

Wildfire smoke and athletic events: understanding public concerns, experiences, and preparedness

MICHAEL R. COUGHLAN, NAOMI SERIO, HEIDI HUBER-STEARNs, BEN CLARK,
AND HOLLIE SMITH

SUMMER 2023



ECOSYSTEM WORKFORCE PROGRAM WORKING PAPER NUMBER 117



About the authors

Michael R. Coughlan is an assistant research professor and associate director of the Ecosystem Workforce Program, Institute for Resilient Organizations, Communities, and Environments, University of Oregon.

Naomi Serio is a faculty researcher at the Ecosystem Workforce Program, Institute for Resilient Organizations, Communities, and Environments, University of Oregon.

Heidi Huber-Stearns is an associate research professor and director of the Ecosystem Workforce Program, Institute for Resilient Organizations, Communities, and Environments, University of Oregon.

Ben Clark is an associate professor and director of the School of Planning, Public Policy, and Management, University of Oregon.

Hollie Smith is an associate professor and associate director of the Center for Science Communication Research, University of Oregon.

About the Ecosystem Workforce Program:

The Ecosystem Workforce Program is a program of the University of Oregon's Institute for Resilient Organizations, Communities, and Environments. We conduct applied social science research and extension services at the interface of people and natural resources. Our publications aim to inform policy makers and practitioners, and contribute to scholarly and practical discourse.

Acknowledgements

Funding for this study was provided by the University of Oregon. We thank the Health and Science Department of World Athletics for their feedback and assistance in survey design.

Peer review provided by Lee Mitchell, Oregon Institute of Technology. Additionally reviewed by Andre Le Duc and Lindsey Salfran, University of Oregon.

For questions, please contact:

Ecosystem Workforce Program
Institute for Resilient Organizations, Communities, and Environments
5247 University of Oregon
Eugene, OR 97403-5247
resilient.uoregon.edu/ewp



Executive Summary

The University of Oregon (UO) frequently hosts collegiate and professional outdoor sports events with large numbers of attendees. In July 2022, UO hosted the World Athletics Championships Oregon22 (WCH Oregon22), which drew thousands of international spectators to Eugene, Oregon. The increasingly longer and more severe wildfire smoke events in the Pacific Northwest are likely to occur during outdoor athletic events. We investigated wildfire smoke concerns, air quality communication preferences, and protective action behaviors among sporting event attendees through a survey created by our interdisciplinary research team from the UO. This report presents survey results and implications for improving communication and protocol for air quality and smoke during future outdoor athletic events.

Key findings from survey respondents

- **Over three-quarters** reported having people especially vulnerable to poor air quality and smoke in their households.
- **Over 90 percent** reported that they were concerned about the impact of wildfire smoke on their health or the health of others in their household.
- Nearly all had experienced wildfire smoke events within the past few years.
- Most individuals reported that they expect the University of Oregon's (UO) sports venues to **monitor and communicate changes in air quality conditions** to event attendees. Most respondents additionally expected the UO sports venues to **cancel the event** if the air quality becomes unhealthy to **most people**.
- Most individuals would have felt better prepared for the last wildfire smoke event they experienced if they had **access to personal protective equipment (PPE)** and adequate household protection, such as air filters, sealing doors and windows, and emergency supplies.

Introduction

Over the past decade, wildfire and smoke events have increased in frequency and duration in Oregon. In conjunction with wildfire, communities in the Pacific Northwest are facing increasingly longer and more severe smoke events and associated poor air quality. The hot and dry weather conditions that favor wildfires also provide suitable conditions for outdoor public gatherings and events such as fairs, concerts, and sports events. The University of Oregon (UO) frequently hosts collegiate and professional outdoor sports events at their world class facilities with large numbers of attendees. In July 2022, UO hosted the World Athletics Championships Oregon22 (WCH Oregon22), which drew tens of thousands of spectators to Eugene, Oregon.

In advance of the event, our team of UO researchers sought to understand public experiences and expectations surrounding poor air quality as well as what their preferred methods were for receiving air quality information during and before outdoor athletic events. Our interdisciplinary team consists of researchers from the Institute for Resilient Organizations, Communities, and Environments (IROCE)'s Ecosystem Workforce Program (EWP), the Center for Wildfire Smoke Research and Practice, the Center for Science Communication Research (SCR), and the Institute for Policy Research and Engagement (IPRE). In advance of WCH Oregon22, we surveyed adults who regularly attend outdoor sports events at UO. This working paper reports the survey results.

Approach

Our target population consisted of adults (age 18 and older) who regularly attend outdoor sports events at the University of Oregon and elsewhere. Attendees of outdoor sports events are diverse but represent a particular subset of the general population. Due to this target population's diffuse and difficult-to-define nature, we opted to employ a wide variety of survey recruitment methods. These methods were designed to increase reach rather than representativeness. Thus, our survey should not be taken as representative and may contain biases that we cannot readily identify.

We used the online survey application Qualtrics to host our survey (Appendix A). The survey consisted of closed-ended multiple-choice questions covering demographics, involvement in UO sporting events, and the core topics:

1. Wildfire smoke and air quality concerns
2. Preferred communication methods and content
3. Wildfire smoke preparedness and protective actions

Initially, the survey launch was announced through a UO-network wide email to inform UO students, faculty, staff, alums, and other affiliates about the upcoming week-long WCH Oregon22 event (there were over 80,000 emails on this listserv of current, past, and otherwise UO affiliated individuals). Readers of this email could click on a brief informational piece about air quality research at UO, which led to a short press release from the UO Office of the Vice President of Research and Innovation that described wildfire smoke research collaborations between EWP, SCR, and IPRE (Appendix B). The press release contained a hyperlink to the Qualtrics survey. The survey was further promoted by a brief news piece aired on the local television station KEZI in May 2022. Interested viewers were directed to the KEZI website, which also hosted a hyperlink to the survey. The survey hyperlink was further pushed out by UO researchers over their personal and organizational social media accounts (Facebook and Twitter), although it was not promoted beyond conventional social network sharing. World Athletics, the international governing body for WCH Oregon 22, included this survey and related research in a news article they posted online about the broader World Athletics and UO air quality collaboration¹, and a video in their Day 5 episode of the World Athletics Club program², with more than 111,000 views during the event. Collectively, these efforts resulted in very low recruitment. Despite our efforts, we were unsuccessful at securing further promotion through other communications channels at UO, including UO Athletics.

To augment our sample size, we then decided to promote survey recruitment through the online crowdsourcing marketplace Amazon Mechanical Turk (MTurk). The use of Mturk as a systematic data col-

lection method has grown significantly over the past decade, but the technique also has several known flaws and biases (Aquinis et al., 2021). Most relevant to this survey, MTurk survey populations can exhibit problems related to infiltration by web robots, self-misrepresentation, and self-selection bias, each of which we acknowledge could have biased our results. To minimize the potential for bias introduced by web robots, we filtered out responses with reCAPTCHA scores of less than 0.5. In terms of self-misrepresentation, the most common issues occur in demographic characteristics related to income, education, age, family status, and gender (Aquinis, et al. 2021). Since we were interested in surveying people who attend outdoor sports events, this may represent another layer of self-misrepresentation. Self-selection bias could be an issue; for example, respondents who report air-quality-related health issues may be over-represented.

The Qualtrics survey data was analyzed in IBM's SPSS Statistics program. Incomplete responses were excluded from the analysis.

Results

Population description

A total of 219 individuals completed the survey. Forty-eight percent of respondents identified as female, 47 percent as male, 2.5 percent as non-binary, and the rest preferred not to answer (Figure 1). The majority (63%) of respondents were between 25 and 44 years old; however, their ages ranged from 18 to 84 years (Figure 2). Most respondents (85%) identified as White, six percent identified as Hispanic or Latino/a/x, five percent as Asian or Asian American, two percent as Black or African American, two percent as Native American/American Indian/Alaskan Native, 0.5 percent as Native Hawaiian or Pacific Islander, and the rest identified as "other" or preferred not to answer. The majority of respondents lived in Oregon (88%). All except two respondents selected English as their spoken language.

We asked respondents if they had members of populations particularly vulnerable to smoke in their

1. <https://worldathletics.org/athletics-better-world/news/world-athletics-and-university-of-oregon-collaboration-helps-advance-wildfire-smoke-impact-research>

2. <https://www.youtube.com/watch?v=zW5OYh7-DxQ&t=698s>

households. The majority of respondents (77%) reported that they had members of vulnerable populations in their household, including children, individuals with asthma or cardiovascular disease, older adults, outdoor workers, and pregnant women. Only 23 percent of respondents reported that no individuals from these populations were a part of their household (Figure 3).

We additionally asked respondents about their involvement in outdoor athletic events. We asked if they, or a member of their household, had purchased tickets in the past five years to various outdoor athletic events. Sixty-three percent reported they had purchased tickets to UO events, including college football games, WCH

Oregon22, US Olympic Track and Field Team Trials, Prefontaine Classic, college track and field, and softball. Seven percent of respondents had purchased tickets for other outdoor events, such as high school football, outdoor concerts, women’s softball, soccer, or lacrosse games.

Figure 1. Respondents' self-reported gender identity.

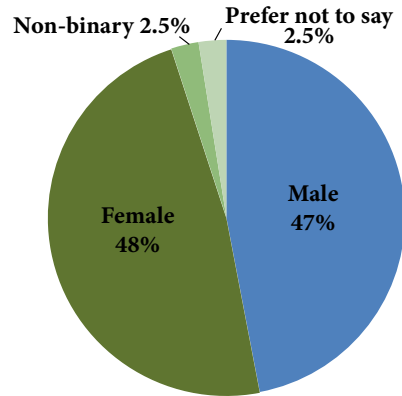


Figure 2. Distribution of respondent ages.

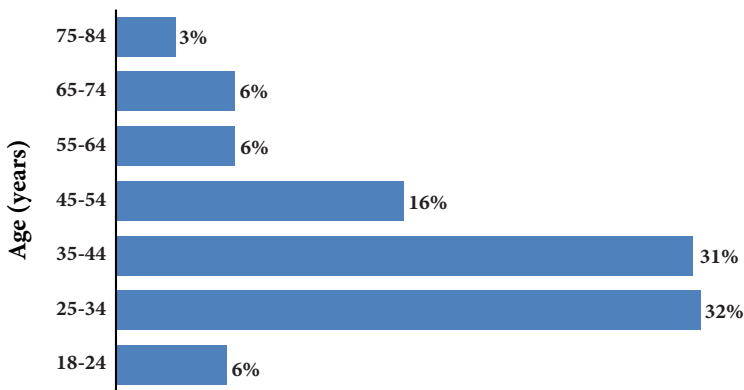
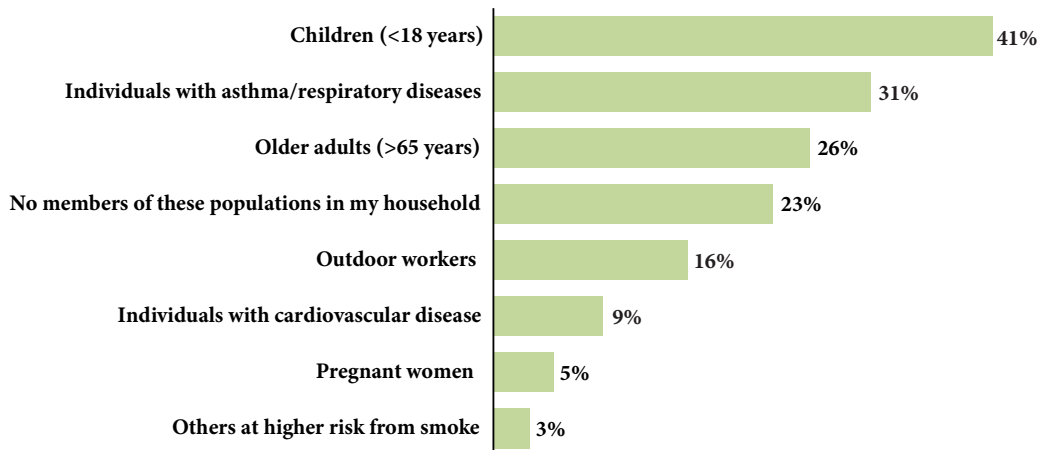


Figure 3. Percentage of respondents with and without members of vulnerable populations in their household (percentages exceed 100% because respondents could select more than one answer).



We also asked respondents how often they thought they would attend outdoor athletic events at the collegiate or professional level in the next year. Thirty-eight percent reported they would likely attend one to two times per year, 26 percent reported three to five times per year, 12 percent reported six to ten times per year, 11 percent reported they likely would not attend events, and 13 percent were unsure (Figure 4).

Wildfire smoke/air quality concern

We asked respondents about their experiences and concerns with wildfire smoke and air quality. Twenty-six percent of respondents reported that they had been exposed to unhealthy air quality due to wildfire smoke for **more than two weeks per year over the past few years**. Twenty-one percent reported more than five days per year of wildfire smoke exposure and 46 percent reported five or fewer days. Four percent of respondents reported they had not experienced wildfire smoke in the

past few years (Figure 5). Most respondents (92%) were either moderately or very concerned about the impact of wildfire smoke on their health or the health of others in their households. Eight percent of respondents reported they were not concerned about the effects of wildfire smoke, and one respondent was unsure (Figure 6).

Figure 6. Respondents' reported concern about the impact of wildfire smoke on their health or the health of others in their household.

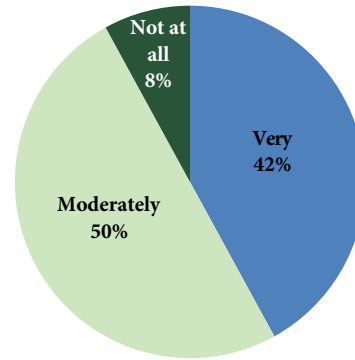


Figure 4. Respondents estimated the number of times they would attend outdoor athletic events at the collegiate or professional level in the next year.

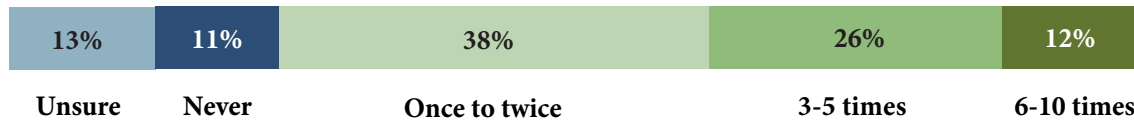


Figure 5. Respondents' self-reported exposure to unhealthy air quality from wildfire smoke over the past few years (averaged per year).



Communication and information

We asked respondents if they would seek information about air quality before deciding to attend an outdoor event if wildfire smoke was possible. Most (73%) respondents reported they would seek information about the air quality. Other respondents were divided between not attending an outdoor event if there were any possibility of wildfire smoke (11%), not seeking information at all (9%), and being unsure what they would do (7%) (Figure 7). For those who said they would seek air quality information before attending an event, we asked about their communication preferences. The most common preferences were text alerts (55%), followed by websites (40%), phone applications (39%), email alerts (36%), and social media (31%). A few participants preferred receiving information by television (26%), radio (18%), or asking friends or family (13%). Five percent chose other communication methods (Figure 8).

We additionally asked respondents what information about smoke-related air quality they would like to have during a smoke event and 99% reported they would like

to receive at least one form of information. Most would like to receive forecasts about air and smoke conditions (85%) and information about how to stay safe while outdoors (62%). Others were interested in information about personal protective equipment (49%) and how to stay safe while indoors (39%). (Figure 9).

Figure 7. Respondents' answers to the question, "if you planned to attend an outdoor event and wildfire smoke was possible, would you seek information about air quality before making a decision to attend?"

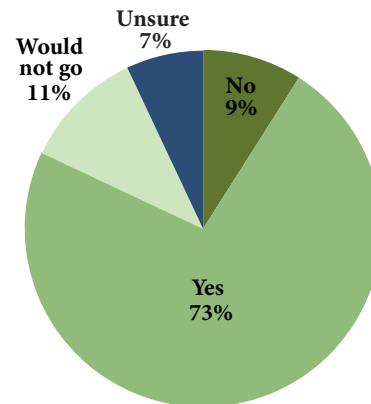


Figure 8. Respondents' preferred method of communication regarding air quality information (percentages exceed 100% because respondents could select more than one answer).

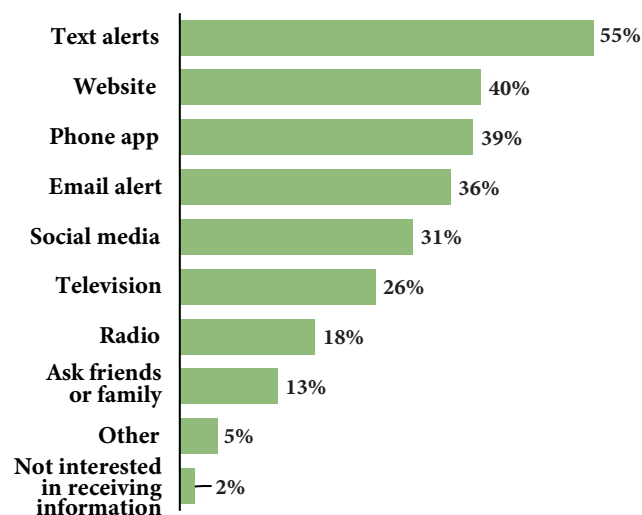
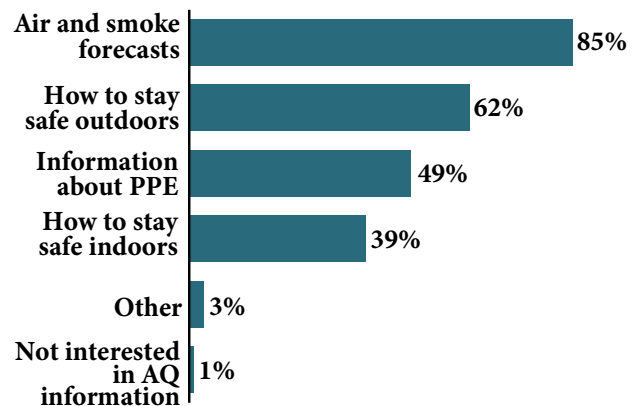


Figure 9. Type of air quality (AQ) and wildfire smoke information respondents would like to receive during smoke events (percentages exceed 100% because respondents could select more than one answer).



We additionally asked respondents about their expectations regarding communication and air quality monitoring for sporting events in Eugene. Most (73%) expected the UO sports venue to monitor and communicate changes in air quality conditions. Many (68%) expected the venue to cancel the event if the air quality become unhealthy to **most people**, while some (32%) expected the venue to cancel the event if the air quality became harmful to **vulnerable people**. Some (26%) expected the City of Eugene or UO sports venue to provide clean-air shelters or gathering places for visitors (Figure 10).

Preparedness and protective actions

We asked respondents about their level of preparedness and the protective actions they took during previous smoke events. The responses varied, with just over half (55%) reporting that they were prepared to reduce their smoke exposure during the last wildfire event they experienced. Thirty-nine percent were not ready to reduce their smoke exposure (Figure 11).

Figure 11. Respondents answers on whether or not they were prepared to reduce their exposure to smoke during the last wildfire event they experienced.

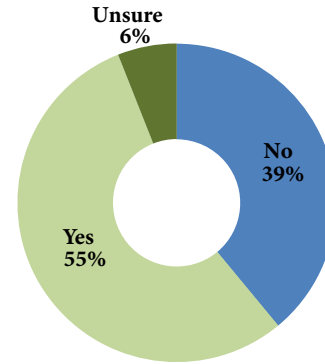
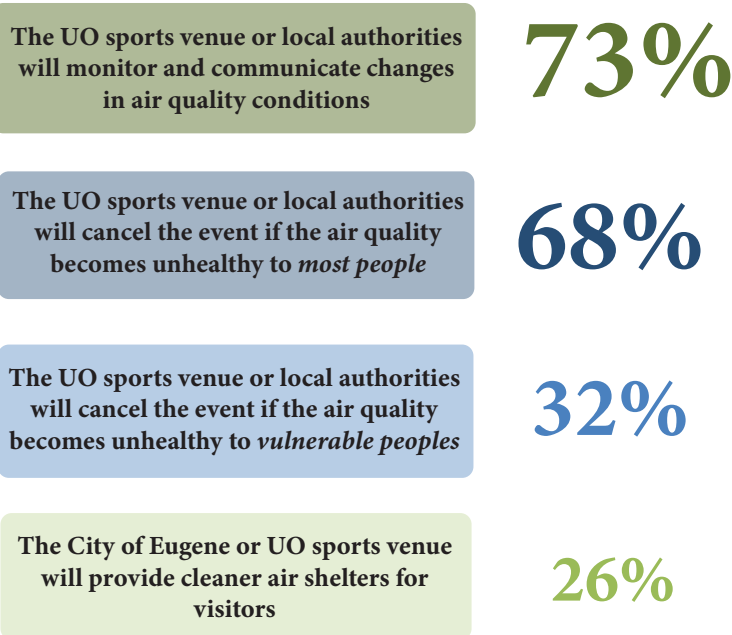


Figure 10. Respondents' expectations for air quality (AQ) communication and response during UO sporting events (percentages exceed 100% because respondents could select more than one answer).

I expect...



When asked about what factors contributed the most to their preparedness, the most common responses were having experienced smoke events before (58%) or knowing what to do in the event of wildfire smoke (51%). Emergency supplies stored at home and a community response plan for wildfire smoke also contributed to respondents' preparedness, with 45 and 16 percent of respondents selecting those factors (Figure 12). Five percent of respondents reported that "other" factors contributed to their preparedness, and six percent were unsure.

We asked respondents if they would have felt more prepared for the last wildfire smoke event had they had

access to various information and resources. The majority (63%) would have felt better prepared if they had access to personal protective equipment, such as respirators, masks, and asthma medications. Over half (57%) would have felt better prepared with household protection such as air filters, sealing doors and windows, and emergency supplies. About half (53% and 51%, respectively) selected that having adequate information about what to do during a smoke event and having information about the possibility of a smoke event would have better prepared them. Seventeen percent reported that having clean-air shelters in their community would have better prepared them (Figure 13).

Figure 12. Factors contributing to respondents' preparedness during the last wildfire event they experienced (percentages exceed 100% because respondents could select more than one answer).

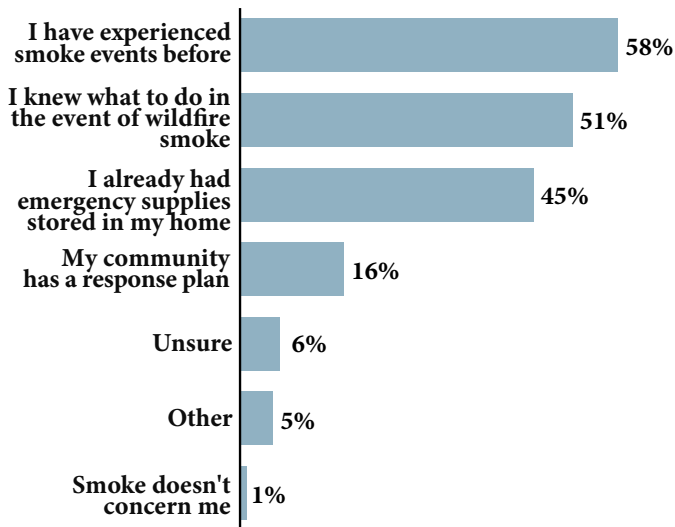
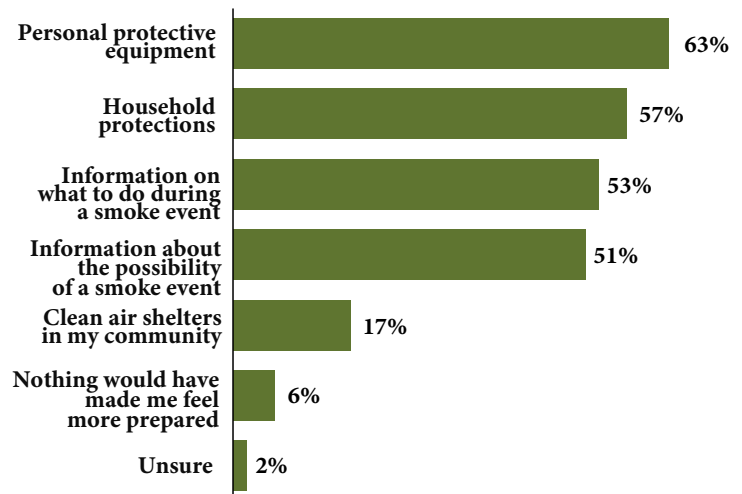


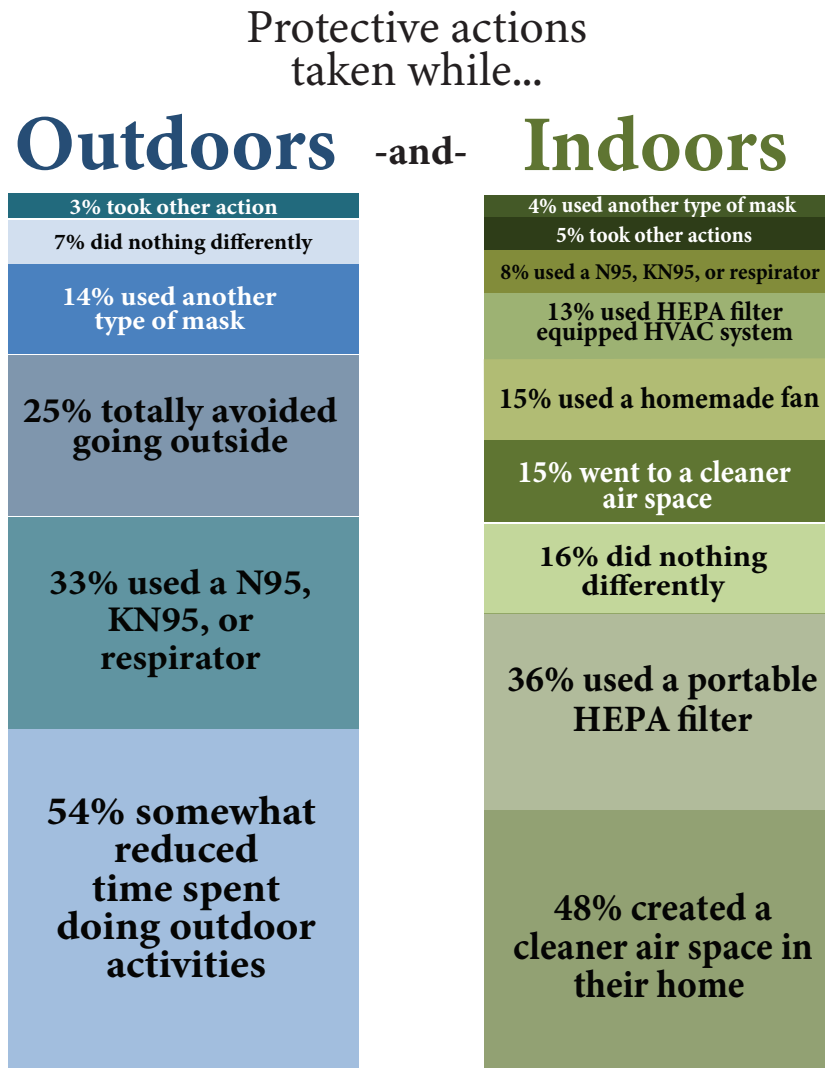
Figure 13. Factors that respondents reported may have better prepared them for the last wildfire smoke event they experienced (percentages exceed 100% because respondents could select more than one answer).



We asked respondents about the protective actions they took **outdoors** during the last wildfire smoke event. Over half (54%) of respondents reported that they somewhat reduced the time spent doing outdoor activities like walking, running, and biking. Thirty-three percent reported using an N95, KN95, or respirator while outdoors, while 14 percent reported using another type of mask outdoors. Twenty-five percent of respondents said they avoided going outdoors altogether during the last smoke event, while seven percent reported not changing their behavior. Three percent of respondents said they took “other” protective actions outdoors, and one percent were unsure (Figure 14).

Lastly, we asked respondents about protective actions they took while **indoors** during the last wildfire smoke event. About half (48%) created a cleaner air space indoors by, for instance, keeping windows and doors shut. Many used air filters, such as portable HEPA air purifiers (36%), homemade box fan filters (15%), and HEPA-filter-equipped HVAC air systems (13%). Some went to a cleaner air space (15%), and others used masks indoors, such as N95, KN95, or respirators (8%) or other types of mask (4%). Sixteen percent of those surveyed reported they did nothing differently indoors during the last smoke event, while five percent took “other” protective actions (Figure 14).

Figure 14. Protective actions respondents reported taking indoors and outdoors during the last wildfire smoke event they experienced.



Implications

Outdoor athletic events

Survey results highlighted that most respondents would like to receive updates on air quality forecasts and information on staying safe before attending an outdoor athletic event. Most respondents also expected the UO sports venue or local authorities to monitor and communicate changes in air quality conditions. Their preferred forms of communication for air quality information included text, email alerts, and website posts. UO and other sporting venues should consider including information on how to access existing air quality resources as part of their event outreach and communications strategies, similar to other pre-game guidance they provide, such as where to access information about parking, shuttles, and clear bag policies. Communication could include QR codes and hyperlinks that point attendees to smart phone apps like the US Environmental Protection Agency's AirNow or air quality websites maintained by state and federal agencies.

Additionally, respondents expected the sports venue would cancel the event if the air quality became unhealthy for the general population. As the frequency and severity of wildfire smoke events and poor air quality are likely to increase in coming years, UO and other venues should consider formalizing air quality related policies and clearly communicating those policies to the public. If our results are representative of outdoor event attendees broadly, significant discrepancies may exist between attendee expectations and the actual protocols for air quality related cancellations that venues follow. Given the complexity of rules, regulations, and contractual obligations that accompany commercial and collegiate sporting events, some outdoor venues themselves may often have limited ability to cancel or postpone events due to poor air quality. Consequently, to facilitate informed decision-making by event attendees, we suggest that UO and other sporting venues combine informational resources about air quality with clear communication about the circumstances under which they will cancel events due to air quality concerns. For example, venues could include this content on event advertisements, tickets, or ticket purchasing channels. These public service announcements could remind

attendees that it is their responsibility to check air quality resources before making a decision to attend an event.

Smoke event concerns and preparedness

Our results suggest that the population surveyed is concerned about the impacts of wildfire smoke on their health and the health of vulnerable household members. Access to personal protective equipment, such as N95 masks, may increase individuals' preparedness for responding to wildfire smoke events. Thus, making these resources available to individuals at outdoor events may increase attendance during periods of uncertainty about air quality. Venues may want to consider selling or freely distributing N95 masks to attendees of outdoor events.

Conclusion

This working paper reports the results of a survey targeting individuals who regularly attend outdoor athletic events at UO or other venues. It summarizes the survey population's expectations, experiences, and concerns regarding wildfire smoke and poor air quality. This report outlines expectations and preferences for sporting venues' communication and protocol during smoke events, as well as individuals' preparedness and protective actions related to prior experiences with poor air quality. Our results are exploratory and, given the low survey response rate, may not reflect the opinions of most athletic event attendees. Our findings suggest that a potential gap may exist between spectators' expectations regarding air quality related cancellations and the actual protocols used by sporting event venues. These implications may be helpful for athletic or other outdoor event venues, policymakers, and organizations advocating for community resilience to wildfires.

Appendix A: Survey

Q1.1

We need your help to learn about air quality at outdoor athletic events in Oregon!

The University of Oregon's Institute for Resilient Organizations, Communities, and Environments (IROCE) and the Institute for Policy Research & Engagement are exploring the perceptions of wildfire smoke in Oregon.

Annually, significant portions of Oregon experience unhealthy to hazardous air quality due to high levels of wildfire smoke. Researchers at the University of Oregon designed this survey to understand public responses to unhealthy air quality from wildfire smoke as well as perceptions and opinions about air quality communication. The purpose of this research is to help to understand what concerns ticket holders for outdoor events might have about air quality, and the best ways to plan for and communicate about air quality, in the event of wildfire smoke. Questions in this survey reflect these informational research needs, but are in no way associated with official University of Oregon emergency management or event planning.

Duration. The questionnaire should take you about 10 minutes to complete.

Risks of Participation. The risks of participating in this survey are not expected to exceed the risks of daily life.

Benefits of Participation. Some of the benefits that may be expected include the creation of new communication materials or options for outdoor athletic event ticket holders in case of a wildfire smoke event. This work might also support broader efforts to reduce the impacts of wildfire smoke on the public.

If you have any questions please contact Dr. Michael Coughlan, Principal Investigator at mcoughla@uoregon.edu | 541-346-0675. You may also contact Research Compliance Services for questions about your rights as participants at 541-346-2510.

Voluntary Consent. You are being asked to voluntarily participate in a research study. It is up to you whether you choose to participate or not. There will be no penalty or loss of benefits to which you are otherwise entitled if you choose not to participate or discontinue participation. By checking "yes," you agree to take this survey and that you are at least 18 years of age. Checking "no" will end survey.

- Yes
- No

Q2.1 The following questions are about how often you have and plan to attend large outdoor athletic events held at University of Oregon facilities.

Q2.2 In the past five years, have you or a householder member purchased **season tickets or special event tickets** to any of the following outdoor athletic events at the University of Oregon (check all that apply):

- No, I have not purchased any season or special event tickets
- Unsure
- College football (season ticket)
- College track and field (season ticket)
- College baseball (season ticket)
- College softball (season ticket)
- US Olympic Team Trials - Track and Field (special event)
- Prefontaine Classic (special event)
- World Athletics Championships Oregon 22 (special event)
- Other (please list):

Q2.3 In the next year, how often do you think you will attend outdoor athletic events at the collegiate or professional level?

- 1-2 times per year
- 3-5 times per year
- 6-10 times per year
- More than 10 times per year
- Never
- Unsure

Q3.1 Section II: The following questions are about how you have experienced wildfire smoke in the past two years (from 2020-current)

Q3.2 How concerned are you about the impact of wildfire smoke to your health or to the health of one or more household members?

- Very
- Moderately
- Not at all
- Unsure

Q3.3 If you planned to attend an outdoor event such as an athletic event or music concert and wildfire smoke was possible, **would you seek information about the air quality** before making a decision to attend?

- No
- Yes
- I wouldn't go to an outdoor event if smoke were possible
- Unsure

Q3.4 How would you like to receive information on smoke-related air quality (select all that apply)?

- I am not interested in receiving information about smoke-related air quality
- Text alert
- Email alert
- Phone app
- Internet website
- Social media
- Television
- Radio
- Ask friends or family
- Other (Please explain):

Q3.5 During a smoke event, what information about air quality would you like to have? (Select all that apply)

- I am not interested in information about smoke-related air quality
- How to stay safe while outdoors
- How to stay safe while indoors
- Information about personal protective equipment (masks, air filtration, etc.)
- Forecasts about air and smoke conditions
- Other (please explain):

Q3.6 How often do you think you have been exposed to unhealthy air quality from wildfire smoke in the past few years?

- Never. I have never experienced wildfire smoke
- Less than one day in a year
- One to three days per year
- Three to five days per year
- More than five days per year
- More than two weeks per year
- Unsure

Q3.7 Has wildfire smoke ever impacted your experience at an outdoor sports event?

- No
- Yes
- Unsure

Q3.8 Were you prepared for reducing your exposure to smoke during the last wildfire event you experienced?

- No
- Yes
- Unsure

Q3.9 Which of these factors contributed the most to your preparedness? (Select all that apply)

- Smoke doesn't concern me
- I have experienced smoke events before
- I already had emergency supplies stored in my home
- My community has a response plan for wildfire and smoke
- I knew what to do in the event of wildfire smoke
- Unsure
- Other (please explain):

Q3.10 Would you have felt more prepared if you had access to ... (Select all that apply)

- Nothing would have made me feel more prepared
- Personal protective equipment (respirators, masks, asthma medications)
- Adequate household protections (air filters, doors and windows that seal, emergency supplies)
- Adequate information on what to do during a smoke event

- Clean air shelters in my community
- Information about the possibility of a smoke event
- Unsure

Q3.11 Did you take any of the following protective measures or make changes to your routine outdoor activities during the last wildfire smoke event?

- I did nothing differently
- Totally avoided going outside
- Somewhat reduced time spent in usual outdoor recreation/exercise (walking, dog-walking, running, biking, etc.)
- Use a N95, KN95, or respirator when outdoors
- Use another type of mask when outdoors
- Other
- Unsure

Q3.12 Did you take any of the following protective actions while indoors during the last wildfire smoke event? (Select all that apply)

- I did nothing differently
- Installed/used a commercial HEPA/HVAC air system
- Used portable HEPA air purifiers
- Used a home-made box fan HEPA air filter indoors
- Created a cleaner air space in my home (e.g. kept windows and doors shut)
- Used a N95, KN95, or respirator when indoors
- Used another type of mask when indoors
- Went to a cleaner air space
- Unsure
- Other

Q3.13 If you travel to the University of Oregon (UO) for an outdoor sports event, what expectations do you have for the event communication and response to air quality? (Select all that apply)

- The UO sports venue or local authorities will monitor and communicate changes in air quality conditions
- The UO sports venue or local authorities will cancel the event if the air quality becomes unhealthy to vulnerable peoples
- The UO sports venue or local authorities will cancel the event if air quality becomes unhealthy or hazardous to most people
- The UO sports venue or local authorities will provide cleaner air shelters for visitors if air quality becomes hazardous
- None of the above

Q4.1 Please tell us about yourself.

Q4.2 Including yourself, are any of these populations members of your household? (Select all that apply)

- Children (under 18 years old)
- Older adults (over 65 years old)
- Pregnant women
- Individuals with asthma or other respiratory diseases
- Individuals with cardiovascular diseases
- Outdoor workers
- Others that I would consider at higher risk from smoke. Please describe:
- None of these populations are part of my household

Q4.3 What is your age (in years)?

Q4.4 What is your gender identity?

- Man
- Non-binary/non-conforming
- Woman
- Prefer to self-identify:
- Prefer not to answer

Q4.5 How do you identify yourself? (Select all that apply)

- Black or African American
- Hispanic or Latino/a/x
- Asian or Asian American
- Native American/American Indian/Alaskan Native
- Native Hawaiian or Pacific Islander
- Middle Eastern or North African
- White
- Other:
- Prefer not to answer

Q4.6 What is your preferred spoken language?

- English
- Spanish
- Other (please write in):

Q4.7 In which country do you currently reside?

Q4.8 What is your zip code?



Appendix B: Outreach Materials

Sports Event Planning with Air Quality in Mind

UO researchers seek to understand public tolerance for poor air quality and preferred methods for receiving event updates

Thousands of visitors will flock to the World Athletics Championships Oregon22 (WCH Oregon22) at the University of Oregon's Hayward Field this July. For many, it may be their first experience visiting the Pacific Northwest, where forest fires and other factors can sometimes affect air quality.

How does the public view exposure to wildfire smoke? If air quality forces changes to planned events, how would visitors want to be informed of those changes? A team of UO researchers monitoring air quality at Hayward Field is launching a survey to find out, and their efforts will help championship organizers while improving our understanding of how to navigate outdoor events when air quality is poor for any reason.

The interdisciplinary team — made up of researchers from [the Institute for Resilient Organizations, Communities, and Environments \(IROCE\)](#), [Center for Science Communication Research](#), and [Institute for Policy Research and Engagement](#) — developed the survey as a baseline assessment for making outdoor events more resilient to the potential hazards, not only in Oregon but internationally. World Athletics is working with the UO to carefully monitor air quality at the event.

“Measuring the air quality impact of athletics events is an extremely interesting field of research that will allow us to ensure the long-term sustainability of our sport,” said Dr. Paolo Emilio Adami, the medical manager of World Athletics, based in Monaco.

Data-Driven Approach to Planning

The survey, which is open to anyone who is planning to attend events at Hayward Field this summer, asks respondents about whether they would seek air quality information prior to attending an event, how they would like to receive information about air quality, whether such information would help them feel more prepared and other questions related to concerns and experiences with wildfire smoke.

“Broadly, what we're doing with our efforts under [WCH Oregon22] is trying to improve individual- and community-level responses to dealing with wildfire smoke,” said [Heidi Huber-Stearns](#), director of the Ecosystem Workforce Program at the UO's Institute for Resilient Organizations, Communities, and Environments. “We're trying to better prepare for the future,



and the future is likely to contain wildfire smoke. We are learning how to improve communication with people before and during events so we can better align our resources and efforts.”

Hollie Smith, associate director for the Center for Science Communication Research, hopes this study will improve important communication processes during all types of hazard events.

“To effectively communicate with volunteers, attendees and community members, you have to get a baseline understanding of where people go for information, what they already know and how they want to receive information,” she said. “It is particularly important for events where so many people will be traveling in and have no familiarity with the communication channels in the area.”

Sensors Compliment Survey Results

Gauging public awareness is one of the ways the UO is collecting data about air quality and its impacts on human health. [Sensors installed at Hayward Field](#) not only detect wildfire smoke, but also other particulate matter like pollen and pollution from vehicles and other sources.

Benjamin Clark, co-director of the UO’s Institute for Policy Research and Engagement noted that “the monitors and data they produce can help people from around the state in all roles, from coaches, trainers, event planners and others to better understand the risks they might face when putting on an outdoor event.”

Through these efforts, the UO team and World Athletics are working together to collectively advance understanding in air quality preparedness and planning.

“We are excited to work with the University of Oregon team on air quality, as their interest in wildfire integrates with our interest in air pollution,” Adami said. “We have never faced the situation of staging an event in an area where wildfires are common, so there is a lot to learn from their expertise. We are trying to set up a joint platform to share information on air pollution and pollen that could help us during [this summer’s event] but also provide the local community with further information through the device that we have installed at Hayward Field.”

Adami said the organization is planning to install another device during the competition that will allow for air quality comparison in different parts of Eugene.



Transdisciplinary Approaches to Environmental Change

There's a convergence of scientific awareness of the harms of smoke pollution, and a growing awareness of respiratory-based health issues, said [Mike Coughlan](#), a faculty research associate at IROCE.

"It's not a novel harm or hazard, but in terms of what the public is used to, it's a novel idea to think that the smoke in the air is harmful," Coughlan said. "This kind of work builds community and individual resilience toward a problem that is getting worse. We're still at an early level of public understanding even though the science is clear that wildfire smoke is a serious public health issue."

Coughlan and Huber-Stearns noted that while the air quality research is important for the sports events this summer, this work can be applied more broadly to understanding how communities, including universities, plan and work through unpredictable and difficult issues like natural hazards.

"The work of this interdisciplinary UO research team better positions the university to respond to air quality concerns not only to protect athletes and fans, but also to contribute to a growing body of research about the effects of wildfire," said Cass Moseley, interim vice president for research and innovation. "This is another example of how the UO is a leader in creating new approaches to how we address environmental concerns as our climate changes."

— *By Kelley Christensen, Office of the Vice President for Research and Innovation*