [Elderly Services](https://www.newhavenct.gov/government/departments-divisions/elderly-services)
* [Fair Rent Commission](https://www.newhavenct.gov/government/departments-divisions/fair-rent-commission)
* [Food System Policy Division](https://www.newhavenct.gov/government/departments-divisions/food-system-policy-division)
* [Livable City Initiative](https://www.newhavenct.gov/government/departments-divisions/livable-city-initiative)
* [Mayor’s Office](https://www.newhavenct.gov/government/office-of-the-mayor)
* [New Haven Fire Department](https://www.newhavenct.gov/government/departments-divisions/new-haven-fire-department)
* [New Haven Free Public Library](https://www.newhavenct.gov/government/departments-divisions/public-library)
* [New Haven Police Department](https://www.newhavenct.gov/government/departments-divisions/new-haven-police-department)
* [NHV Health](https://www.newhavenct.gov/government/departments-divisions/nhv-health)
* [Office of Building Inspection & Enforcement](https://www.newhavenct.gov/government/departments-divisions/office-of-building-inspection-enforcement)
* [Office of Emergency Management](https://www.newhavenct.gov/government/departments-divisions/office-of-emergency-management)
* [Office of Management and Budget](https://www.newhavenct.gov/government/departments-divisions/office-of-management-budget)
* [Parks & Public Works](https://www.newhavenct.gov/government/departments-divisions/parks-and-public-works)
* [Public Safety Communications](https://www.newhavenct.gov/government/departments-divisions/public-safety-communications)
* [Public School District](https://www.nhps.net/)
* [Transportation, Traffic, and Parking](https://www.newhavenct.gov/government/departments-divisions/transportation-traffic-parking)

**Example:** Stamford

* [Building Department](https://www.stamfordct.gov/government/operations/building-department)
* [Citizen’s Service Bureau](https://www.stamfordct.gov/government/view-all-city-departments/citizen-s-service-bureau)
* [Community Development](https://www.stamfordct.gov/government/operations/land-use-bureau-planning-zoning-zoning-enforcement/community-development)
* [Department of Health](https://www.stamfordct.gov/government/public-safety-health-welfare/department-of-health)
* [Environmental Inspections](https://www.stamfordct.gov/government/public-safety-health-welfare/department-of-health/about-us/laboratory)
* [Environmental Protection Board](https://www.stamfordct.gov/government/operations/environmental-protection-board)
* [Fire Department](https://www.stamfordct.gov/government/public-safety-health-welfare/fire-departments)
* [Mayor’s Office](https://www.stamfordct.gov/government/mayor-s-office)
* [Nursing](https://www.stamfordct.gov/government/public-safety-health-welfare/department-of-health/about-us/nursing)
* [Office of Operations](https://www.stamfordct.gov/government/operations)
* [Office of Policy & Management](https://www.stamfordct.gov/government/administration/office-of-policy-management)
* [Parks](https://www.stamfordct.gov/around-town/parks)
* [Police](https://www.stamfordct.gov/government/public-safety-health-welfare/police-department)
* [Public Health Safety & Welfare](https://www.stamfordct.gov/government/public-safety-health-welfare)
* [Public Schools](https://www.stamfordpublicschools.org/)
* [Recreation Services](https://www.stamfordct.gov/government/operations/recreation-services)
* [Social Services](https://www.stamfordct.gov/government/public-safety-health-welfare/social-services)
* [Transportation, Traffic & Parking](https://www.stamfordct.gov/government/operations/transportation-traffic-parking)

## Appendix C: Helpful Resources & References

**Include links to websites and external documents outlining supplemental information for heat and ground-level ozone planning and response**

**Example:**

Community Preparedness & Resilience

* [American Planning Association: Planning for Urban Heat Resilience](https://planning-org-uploaded-media.s3.amazonaws.com/publication/download_pdf/PAS-Report-600-r1.pdf)
* [Connecticut Governor’s Council on Climate Change Equity and Environmental Justice Working Group: Centering Equity in Climate Change Resilience Planning: A Guide for Connecticut Municipalities](https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3-2022-agendas-and-minutes/Centering-Equity-in-Climate-Change-Resilience-PlanningA-Guide-for-Connecticut-Municipalities672022.pdf)
* [Environmental Health Perspectives: Healthy Neighborhoods: Walkability and Air Pollution](https://ehp.niehs.nih.gov/doi/10.1289/ehp.0900595)
* [Environmental Protection Agency: Climate Change and Social Vulnerability in the United States, A Focus on Six Impacts](https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf)
* [Environmental Research Letters: Connecting people and place: A new framework for reducing urban vulnerability to extreme heat](https://iopscience.iop.org/article/10.1088/1748-9326/5/1/014021/pdf)
* [River Network: Tools for Equitable Climate Resilience: Fostering Community Leadership](https://www.rivernetwork.org/wp-content/uploads/2020/12/equitable-climate-resilience-fostering-community-leadership.pdf)
* [River Network: Tools for Equitable Climate Resilience: Fostering Community-led Research and Knowledge](https://www.rivernetwork.org/wp-content/uploads/2021/02/rivernetworkcommunityledresearchtoolkit.pdf)
* [Yale Center on Climate Change and Health: The Air Quality Benefits of Climate Action in Connecticut: A Yale Center on Climate Change and Health Issue Brief](https://ysph.yale.edu/yale-center-on-climate-change-and-health/policy-and-public-health-practice/yccch%20air%20quality%20issue%20brief_412616_48542_v1.pdf)
* [Yale Center on Climate Change and Health: Community-centered Climate Resilience: Summary for Communities & Policymakers](https://ysph.yale.edu/yale-center-on-climate-change-and-health/policy-and-public-health-practice/community_centered_climate_resilience_in_ct_424021_48542_v1.pdf)
* [Yale Center on Climate Change and Health: Extreme Events and Health in Connecticut: A Yale Center on Climate Change and Health Issue Brief](https://ysph.yale.edu/yale-center-on-climate-change-and-health/policy-and-public-health-practice/yccch_extreme_events_issue_brief_421620_48542_v1.pdf)
* [Yale Center on Climate Change and Health: Extreme Heat in Connecticut: A Yale Center on Climate Change and Health Issue Brief](https://ysph.yale.edu/yale-center-on-climate-change-and-health/policy-and-public-health-practice/yccch%20extreme%20heat%20issue%20brief_407652_48542_v2.pdf)

Connecticut: Extreme Heat and Air Quality Data

* [American Lung Association [ALA]: 2022 Report Card: Connecticut](https://www.lung.org/research/sota/city-rankings/states/connecticut)
* [Environmental Protection Agency [EPA]: AirCompare](https://www3.epa.gov/aircompare/)
* [[EPA]: Air Quality - Cities and Counties](https://www.epa.gov/air-trends/air-quality-cities-and-counties)
* [[EPA]: Air Quality Statistics Report](https://www.epa.gov/outdoor-air-quality-data/air-quality-statistics-report)
* [[EPA]: Connecticut, State AQI](https://www.airnow.gov/state/?name=connecticut)
* [[EPA]: Our Nation’s Air 2022](https://gispub.epa.gov/air/trendsreport/2022/#home)
* [Centers for Disease Control and Prevention [CDC]: Heat & Health Tracker](https://ephtracking.cdc.gov/Applications/heatTracker/)
* [[CDC]: National Environmental Public Health Tracking Network](https://ephtracking.cdc.gov/DataExplorer/?c=11&i=81&m=-1)
* [CIRCA and UCONN: Climate Change Vulnerability Index: Heat Viewer](https://connecticut.maps.arcgis.com/apps/webappviewer/index.html?id=e0de6c1d51234f899e4e1599bbc41701)
* [Federal Emergency Management Agency [FEMA]: National Risk Index](https://hazards.fema.gov/nri/map)
* [National Centers for Environmental Information, National Oceanic and Atmospheric Administration [NOAA]: Climate at a Glance](https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/mapping)
* [[NOAA]: Climate Prediction Center Probabilistic Extremes Forecast](https://www.cpc.ncep.noaa.gov/products/predictions/threats/extremesTool.php)
* [[NOAA and CDC]: Extreme Heat Vulnerability Mapping Tool](https://geoxc-apps2.bd.esri.com/Climate/HeatVulnerability/index.html)
* [[NOAA]: State Climate Summaries, Connecticut](https://statesummaries.ncics.org/chapter/ct/)
* [New York University Marron Institute of Urban Management & American Thoracic Society: Health of the Air](https://healthoftheair.org/#:~:text=The%20Health%20of%20the%20Air,American%20Thoracic%20Society%20(ATS))
* [U.S. Department of Health and Human Services [HHS]: LIHEAP and Extreme Heat](https://liheap-and-extreme-heat-hhs-acf.hub.arcgis.com/)

Existing Heat & Air Quality Plans / Plan Guidance

* [Arizona Department of Health Services: Heat Emergency Response Plan](https://silo.tips/download/arizona-department-of-health-services-heat-emergency-response-plan)
* [California Governor’s Office of Emergency Services: Contingency Plan for Excessive Heat Emergencies](https://www.caloes.ca.gov/PlanningPreparednessSite/Documents/ExcessiveHeatContingencyPlan2014.pdf)
* [CDC: Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation](https://www.cdc.gov/climateandhealth/docs/HeatResponsePlans_508.pdf)
* [City of Fort Collins: Fort Collins Air Quality Plan](https://www.fcgov.com/airquality/files/2019_draft_cofc_aqplan.pdf)
* [City of San Antonio, Office of Sustainability: 2018-2020 City of San Antonio - Ozone Action Day Plan](https://www.sanantonio.gov/Portals/0/Files/Sustainability/Environment/planOzoneActionDay.pdf)
* [Colorado Department of Transportation: Air Quality Action Plan](https://www.codot.gov/programs/environmental/air-quality/assets/cdot-air-quality-action-plan)
* [County of San Diego Health and Human Services Agency: Consumer Version Excessive Heat Response Plan](https://www.sandiegocounty.gov/content/dam/sdc/hhsa/programs/phs/ExtremeHeat/EHRP_Consumer_Version.pdf)
* [Cumberland Public Health District: Coordinated Heat Response Plan](https://www.maine.gov/dhhs/mecdc/environmental-health/heat/documents/cumberlandplan_2015.pdf)
* [Homeland Security and Emergency Management Agency: 2022 District of Columbia Heat Emergency Plan](https://hsema.dc.gov/sites/default/files/dc/sites/hsema/District%20Heat%20Emergency%20Plan_FINAL.pdf)
* [Maryland Department of Health: Extreme Heat Emergency Plan](https://health.maryland.gov/preparedness/Documents/MDH%20Extreme%20Heat%20Emergency%20Plan%202020.pdf)
* [National Association of Counties: Air Quality Improvement Guide for Local Governments](https://www.naco.org/sites/default/files/documents/AQ_Factsheet%20-%20Air%20Quality%20Improvement%20Guide%20for%20Local%20Governments.pdf)
* [Office of the Assistant Secretary for Preparedness and Response [ASPR]: Draft Extreme Heat Response Plan](https://files.asprtracie.hhs.gov/documents/sample-health-department-heat-response-plan-508.pdf)
* [South Coast Air Quality Management District [AQMD]: Air Quality Management Plan](http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf)
* [[SC AQMD]: Vision for Clean Air: A Framework for Air Quality and Climate Planning](http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/vision-for-clean-air-2012/draft-vision-for-clean-air-a-framework-for-air-quality-and-climate-planning.pdf?sfvrsn=4)
* [Stanislaus County: Extreme Heat Contingency Plan](https://www.stanoes.com/pdf/extreme-heat-plan.pdf)

## Appendix D: Health Implications of Extreme Heat, Ozone and PM2.5 Exposure

### Heat-related Illnesses

|  |  |  |  |
| --- | --- | --- | --- |
| Condition[[20]](#endnote-1) | Effects & Symptoms[[21]](#endnote-2),[[22]](#endnote-3),[[23]](#endnote-4),[[24]](#endnote-5) | Treatment | Vulnerable Groups[[25]](#endnote-6),[[26]](#endnote-7),[[27]](#endnote-8) |
| Heat Cramps | Short-term: Uncomfortable and severe cramping or muscle spasms in the legs, arms, or trunkHeavy sweating; flushed or moist skinLong-term:None identified aside from risk of future incidents | Rest in a location with cool(er) temperatureDrink beverages with salt and sugar (e.g., sports drinks)Seek medical attention: if cramping and/or spasms persist for longer than one hour | Individuals on a low-sodium dietIndividuals with pre-existing conditions (e.g., heart, lung)Infants and childrenAging population (i.e., 65+ years of age)Overweight and/or obese individualsOutdoor workersLow-income communitiesUrban residentsPeople experiencing homelessness or those who are underhoused |
| Heat Exhaustion | Short-term:Muscle crampsNauseaVomitingDiarrheaHeadache, dizzinessFatigueFast, weak pulseHeavy sweating; pale, moist skinLong-term:None identified | Rest in a location with cool(er) temperatureDrink water or beverages with salt and sugar (e.g., sports drinks)Remove tight clothingUtilize a cold compressSeek medical attention: if symptoms persist for longer than one hour |
| Heat Stroke | Short-term:Warm, dry skinRapid heart rateNauseaVomiting HeadacheFatigueConfusionLethargyBody temperature of 103℉+SeizuresLong-term:[[28]](#endnote-9)Acute respiratory distress syndrome (ARDS)Brain swellingKidney and/or liver failureMetabolic dysfunctionNerve damageReduced blood flow to the heart | Call 911Relocate to cool(er) location, reducing temperature with a cold compress or bathDo not consume any beverages |
| Heat Rash | Short-term:Clusters of red bumps on skin, typically on the upper chest, neck, and skin folds (e.g., groin, elbow creases)Long-term:[[29]](#endnote-10)Postinflammatory hypopigmentation or hyperpigmentation, most common among people with Brown or Black skin | Relocate to cool(er), dry locationUse powder (e.g., baby powder) to soothe the rash in affected bodily regions |
| Heat Syncope | Short-term:Fainting, dizzinessLong-term:None identified | Relocate to cool(er) locationSlowly drink water, clear juice, or a sports drink |
| Rhabdomyolysis | Short-term:Muscle painDark urine and/or reduced urinationWeaknessLong-term:[[30]](#endnote-11)Lingering muscle weaknessAcute kidney injury | Drink waterSeek immediate medical attention |

### Health Effects of Ozone Exposure[[31]](#endnote-12),[[32]](#endnote-13)

|  |  |
| --- | --- |
| Health Effects & Symptoms  | Vulnerable Groups |
| Short-term:CoughingSore, scratchy throatDifficulty breathing; airway inflammationIncreased infant mortalityIncreased hospital admissions and emergency department visits for cardiovascular disease, chronic obstructive pulmonary disease (COPD), and asthma among childrenLong-term:Increased vulnerability to respiratory infectionIncreased prevalence, frequency, and severity of asthma (attacks) among childrenImpaired cognitive functioningIntensification of pre-existing respiratory and cardiovascular conditions (e.g., asthma, emphysema, chronic bronchitis, heart disease, atherosclerosis, COPD)Elevated likelihood of developing diabetes and lung cancerElevated risk of developing Parkinson’s and Alzheimer’s disease among other forms of dementiaReduced and impaired lung development and function in childrenIncreased risk of preterm birth and low birth weightIncreased fetal and infant mortalityPremature death | Individuals with preexisting respiratory conditions (e.g., asthma, COPD, bronchitis)ChildrenAging population (65+ years of age)Outdoor workersIndividuals with reduced/insufficient intake of certain nutrients (e.g., vitamins E and C)People experiencing homelessness or those who are underhoused |

### Health Effects of PM2.5 Exposure[[33]](#endnote-14),[[34]](#endnote-15)

|  |  |
| --- | --- |
| Health Effects & Symptoms  | Vulnerable Groups |
| Short-term:Coughing and wheezingDifficulty breathingIncreased heart palpitationsIncreased risk of heart attacksIncreased hospital admissions and emergency department visits for cardiac failure, chronic obstructive pulmonary disease (COPD), respiratory infections, and asthmaLong-term:Increased risks of lung cancerIncreased risk of pneumoniaDevelopment of asthmaImpaired lunch development of childrenIncreased preterm birth and low birth weightIncreased risk of Alzheimer's, Parkinson's, and neurodegenerative diseases | Individuals with preexisting respiratory conditions (e.g., asthma, COPD, bronchitis)ChildrenAging population (65+ years of age)Pregnant peopleOutdoor workersPeople experiencing homelessness or those who are underhoused |

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