Wildfire Protection Plan			
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Resource Guidance Document

First Draft: 2020

Wildfire Smoke Events

Some of the largest wildfires in California history have impacted CSU (California State University) campuses in recent years. The Ventura County Fire Department ordered an evacuation of Channel Islands due to the Hill Fire in 2018. The Camp Fire, near Chico, affected Chico State students and employees and inundated the campus with smoke. During the fall 2020 wildfire events, seven CSU campuses closed or curtailed activities due to smoke impacts.

Wildfires produce substantial amounts of particles and gases, including fine and coarse particles, greenhouse gases (carbon dioxide, methane, nitrous oxide), photochemically reactive compounds (e.g., carbon monoxide), non-methane hydrocarbons, and nitrogen oxides. Wildfire contributes to air pollution by emitting primary pollutants and producing secondary pollutants, e.g., ozone, through photochemical processing. The impact of wildfires on air quality depends on weather patterns (including temperature, humidity, and wind speed), fire plume dynamics, amount and chemical composition of the emissions, and the atmosphere into which the emissions are dispersed. Geography also plays a role; mountains and other features may contribute to inversion layers that can keep smoke contained in certain areas (or keep smoke out).

In California, the Division of Occupational Safety and Health (Cal/OSHA) is responsible for enforcing California laws and regulations pertaining to worker safety and health. For more information on new regulations to protect workers during wildfire smoke, see the section on "Protect Outdoor Workers."

Purpose

This guidance document provides references, good practices, and regulatory information for the campus to consider when deciding on operational changes in response to potentially harmful exposures to wildfire smoke. The scope of this document focuses on air pollutants generated by wildfire smoke.

Planning Process

This guidance document was developed by an interdisciplinary work group with representation from both the Chancellor's Office and campus staff in the following areas: Emergency Management, Safety, Health, and Sustainability; Risk Management; Academic Continuity; Student Wellness; and Business Continuity.

This is a living document that will be reviewed at least annually due to the dynamic circumstances surrounding wildfire hazards and response in California.

Definitions:

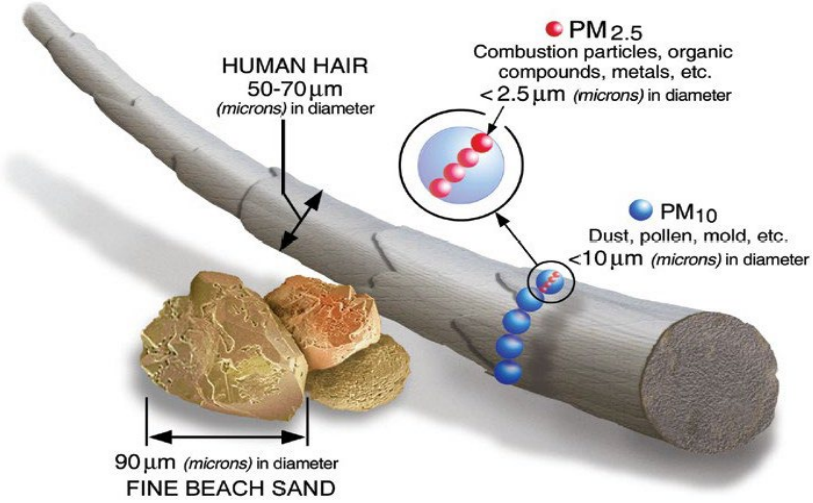
Title 8 California Code of Regulations §5141.1 Protection from Wildfire Smoke: Guidance for worker safety and health in wildfire regions

Air Quality Index: Used for reporting daily air quality. It tells you how clean or polluted your air is, and what

associated health effects might be a concern for you. The current AQI is also referred to as the “NowCast” and represents data collected over varying time periods to reflect present conditions as accurately as possible.

Particulate Matter: Particulate matter (also called particle pollution) is 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.

Particulate Matter 2.5: Fine inhalable particles, with diameters that are 2.5 micrometers and smaller. How small is 2.5 micrometers? Think about a single hair from your head. The average human hair is about 70 micrometers in diameter, making it 30 times larger than the largest fine particle.



Environmental Controls: The degree to which individuals, groups, or business units can modify and adapt features of their physical workplace to enhance work and business effectiveness and provide protection.

Administrative Controls: Training, procedure, policy, or shift designs that lessen the threat of a hazard to an individual. Administrative controls typically change people's behavior rather than removing the actual hazard.

APCD: Air Pollution Control District

Essential Employees: Determined by the Chief of Police.

EOC: The emergency operations center is a physical or virtual location from which coordination and support of incident management activities are directed.

ENS: Emergency Notification System

IITS: Instructional & Information Technology Services

SH&S: Safety Health & Sustainability

UPD: University Police Department

FS: Facility Services

IRM: Integrated Risk Management

NIOSH (National Institute for Occupational Safety and Health): The National Institute for Occupational Safety and Health of the U.S. Centers for Disease Control and Prevention. NIOSH tests and approves respirators for workplace use.

Preparedness and Planning

Wildfire smoke contains chemicals and fine particles that can have adverse health effects. The most significant hazard comes from breathing fine particles in the air, which can cause breathing difficulties, impair lung function, and exacerbate existing respiratory and heart conditions. Fine particulate matter of 2.5 micrometer diameter or smaller size (PM2.5) is considered the most harmful. The objective of this document is to help protect the Cal State Univ. San Marcos campus from exposure to wildfire smoke and to ensure that we are following California Code of Regulations Title 8 Section 5141.1. Protection from Wildfire Smoke.

Managers and Supervisors

- Managers and supervisors who oversee employees who perform work activities outdoors during or after wildfires when smoke is present shall:
    - Ensure that their employees are made aware of the Wildfire Smoke Exposure Program.
    - Ensure that their employees have access to respiratory protection supplies (N95's) and are wearing respirators when the AQI is >500. If an employee is required to wear an N-95 respirator, they must be trained and certified and have passed a fit test. Fit tests are provided by SH&S (Safety, Health & Sustainability) for Quantitative testing. Quantitative is data, numbers-based, countable, or measurable. Qualitative data is interpretation-based, descriptive, and language-related. Whereas quantitative data is statistical and typically structured – meaning it is more rigid and defined. This data type is measured using numbers and values, making it a more suitable candidate for data analysis. For quantitative testing, SH&S uses an outside vendor, such as our Occupational Medicine provider. Contact SH&S if your job description or AQI requires you to wear a respirator. SH&S will assist with scheduling and fit testing for campus employees.

- To the extent feasible, encourage and allow employees to work in enclosed structures or vehicles where the air is filtered.
- Implement the following control systems for employees who must work outdoors during a wildfire:
  - Changing procedures, such as moving workers to a place with a lower current AQI for PM2.5.
  - Reducing work time to one hour in areas with unfiltered air.
  - Increasing rest time and frequency and providing a rest area with filtered air.
  - Reducing the physical intensity of the work to help lower the breathing and heart rates.
  - Notify SH&S if their employees inform them that the air quality is getting worse or if they are suffering from any symptoms due to the air quality.

Employees working outdoors during a wildfire shall:

- Understand and follow the requirements of the CSUSM (California State University, San Marcos) Wildfire Smoke Exposure Management Program, including participating in training.
- Wear respirators when required to do so (i.e., AQI is >500).
  - Proper training must be given when an employee is REQUIRED to wear a respirator. Contact SH&S for training if the employee is not properly trained.
- Inform their supervisor if the air quality is getting worse.
- Inform their supervisor if they are suffering from any symptoms due to the air quality.

Students and Visitors are encouraged to:

- Remain in enclosed structures or vehicles where the air is filtered, as much as possible, when experiencing poor air quality/smoke caused by a wildfire **unless instructed to evacuate**.
- Follow any emergency notifications or communications provided by the campus (i.e., evacuate the campus, shelter in place, etc.)
- Seek medical attention if they are suffering from any symptoms due to the air quality.

Campus Notice and Communication

- Office of Communications and Emergency Management shall:
  - In consultation with Safety, Health, and Sustainability, provide updated information to the campus regarding air quality, protective measures, at any time the AQI reaches an unhealthy level (151-500)
  - Provide information to employees, students, and visitors regarding campus closures or evacuations. Communication methods include email, text messages, cell phone alerts, and updates on the campus website.

Safety, Health & Sustainability

- Provide training for all employees who perform work activities outdoors during or after wildfires when smoke is present.
  - Protecting Employees from Wildfire Smoke
- Monitor PM2.5 AQI at the worksite before and periodically during each shift when AQI is 151 or greater during wildfire events.
- Provide updated information to the Office of Emergency Management and the Office of Communications regarding AQI forecasts and the current AQI.

Air Quality Monitoring

- Air Quality Index (AQI) is a weighted 24-hour rolling average of particulates in the air combined with weighting factors identified by the **U.S. Environmental Protection Agency (EPA)**. This combination creates an index number (AQI) designed to provide the public with basic public health information about the general acceptability and health impacts of exposure to outdoor air for extended periods. More details about the AQI and color-coded charts are below. AQI is most commonly measured for PM2.5, which refers to fine inhalable particles with diameters of 2.5 micrometers or smaller. The smaller particles get past defenses in the upper respiratory system and go deeper into the lungs, causing the most concern.

AIR QUALITY INDEX FOR PARTICLE POLLUTION		
Air Quality Index	**Air Quality**	**Health Advisory**
0 to 50	Good	None.
51 to 100	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
101 to 150	Unhealthy for Sensitive Groups	People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.
151 to 200	Unhealthy	People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.
201 to 300	Very Unhealthy	People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.

Cal State San Marcos will use the following methods to determine employees' exposure to PM2.5 while working outdoors during a wildfire.

- **AirNow.gov** is an official source that uses high-quality air monitors that are designed to monitor air quality on a regional basis. This website provides average air quality over a 24-hour period and forecasts for future air quality. The Cal/OSHA Protection from Wildfire Smoke Rule specifically refers to the AirNow site. Reporting the "official U.S. Air Quality Index (AQI)", AirNow is a partnership of the U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration (NOAA), National Park Service, NASA, Centers for Disease Control, and tribal, state, and local air quality agencies.
- **PurpleAir.com** is a source that provides more granular details on air quality and a network of ad-hoc sensors that community members link to the website. It is not an official government-mandated source. However, the website can provide more location-specific information that may capture variations due to microclimates and topography. Many campuses already rely on PurpleAir to inform decision-making, and many have purchased and deployed their own sensors to provide more data points for local air quality. Given the unofficial nature of PurpleAir, caution should be exercised in relying upon this information as an exclusive source. If utilizing PurpleAir for wildfire smoke monitoring, the user should use the US

EPA Conversion, as the site default, is for ambient air pollution. An explanation of the need for conversion is provided in this article.

For indoor air quality concerns, the campus might consider purchasing indoor air monitoring sensors or handheld monitoring devices to ensure the effectiveness of air filtration systems and protect the health of indoor employees.

Personal Protective Equipment

- N95 masks are special face coverings with respirators that are designed to filter out particles before the air is breathed. The N-95 means that it is certified to filter out 95% of particles 0.3 microns or larger when worn properly. During air quality events with significant PM2.5, N95 respirators are provided to employees and students who voluntarily request them, depending on the PM2.5 level and the time the employee or student is required to be outdoors.
- Campus will work with procurement in advance of wildfire incidents to maintain an emergency supply of N95 masks when possible.
- Cal / OSHA (Occupational Safety and Health Administration) requires the provision of **voluntary** use respirators (such as N95 filtering facepiece respirators) where the PM2.5 AQI ≥151 (but does not exceed 500) for employees working outside for more than an hour while exposed to wildfire smoke.
- When feasible, it is also good practice to make N95 masks available to students and those with medical needs who may be required to be on campus.
- The Chancellor's Office procurement team maintains a supply of N95 masks that can be requested from campuses in emergency situations.
- Where the PM2.5 AQI >500, respirator use is required in accordance with Title 8 section 5144 and the campus respiratory protection program.
    - For voluntary use (AQI 151–500), employees will receive Appendix D information per §5144 and are not required to undergo medical evaluation or fit testing.
- AQI will determine whether respirator use is voluntary or required for employees who must work outdoors during a wildfire or smoke event.
    - AQI of 151-500 (Voluntary use)
    - Dispose of N95 masks immediately if damaged, soiled/wet, or if there is difficulty breathing through the mask.
    - Do not reuse N95s; put on a new N95 at the start of each shift.
        - N-95s are available from SH&S and Emergency Management, as necessary.
- AQI of >500 (Required use):
    - Required use in compliance with 8 CCR §5144. Respiratory Protection. Meaning, the respirator user must be:
        - Medically cleared for tight-fitting respirator use.
        - Trained in the use of a tight-fitting respirator
        - Fit-Tested for the specific tight-fitting respirator they will be using.

Assess Building Heating, Ventilation, and Air Conditioning Systems

- Facilities Development & Management should analyze campus buildings for the quality of air filtration systems.
- Adjust outdoor air intake as appropriate while maintaining required ventilation standards, including reducing outdoor air during wildfire smoke events in accordance with ASHRAE Guideline 44, while maintaining positive building pressures and optimizing MERV filtration.
- During wildfire smoke events, HVAC systems should minimize outdoor air intake and disable economizers where feasible, while ensuring sufficient ventilation is maintained to support

occupant health, laboratory exhaust requirements, and building pressurization. Buildings constructed within the last 15 years have modern filtration systems and will be most efficient in providing safe air quality even during wildfire smoke events.

- Pre-identify buildings that do not have modern air filtration systems and establish an understanding of the response needed for activities to take place in these buildings. Or determine that the HVAC system will not support the air filtering needed to make the building operational.
- The primary method of controlling indoor exposure to wildfire smoke is through Environmental Control. Acceptable Environmental Controls include enclosed buildings, structures, or vehicles with air filtration.
- Whenever Environmental Controls are not feasible or do not reduce employee exposure to PM 2.5 to less than an AQI of 151, the campus will implement Administrative Controls. Acceptable Administrative Controls include relocating workers to a lower-AQI location, changing work schedules, reducing work intensity, or providing rest periods.

Local Context

- Each CSU campus has its own unique situation and needs driven by varying wildfire exposure, geography, and regional partners. Therefore, the CSU system allows for local variations in the adoption of wildfire smoke planning and response.
- Some campuses are in areas where air quality is consistently unhealthy for sensitive groups due to chronic air pollution. Such campuses might have higher thresholds for curtailing activities than campuses in regions accustomed to better air quality.
- Campuses must maintain a Wildfire Smoke Program per Cal OSHA guidelines. This program is maintained through the campus Environmental Safety, Health, and Sustainability Office and may be a local resource to review.

Training

Title 8 CCR §5141.1 and 3203 require employers to provide effective training and instruction on protection from wildfire smoke. CSUSM has established a training module for campuses to meet this requirement and raise awareness of AQI and the appropriate actions employees should take during poor air-quality incidents. It is called Protection from Wildfire Smoke (CSU) and can be accessed through the CSU LearnerWeb System.

Safety, Health & Sustainability

- Work with Department Managers to identify and provide training for all employees who may perform work outdoors during or after wildfires when smoke is present.

- In accordance with Appendix B of Title 8 CCR §5141.1, this training will include, at a minimum, the following topics:
    - Monitor PM2.5 levels at the worksite before and periodically during each shift when AQI is 151 or greater during wildfire events
    - The health effects of wildfire smoke
    - The right to obtain medical treatment without fear of reprisal
    - How employees can obtain the current Air Quality Index (AQI) for PM2.5
    - The requirements in Title 8, section 5141.1 about wildfire smoke
    - The employer's two-way communication system
    - The employer's methods to protect employees from wildfire smoke

- The importance, limitations, and benefits of using a respirator when exposed to wildfire smoke
- How to properly put on, use, and maintain the respirators provided by the employer.

SH&S can provide online and in-person training for employees. To schedule in-person training, contact the SH&S office at 760-750-4502.

Documentation and Recordkeeping

CSUSM shall maintain documentation necessary to demonstrate compliance with Title 8 CCR §5141.1 (Protection from Wildfire Smoke), §5144 (Respiratory Protection), and §3203 (IIPP).

Safety, Health & Sustainability (SH&S) is responsible for coordinating recordkeeping in collaboration with Human Resources, Facilities Development & Management, and Emergency Management.

Air Quality Monitoring

When PM2.5 AQI equals or exceeds 151, the campus will document:

- Date and time of AQI checks
- AQI value and monitoring source (e.g., AirNow, APCD, campus monitor)
- Operational decisions made

Monitoring records will be retained for a minimum of three (3) years.

Respiratory Protection Records

Voluntary Use AQI 151-500

- Documentation that Appendix D information was provided
- Respirator distribution and inventory tracking

Required Use PM2.5 AQI >500

- Medical clearance documentation
- Fit testing records
- Respirator training records

Records will be maintained in accordance with §5144 requirements.

Incident and Exposure Reporting

The campus will document:

- Employee symptom reports
- Work modifications
- Injury/illness reports or workers' compensation claims (if applicable)

Records will comply with Cal/OSHA recordkeeping requirements (8 CCR §14300).

Program Review

The Wildfire Smoke Protection Plan will be reviewed annually or after significant events. Documentation of review and revisions will be maintained.

Decision Process

Key Participants

Campus will consider activating the Emergency Operations Center or forming a separate Incident Management team focused specifically on wildfire smoke hazards. The following departments have been identified as critical to this process:

- Policy group including the President, Cabinet, and designees
- University Police and Emergency Management
- Safety, Health, and Sustainability
- Integrated Risk Management
- Facilities, Development & Management, Energy Management and Utilities Services
- Academic Affairs
- Student Affairs, including Residential Life, Athletics, Health Centers, and Auxiliaries
- Public Information Officer/Office of Communications
- Human Resources

Decision Matrix

Safety, Health, and Sustainability: the IMT monitors AQI regularly via AirNow, local air district sources, and campus-installed monitoring devices. PurpleAir data may be used as supplemental information when appropriately calibrated. Early mornings, midday, and late afternoons are appropriate times for reviewing the changing air conditions. When the air quality index remains above 200, more frequent monitoring may be required.

AQI 100-150 Unhealthy for Sensitive Groups

- Campus remains open.
- Campus-wide communications on platforms to be determined when AQI >125
- Determination about next day operations by 5 pm so the campus maintains a two-way communication system in accordance with 8 CCR §§3203 and 5141.1, allowing employees to report worsening air quality or symptoms without fear of reprisal.

AQI 151-200 Unhealthy

- Campus remains open. Restrictions on outdoor work and academic activities are considered.
- Cal-OSHA requirements are triggered at 151 regardless of operational decisions.
- Campus-wide communications on platforms to be determined.
    - Message sent by 5:00 PM when the next day's forecast is over 150
    - Use of ENS for messaging is considered

AQI >200 Very Unhealthy

- Campus remains open. Restrictions on outdoor work and academic activities are implemented.
- Cal-OSHA requirements are triggered.

- Campus-wide communications on platforms are to be determined.
    - Message sent by 5:00 PM when the next day's forecast is over 200
    - Use of ENS for messaging
- NCAA restrictions in effect

AQI > 300 Hazardous

- **RESTRICTED OPERATIONS LIKELY**
- In consultation with the Advisory Committee, the President considers:
    - Suspend classes and/or interrupt business operations
    - Evacuate campus
    - Initiate EOC (Emergency Operations Center)
- If a recommendation is made to restrict operations on campus, the President consults the Chancellor. After consultation with the Chancellor, declare a campus emergency (Title 5, Sections 41302 and 42402) and sign an Emergency Proclamation if warranted.
- Initiate closure of campus by messaging the campus community using the Emergency Notification System, followed by a detailed email to faculty, staff, and students.
- EOC facilitates the determination of critical staff to support residence halls, dining, facility operations, safety, and PD operations.
- EOC follow-up with appropriate departments to determine the impact on onsite and offsite activities in Athletics, events, tours, and similar activities to ensure the message is received and whether support is needed to implement.
- Refer to HR (Human Resources) policy for Emergency Closure (Full or Partial) or Significant Alteration in Operations – State of Emergency (Fires, Health Emergencies, and Natural/Human Made Disasters) for guidance regarding employee pay and leave.

Air Quality Index

Refer to the AQI range and the associated EPA recommendations when considering actions. CSUSM should consider local context, vulnerability of on-campus groups, and quality of air filtration systems on campus when establishing decision-making thresholds based on AQI.

- Air Quality of over 300 is considered hazardous for everyone, and actions curtailing outdoor activities will be considered.
- When employees are exposed to wildfire smoke at a PM2.5 AQI of 151 or more, Cal/OSHA requires a combination of training, communication, monitoring, PPE (Personal Protective Equipment), and/or HVAC filtration.
- The University of California system established an air quality decision guide for its campuses in 2019, which may be a helpful reference for establishing thresholds and guidelines.
- Consider how varying levels of AQI might affect the campus stakeholders listed in the following section and what actions the university might take when certain thresholds are met.

Campus Stakeholders

Identify key stakeholders and campus activities, as well as points of contact for message dissemination for each group/activity. These include:

- Outdoor workers/volunteers
- Classes – particularly any that may be held outdoors, such as kinesiology
- Athletics, including the Rec Center, Club Sports, and teams that may be traveling
- Outdoor camps, movies/concerts, fairs, rallies, farmers markets, or other events
- Residential students, particularly those living in older buildings
- Center for Children and Families
- Sensitive Groups and Persons with Disabilities related to respiratory health
- Satellite campuses, off-site centers, preserves, or other off-site facilities where campus activities are conducted.

Impacts on Labor

Human Resources will provide guidance on the labor impacts of decisions to curtail activities and modify employee work. The campus HR department can provide information regarding essential/emergency employee status and pay implications arising from the use of such terms in crisis communications.

- Managers review and activate essential functions per written plans and event needs.
- Prepare information defining essential workers, disaster service workers, Collective Bargaining Agreements, and other relevant information.
- Assure telecommuting policies and procedures are in place and followed.

Altered Business Operations

Determine or define when to curtail activities (using established emergency decision-making processes) and alter business / academic operations. Levels of curtailment might include:

- Full campus closure – no access, lockdown, entrances blocked, residence halls depopulated
- All classes cancelled/suspended (due to the level of impact on the campus community and connectivity issues that may be prevalent during local wildfire conditions)
- In-person classes cancelled/suspended
- Non-instructional closure/Business closure
- Essential services only (defined by UPD Chief and Emergency Management)
- Residential students only

Preparing for Closure or Curtailed Activities

Internal Stakeholder Communication

Key internal stakeholders who may require targeted advance communications might include Academic Deans, Dean of Students, Directors, Managers & the communications team. The campus should consider taking the following actions to effectively communicate our posture in response to the wildfire smoke event:

- Provide communications to managers of outdoor workers
- Warn support services and essential services leadership before closing or curtailing activities (such as IT, PD, Facilities, RM/SH&S, PIO (Public Information Officer))
- Notify EOC management and/or section chiefs for situational awareness, even if the EOC will not

be activated
- Identify vendors and third-party contractors and prepare communication
- Provide notification of any level of campus closure to the CSU Chancellor's Office, Director of Systemwide Emergency Management, and Senior Advisor for Academic and Student Affairs

Communication with the Campus Community

The Campus Public Information Officer / Office of Communications should consider the following when preparing to communicate campus response actions.

- Methods of communication available and the timeframe of expected actions. For example, a campus may choose to activate its mass notification system for a sudden closure due to hazardous air quality. A campus may choose to use a less intrusive method, such as campus-wide email mailing lists, for a next-day / continued closure announcement.
- Timing of communication will vary depending on the unique circumstances of the wildfire. However, the campus may choose to make decisions about next-day curtailment of activities based on evening weather forecasts and AQI predictions to allow staff and students to adjust their schedules accordingly or may choose to make the decision and communicate in the morning.
- Campus will be utilizing a banner announcement on the university's home page to communicate campus status. The banner may link to a webpage with emergency-specific information, references, and safety information.
- Campus may consider utilizing on-campus physical signage (i.e., A-frame sandwich boards) or digital signage to convey air quality information and forecasts when campus remains open.

Providing Indoor Clean Air Space

When feasible, designating one building with good air filtration (such as a Student Center or University Library) can provide students with a safe place to study during poor air-quality events.

Off-Campus Activities

Identify off-campus activities by students that can/cannot be suspended during campus closure (i.e., nursing clinical placements, student teaching, internships, service learning, field trips, events, athletics, etc.).

Including satellite campuses in wildfire smoke emergency plans and considering their unique geographic circumstances when creating air-quality monitoring and action plans for these campuses.

Wildfire Smoke and Health

Until recently, most of the research on the detrimental health effects of air pollution was not wildfire specific. Increased fire activity has led to an uptick in published research on a broad range of health outcomes associated with exposure to wildfire smoke. Wildfire smoke measurement and epidemiology are active areas of research with novel approaches uncovering associations that were previously undetectable. In addition, wildfire smoke episodes have led to greater public interest in air quality, advances in low-cost sensor technology, and community-led projects that provide expanded access to

information.

A growing body of scientific evidence links exposure to wildfire smoke to adverse health effects. Although it is often assumed that most healthy people will recover from short-term exposure to wildfire smoke, others may experience more severe symptoms due to biological factors (e.g., life stage or pre-existing medical condition) and extrinsic, nonbiological factors (e.g., socioeconomic status, lack of access to adequate housing, lack of access to healthcare, etc.).

Exposure to PM is currently the most well-described public health threat from wildfire smoke. Fine particles from smoke and coarse particles from ash are respiratory irritants that can cause coughing, wheezing, and difficulty breathing. PM may also affect the body's physiological mechanisms that remove inhaled foreign materials from the lungs, such as pollen and bacteria, and may cause systemic inflammation that can affect multiple organs. Studies of ambient air pollution have found that exposure to fine and coarse particles is linked with increased risk of premature mortality and aggravation of pre-existing respiratory and cardiovascular disease.

Recent reviews conclude that a strong association exists between exposure to wildfire smoke or wildfire-PM2.5 and all-cause mortality and respiratory morbidity. Strong positive associations have been found between wildfire smoke exposure and exacerbations of the following common respiratory ailments:

- Asthma
- COPD
- Bronchitis
- Pneumonia

Studies have linked fine PM to increased risks of heart attacks and sudden death from cardiac arrhythmia, heart failure, or stroke. The epidemiological data specifically linking wildfire smoke exposure to cardiovascular morbidity and mortality have been mixed, although several recent studies identified elevated risks of specific health outcomes, including emergency department visits for:

- Ischemic heart disease
- Dysrhythmia
- Heart failure
- Pulmonary embolism
- Stroke

People with Lung Conditions:

People with asthma, chronic obstructive pulmonary disease (COPD), or other chronic lung diseases may experience breathing difficulties during smoke events. Asthma is characterized by chronic inflammation of the bronchi and smaller airways with intermittent airway constriction that may lead to coughing, wheezing, and shortness of breath. Individuals with COPD, encompassing emphysema and chronic bronchitis, may also experience worsening symptoms due to exposure to wildfire smoke. Patients with COPD often have an asthmatic component to their condition that may result in their experiencing asthma-like symptoms. However, because their lung capacity is typically reduced, additional airway constriction may result in symptoms requiring medical attention.

People with Heart Conditions:

Cardiovascular disease is the leading cause of mortality in the U.S. and includes high blood pressure, heart failure, and vascular diseases such as coronary artery or cerebrovascular disease. Air pollution studies have linked PM to increased risk of heart attacks, heart failure, cardiac arrhythmia, and other adverse effects in those with existing cardiovascular disease. Chemical messengers released into the blood due to lung inflammation may increase the risk of blood clot formation, angina episodes, heart attacks, and strokes. Despite this evidence regarding cardiovascular effects, wildfire-related cardiovascular studies have been inconsistent, although several recent investigations have identified elevated risks of specific health outcomes, including increased rates of emergency department visits for ischemic heart disease, dysrhythmia, heart failure, pulmonary embolism, and stroke.

Schools and Childcare Facilities:

Schools and childcare facilities are important sites for wildfire smoke preparedness activities. Before a smoke event, schools and childcare facilities can evaluate their ventilation systems; acquire access to portable air cleaners; identify students and staff who may be particularly sensitive (e.g., those with asthma); and confirm that such students have an Asthma Action Plan.

Group	Potential Health Effects from Wildfire Smoke
Children	All children: coughing, wheezing, difficulty breathing, chest tightness, decreased lung function. Children with asthma: worsening asthma symptoms and heightened risk of asthma attacks.
Older adults	Exacerbation of heart and lung disease leading to the need for medical care, emergency department visits, or hospital admissions.
People with lung disease	Possible breathing difficulties (e.g., coughing, wheezing, and chest tightness) and exacerbations of chronic lung diseases (e.g., asthma and COPD) that may lead to increased medication usage, emergency department visits, or hospital admissions.
People with heart disease	Possible triggering of ischemic events, such as angina, heart attack, or stroke; abnormal heart rhythms that could lead to emergency department visits or hospital admissions; worsening heart failure.
Pregnant people	Limited evidence shows air pollution-related effects on pregnant individuals and the developing fetus.

People with social vulnerabilities	Greater exposure to wildfire smoke due to less adequate housing and reduced access to mitigation options, along with a higher likelihood of untreated or inadequately treated health conditions such as lungs, heart, or metabolic disease. Unhoused individuals are particularly vulnerable to wildfire smoke.
Outdoor workers	Those who must work outdoors may experience greater exposures due to environmental working conditions. Low-wage and migrant workers are especially vulnerable.
People who are immunocompromised	The CDC (Centers for Disease Control) states that people who are immunocompromised or taking drugs that suppress the immune system are likely to be at greater risk of adverse health effects from wildfire smoke.
People who have had COVID-19	CDC states that people who currently have or who are recovering from COVID-19 may be at increased risk of health effects from exposure to wildfire smoke due to compromised heart and/or lung function related to COVID-19.

Post Event Recovery

Cleanup and Odor Removal

Consider replacing HVAC filters, flushing buildings with maximized outside air, and conducting industrial hygiene assessments of areas of concern. When possible, campuses should increase filter stock in advance of wildfires, as shipping delays can occur during a wildfire event. Consider precautions to prevent exposure during ash cleanup.

Documentation of Expenses

Document expenses that otherwise would not have been incurred for potential reimbursement of funds via CSU's property insurance, FEMA (Federal Emergency Management Agency), or other potential sources of funds. This is done by cost tracking in accordance with Cal OES reimbursement guidelines.

Resources and References

EPA

The EPA provides an Air Quality Index (AQI) for very small particles; the index is known as PM2.5.

- Review the "Air Quality Guide for Particle Pollution" (attached)
- See the EPA website AirNow.org.
- Particle pollution causes many health problems; some people may be at greater risk.

Cal/OSHA

Title 8 CCR §5141.1 (Permanent Wildfire Smoke Regulation) requires:
Provision of voluntary use respirators (N95) to all employees who are not exempt at PM2.5 AQI 151 or greater.

- Mandatory respirator use at PM2.5 AQI >500 in accordance with 8 CCR §5144.
- For voluntary use (AQI 151–500), employees will receive Appendix D information per §5144 and are not required to undergo medical evaluation or fit testing
- Other requirements include identification of hazards, training, communication, etc.
  Exemptions involve enclosed buildings or structures with air filtered by a mechanical ventilation system.
- Exemptions also include employees working in enclosed vehicles with cabin air filtration and employees exposed for less than one hour during a shift.

NCAA Guidance

In September 2018, the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports updated its 2016 guidance on student-athlete practice and competition activities in poor air-quality conditions. This guidance is provided below:

There are three reasons why otherwise healthy athletes are at special risk for inhaling pollutants. First, as physical activity increases minute ventilation, the number of pollutants inhaled relative to rest increases. Second, during activity, a larger proportion of air is inhaled through the mouth, which bypasses the body's built-in nasal filtration system. Third, pollutants are inhaled more deeply and may diffuse into the bloodstream more quickly during physical activity. These risks are heightened in athletes with pre-existing pulmonary or cardiac conditions.

An important and standardized national air quality resource is the National Weather Service's (NWS) Air Quality Forecast System. This system "provides the US with ozone, particulate matter, and other pollutant forecasts with enough accuracy and advance notice to take action to prevent or reduce adverse effects."

A key component of this forecast system is the NWS Air Quality Index (AQI).2 The AQI provides real-time monitoring and alerts in response to changing air quality levels. The AQI accounts for five different pollutants, including: 1) ground-level ozone; 2) particle pollution (also known as particulate matter); 3) carbon monoxide; 4) sulfur dioxide; and 5) nitrogen dioxide. Of these, ground-level ozone and particulate matter are the most common and most concerning pollutants for outdoor physical activity. The AQI is a single number on a scale of 0–500, where 0 indicates no air quality problems, and 500 indicates the most hazardous levels of air pollution. A specialized version of the AQI for particle pollution is also available and should be consulted when air quality is threatened by wildfires, road dust, and agricultural operations.2

When threatening or dangerous air quality levels are present, the AQI increases, and the National Weather Service (NWS) issues a corresponding air quality alert. Those alerts and their corresponding behavioral modification recommendations for particle pollution can be found at https://www.airnow.gov.2

Consistent with this information, the Committee on Competitive Safeguards and Medical Aspects of Sports offers the following general guidance to member institutions trying to make decisions about the appropriateness of practice or competition in degrading air quality situations:

Attentive monitoring of local AQI and associated air quality alerts, especially during times of extreme environmental conditions, is recommended. This monitoring is best performed by the primary athletics healthcare providers, who are trained to assess environmental impacts on student-athlete health and safety. However, schools may choose to delegate this responsibility to other staff members with knowledge and training about environmental monitoring.

Member schools should consider shortening or canceling outdoor athletic events (practices and competitions) in accordance with AQI guidance. Exposure should be managed more conservatively for student-athletes with pre-existing pulmonary or cardiac conditions, which may exacerbate the complications of these conditions and lead to an acute medical emergency. Specifically, at an AQI of 100 or higher, schools should consider removing sensitive athletes from outdoor practice or competition venues and should closely monitor all athletes for respiratory difficulty.2 Reduce heavy or prolonged exertion in sensitive individuals.

At AQIs over 151, outdoor activities should be shortened, and exertion minimized by reducing activity intensity. Sensitive athletes should be moved indoors.

At AQIs of 200 or above, serious consideration should be given to rescheduling the activity or moving it indoors. Prolonged exposure and heavy exertion should be avoided.

Avoid all outdoor physical activity for sensitive individuals.

At AQIs of 300 or higher, outdoor activities should be moved indoors or canceled if indoor activities are unavailable.

School emergency action plans should guide emergency care responses in such circumstances, and staff should rehearse them at least once a year.

Other Sources

- Local air quality/pollution control district or the California Air Resources Board
- Local public health sources or the California Department of Public Health
- National Weather Service
- U.S. Forest Service Wildland Air Quality Response Program website
- CalFire and CalOES websites for the status of fire incidents
- CSURMA fire hazard maps

Revision dates
3/16/2026 - RF
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