

The Human Response to Wildfire Smoke

EPA SMOKE MANAGEMENT MEETING

Mariah Fowler M.S. CE

Moji Sadegh Ph. D

May 30, 2019



BOISE STATE UNIVERSITY

Photo: Ridler, Keith. "Central Idaho Wildfire Enters Sawtooth National Forest." *The Spokesman-Review*, 31 July 2018, www.spokesman.com/stories/2018/jul/31/central-idaho-wildfire-enters-sawtooth-national-fo/.

Why are we here?

Human Response – Risk Mitigation

Wildfires and wildfire smoke will continue to be a daunting hazard in the western United States

Social behavioral understanding of the human response to wildfire smoke hazard can help public health and safety administrators mitigate associated risks

Trans-disciplinary approach is required (All of you)

Human Response – Policy

Lack of social behavioural understanding may render “*well-intended policies*” ineffective

The implementation of a risk management system for wildland fire policy and operations needs to account for smoke as well

Importance of social interactions, local knowledge of risk, financial support

Human Response – Perception of Hazard



- Peoples' response to hazards depends on their interpretation of the risk
- *"shaped by their own experience, personal feelings and values, cultural beliefs and interpersonal and societal dynamics"* (Eiser et al. 2012).
- Importance of social interactions, local knowledge of risk, financial support

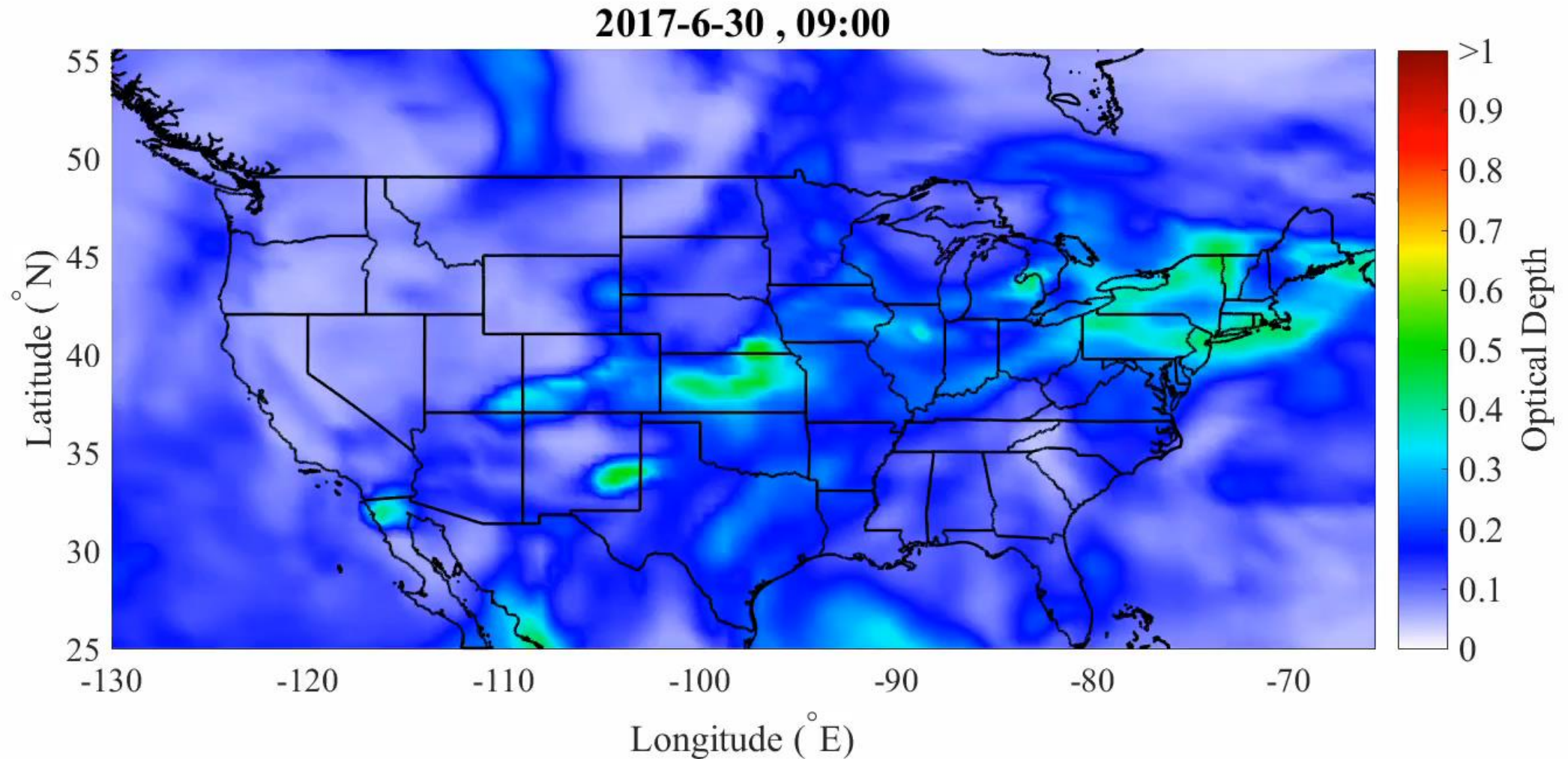
Blades, Jarod J., Steven R. Shook, and Troy E. Hall. "Smoke management of wildland and prescribed fire: understanding public preferences and trade-offs." *Canadian Journal of Forest Research* 44.11 (2014): 1344-1355.

Eiser, J. Richard, et al. "Risk interpretation and action: A conceptual framework for responses to natural hazards." *International Journal of Disaster Risk Reduction* 1 (2012): 5-16.

Olsen, Christine S., et al. "Communicating about smoke from wildland fire: challenges and opportunities for managers." *Environmental management* 54.3 (2014): 571-582.

Raschky, Paul A. "Institutions and the losses from natural disasters." *Natural hazards and earth system sciences* 8.4 (2008): 627-634.

Impacts of Wildfires: Smoke



Science Gap



- Human response to wildfire smoke is for the most part unknown
- Impacts of a smoke event's length on human behavior has not been studied
- Perception of smoke as a hazard has not documented
- Extent that people are willing to pay for mitigation of smoke hazard is unknown



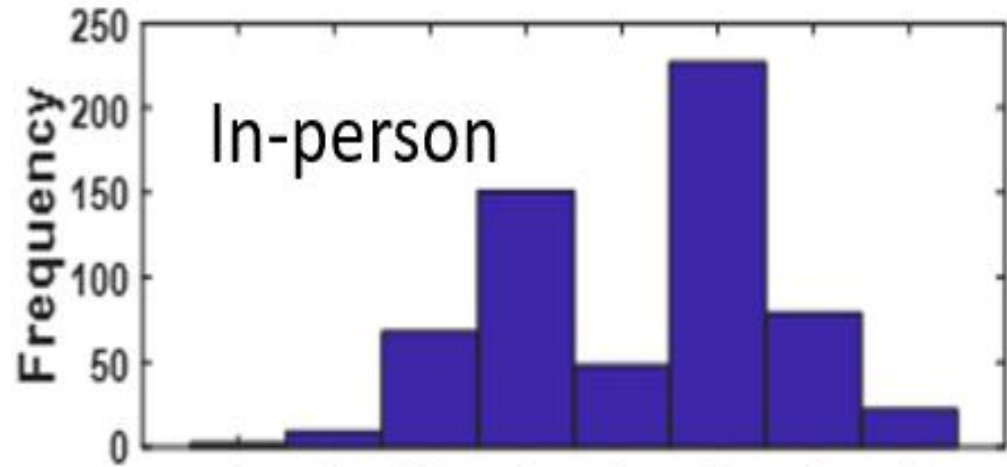
Survey Questions

Category	Category	Category	Questions content
Demographic Data (6 questions)	Air Quality Notification (13 questions)	Natural Hazard Questions (3 questions)	<ul style="list-style-type: none"> • Perception of smoke as a hazard, • Comparison with other hazards such as tornadoes and hurricanes, • Evacuating home to prevent smoke impacts
Activity Data (3 questions)		Health Questions (3 questions)	<ul style="list-style-type: none"> • Smoke-related health experience, • Type of observed symptoms, • Mitigation strategies to reduce health issues

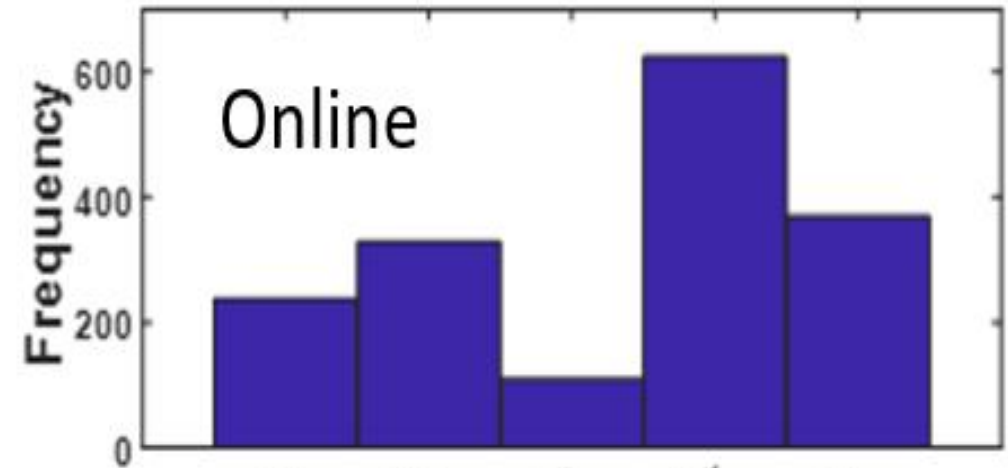
Survey Collection



Demographic Results



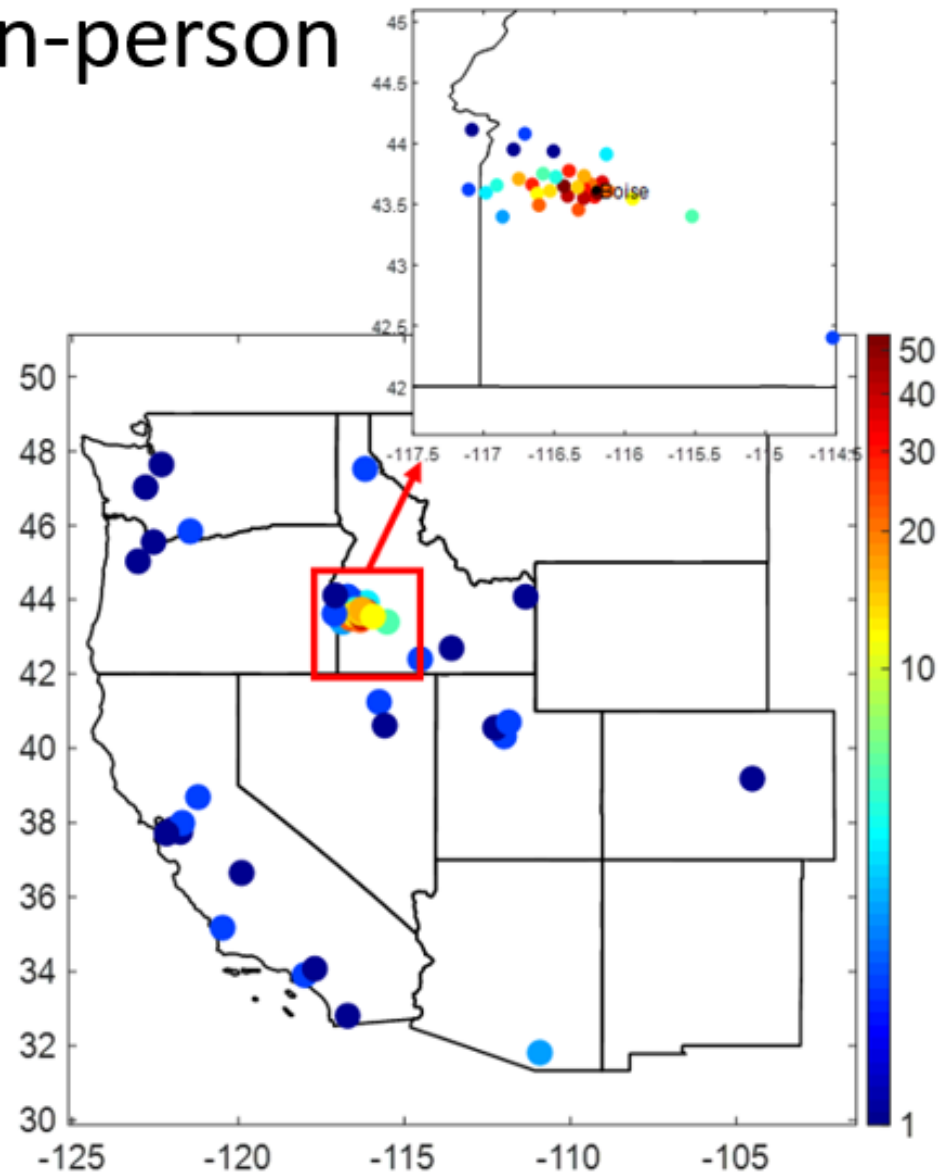
8th grade or less
Some high school, no diploma
High school graduate, diploma or GED
Some college, no degree
Associate degree
Bachelor's degree
Master's degree
Ph.D., M.D., J.D. or similar



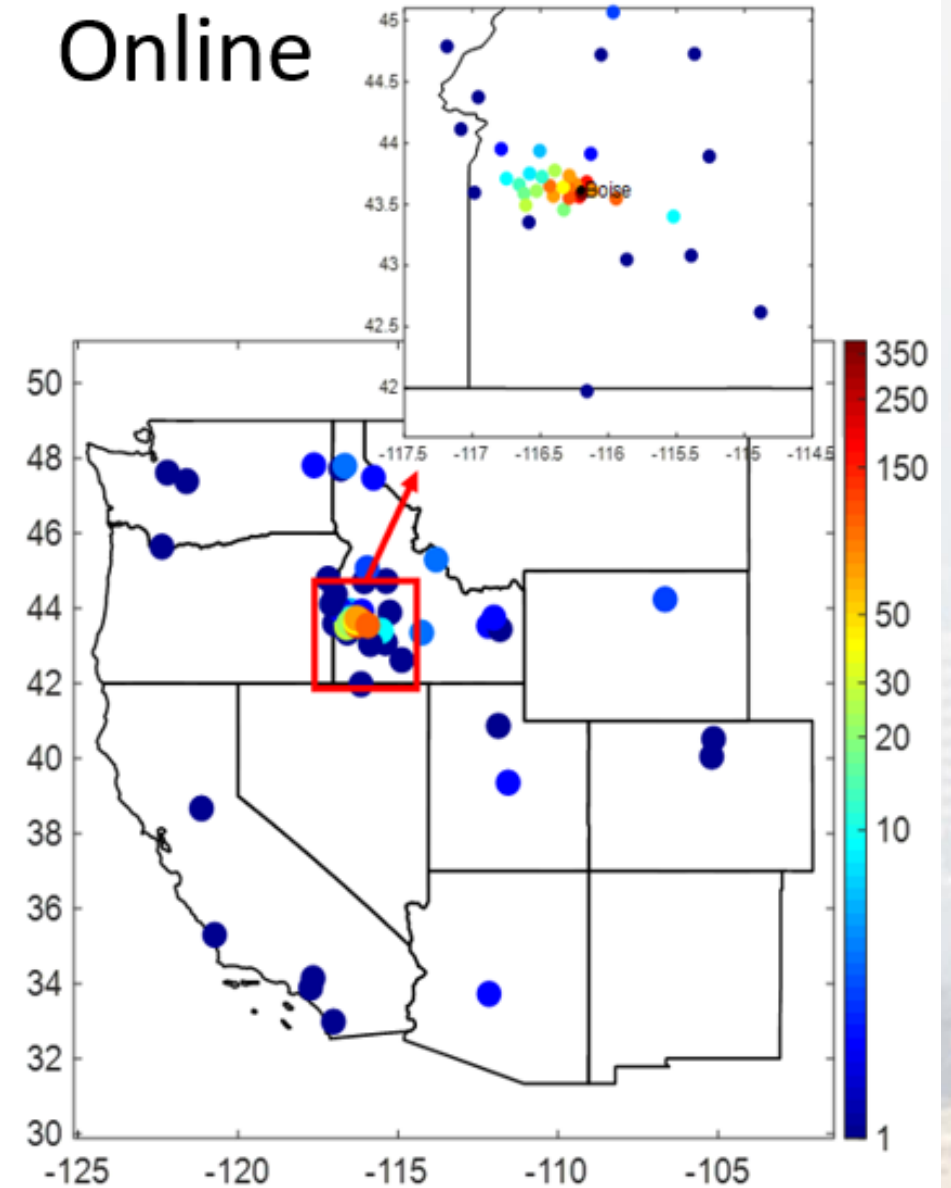
Undergrad: freshman or sophomore
Undergrad: junior or senior
Graduate student
Boise State staff
Boise State faculty

Participant Zip Code

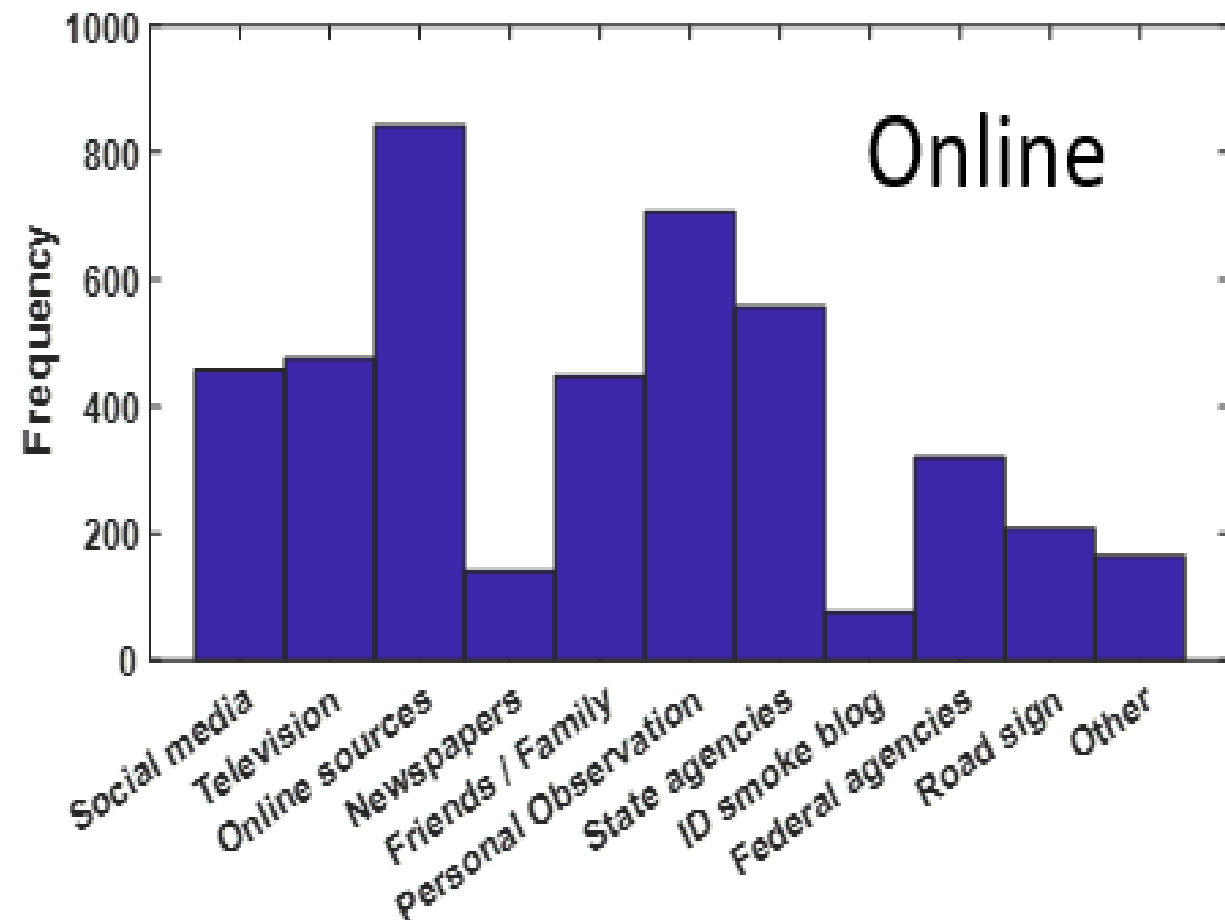
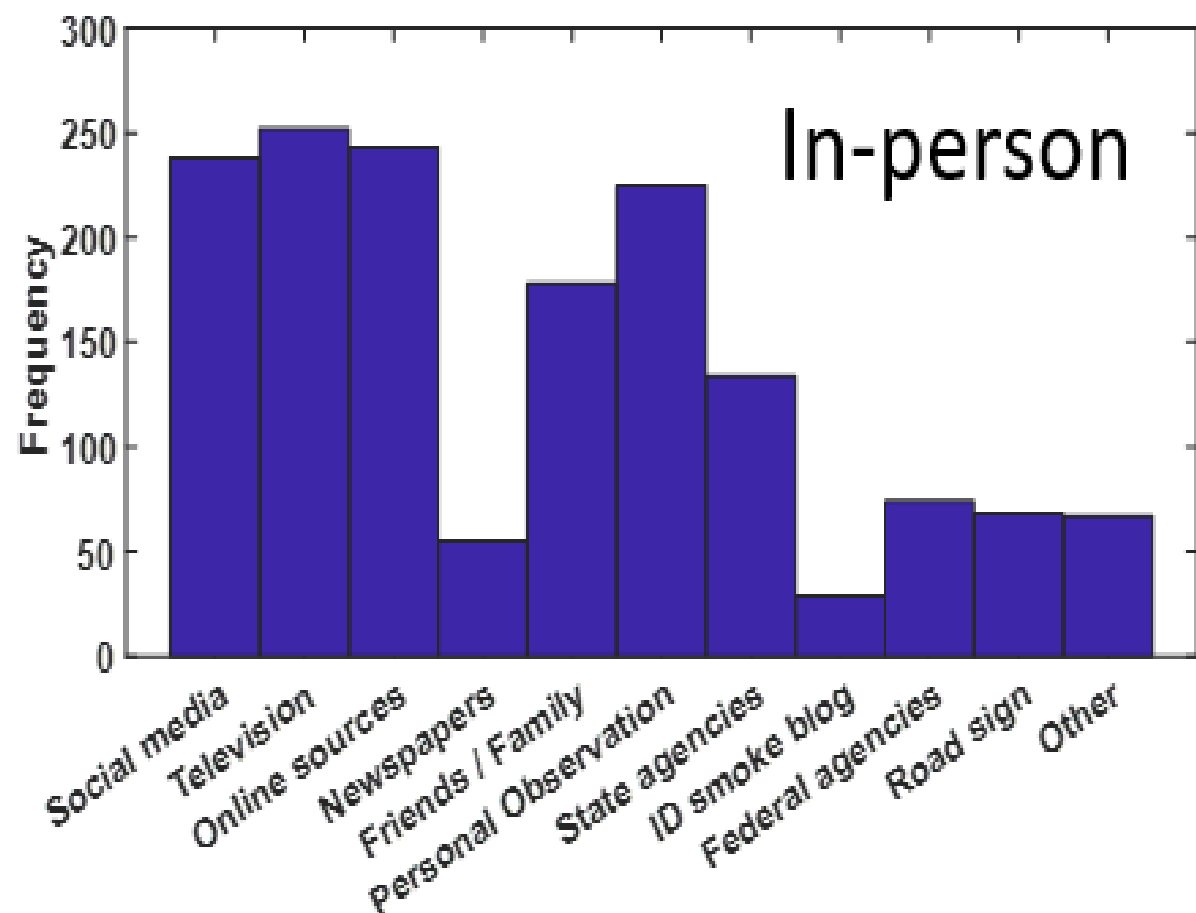
In-person



Online

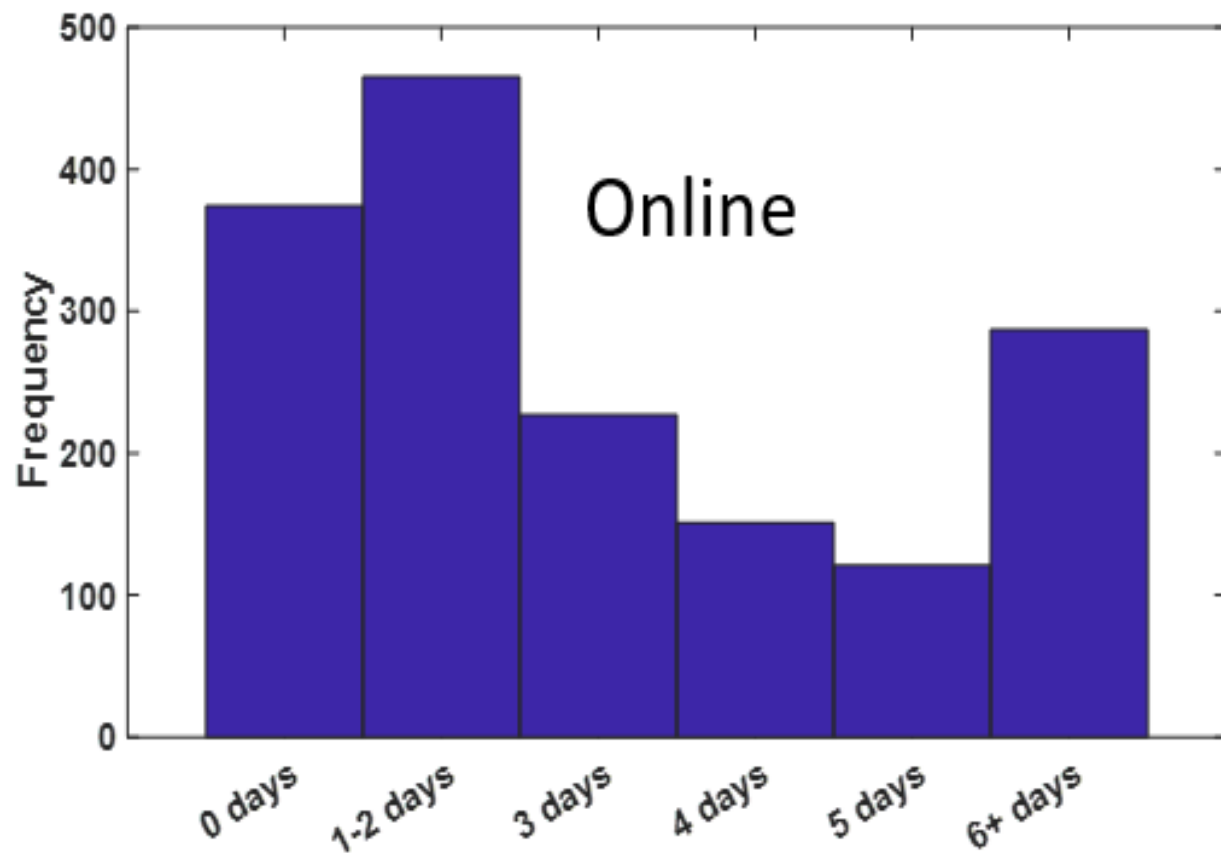
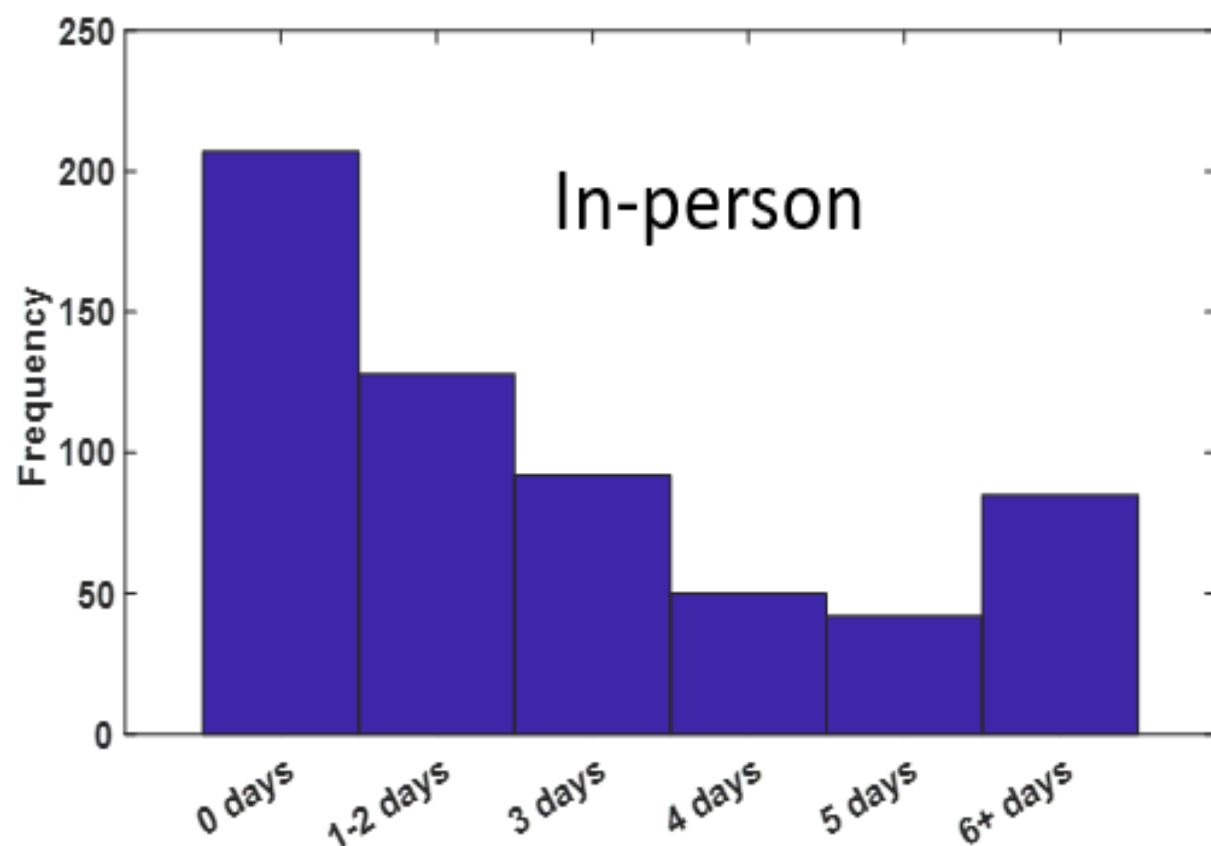


Air Quality Notifications



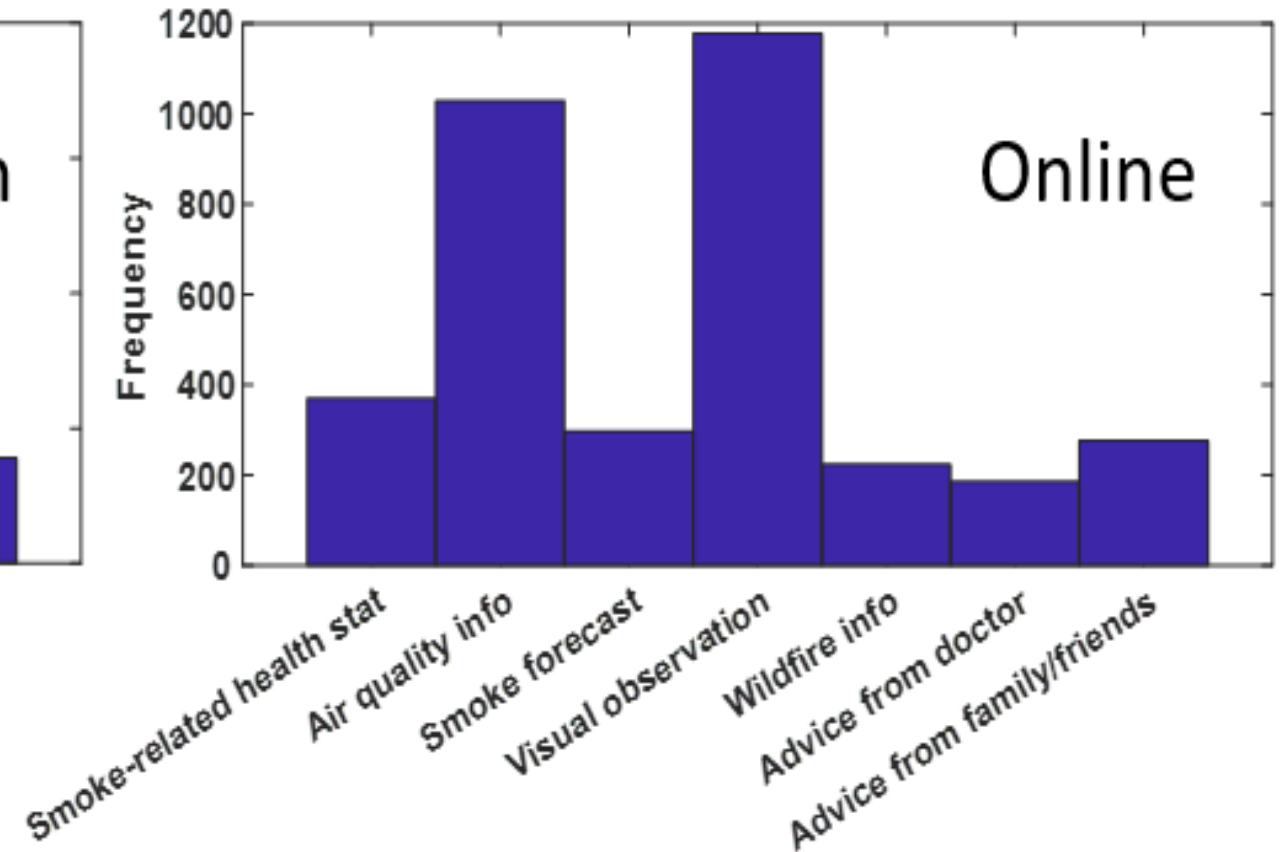
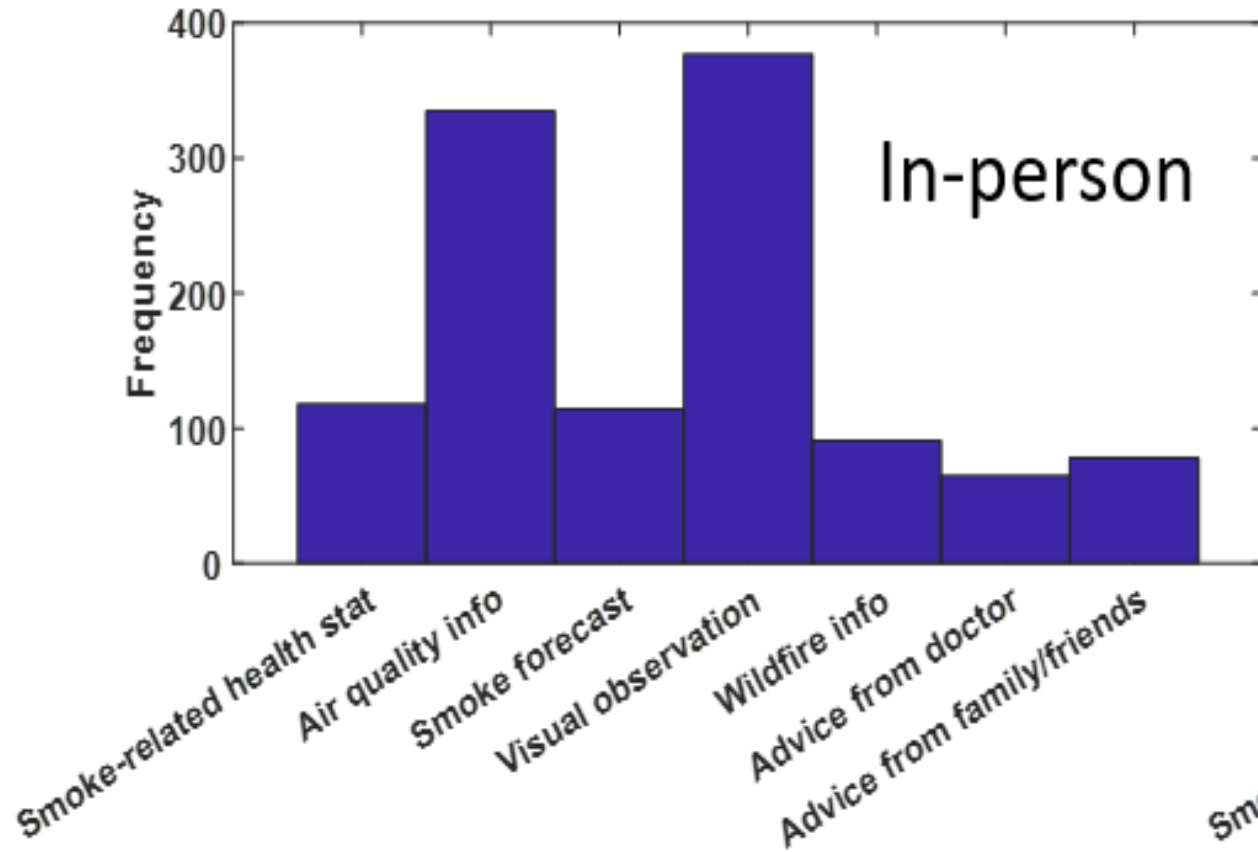
Which source do you use to find wildfire smoke notifications? [Check all that apply]

Activities



During summer of 2018, think of the *longest* period of consecutive days you reduced or eliminated your outdoor activities due to a smoke event. How many consecutive days did you reduce or eliminate activity?

Info that Motivated to Reduce Outside Activities



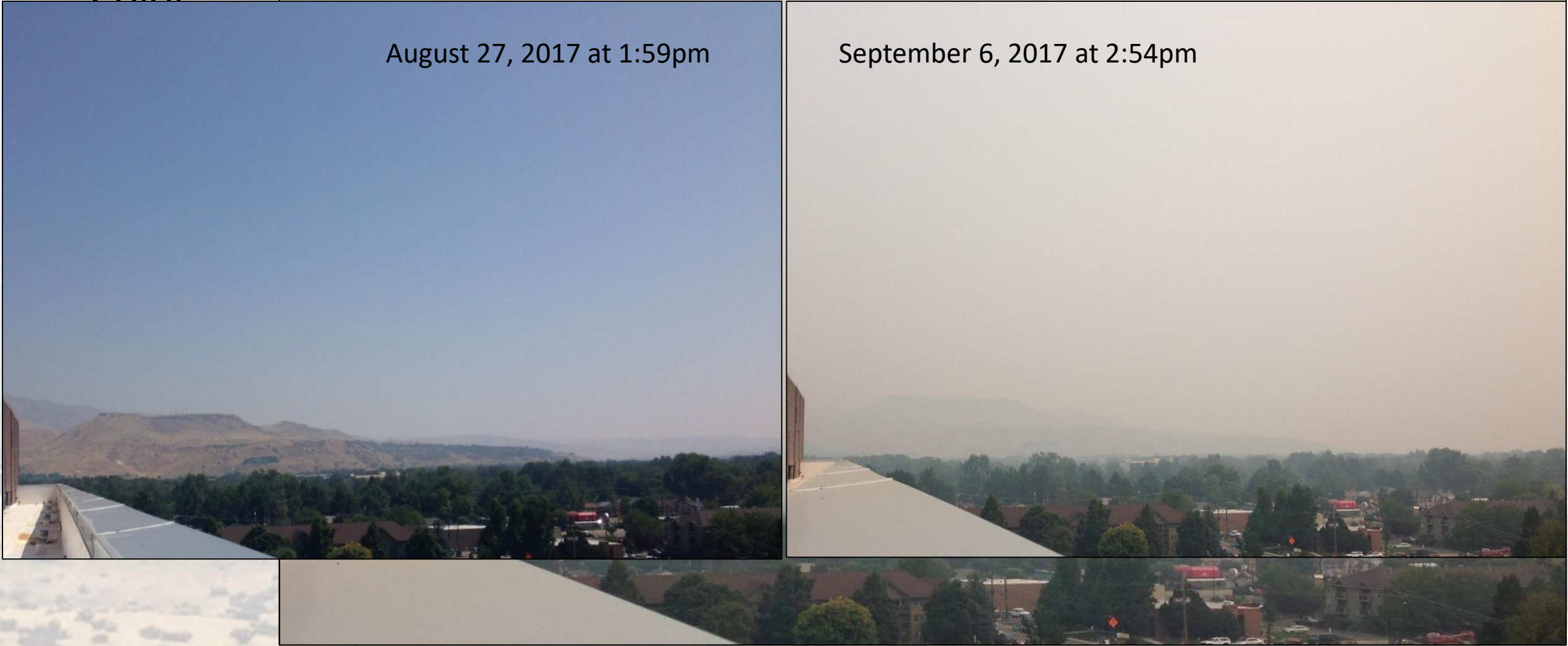
If you decided to limit your outdoor activity during a smoke event, what type of information motivated your decision to do so? [Check all that apply]

AQI Game....

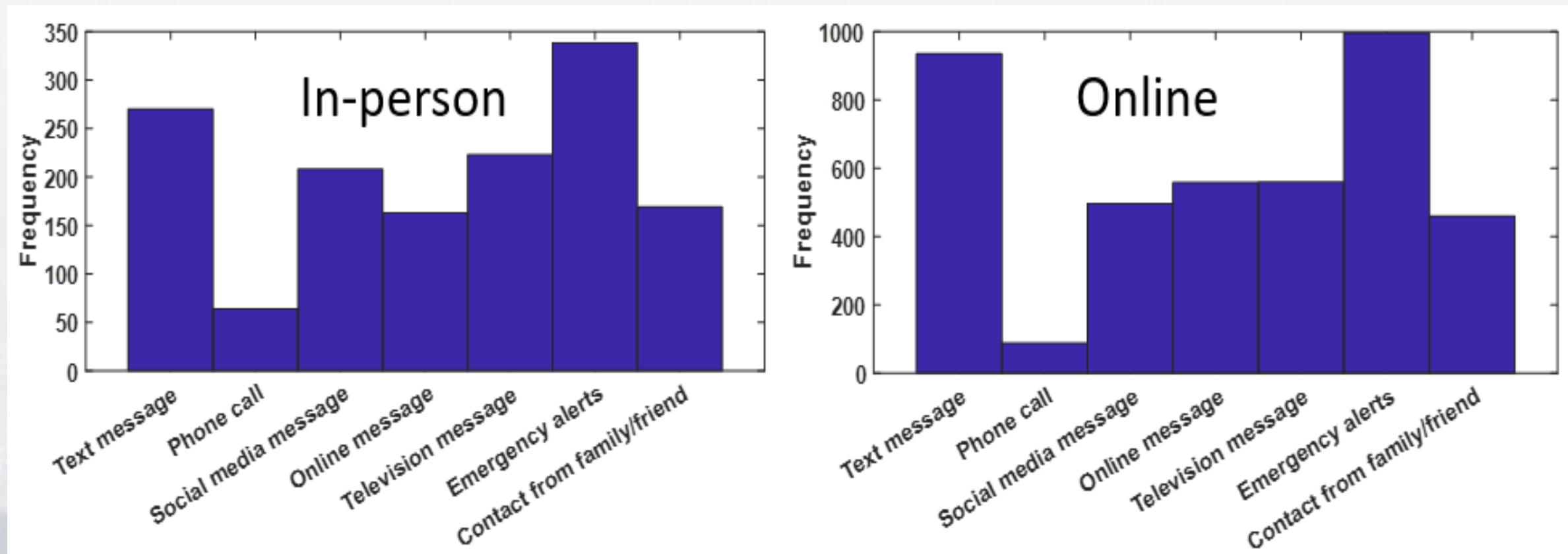
Color

August 27, 2017 at 1:59pm

September 6, 2017 at 2:54pm

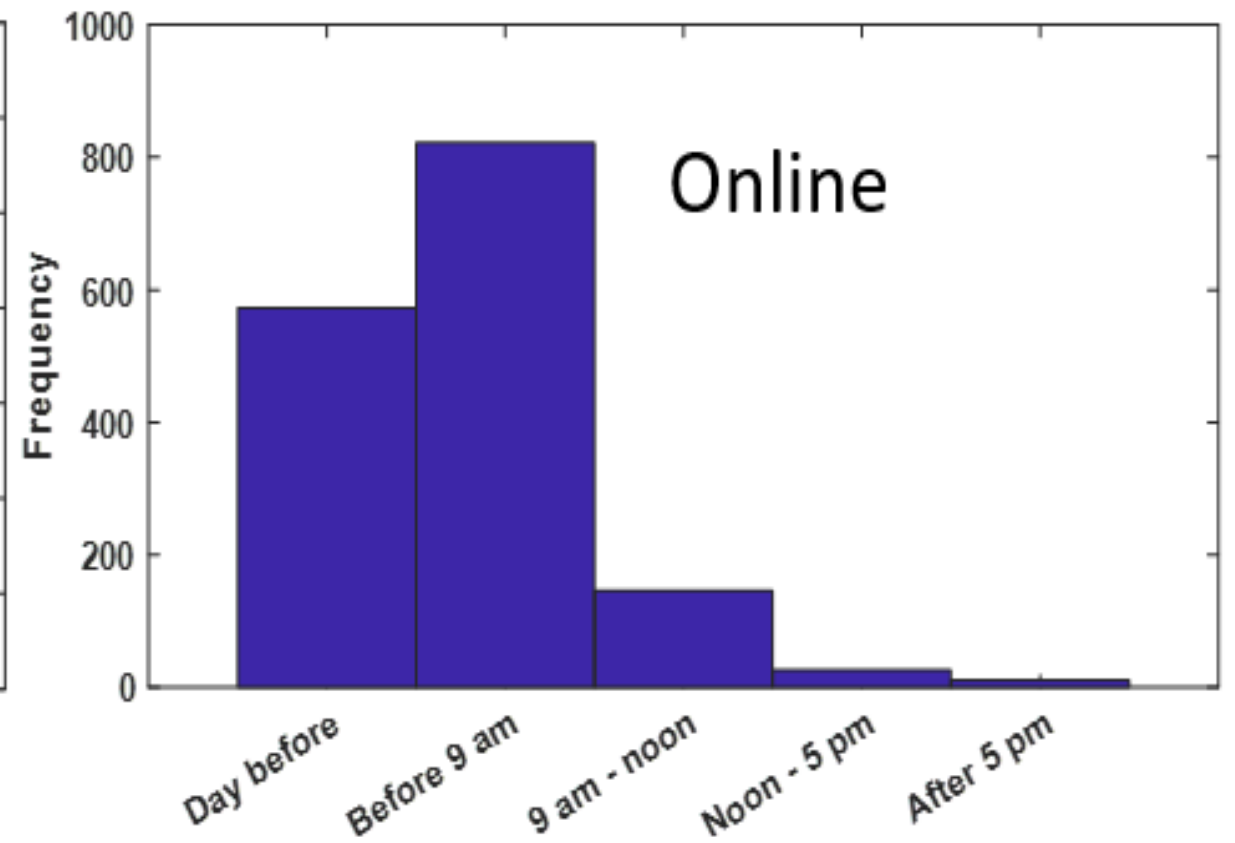
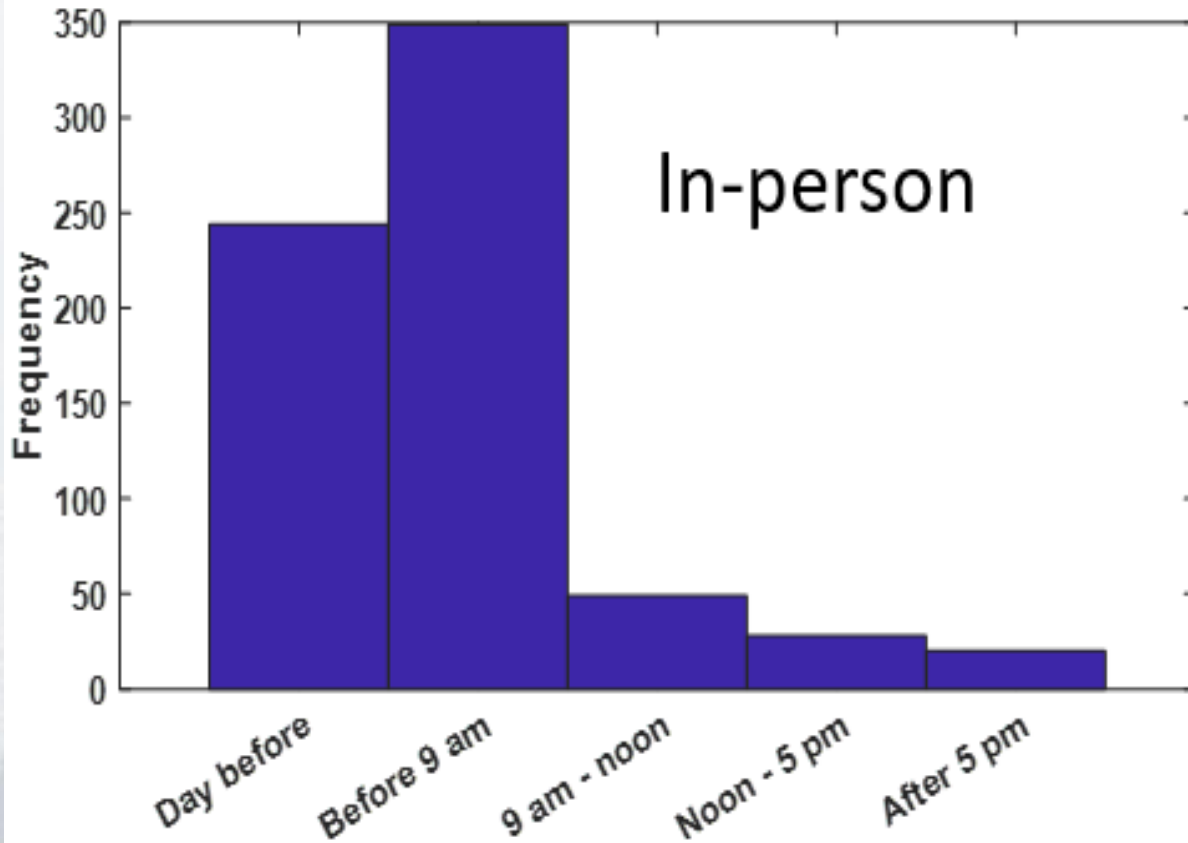


Message Medium that Motivated Mitigation Actions



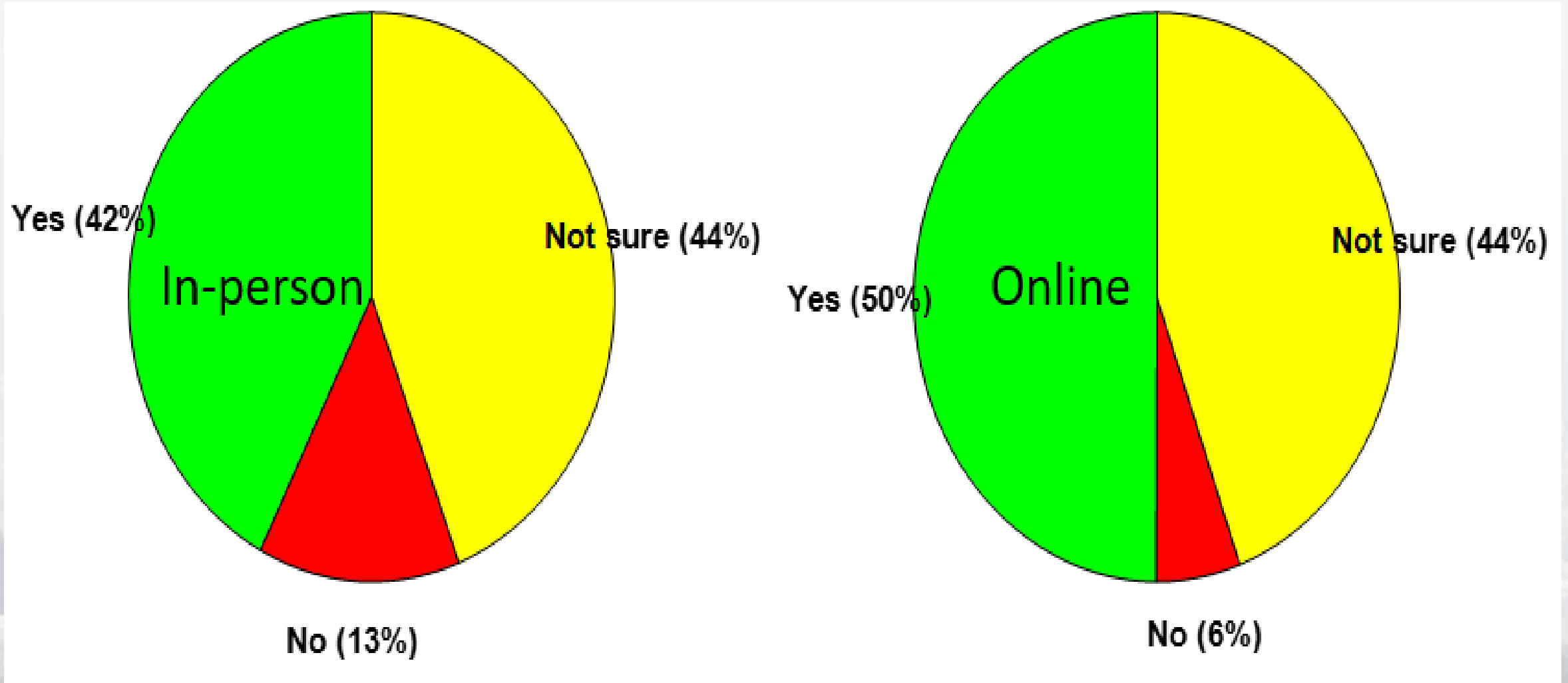
What type of message could motivate / motivated you to take action to mitigate the risk of issues related to wildfire smoke, such as staying indoors or leaving the area? [Check all that apply]

Message Timing



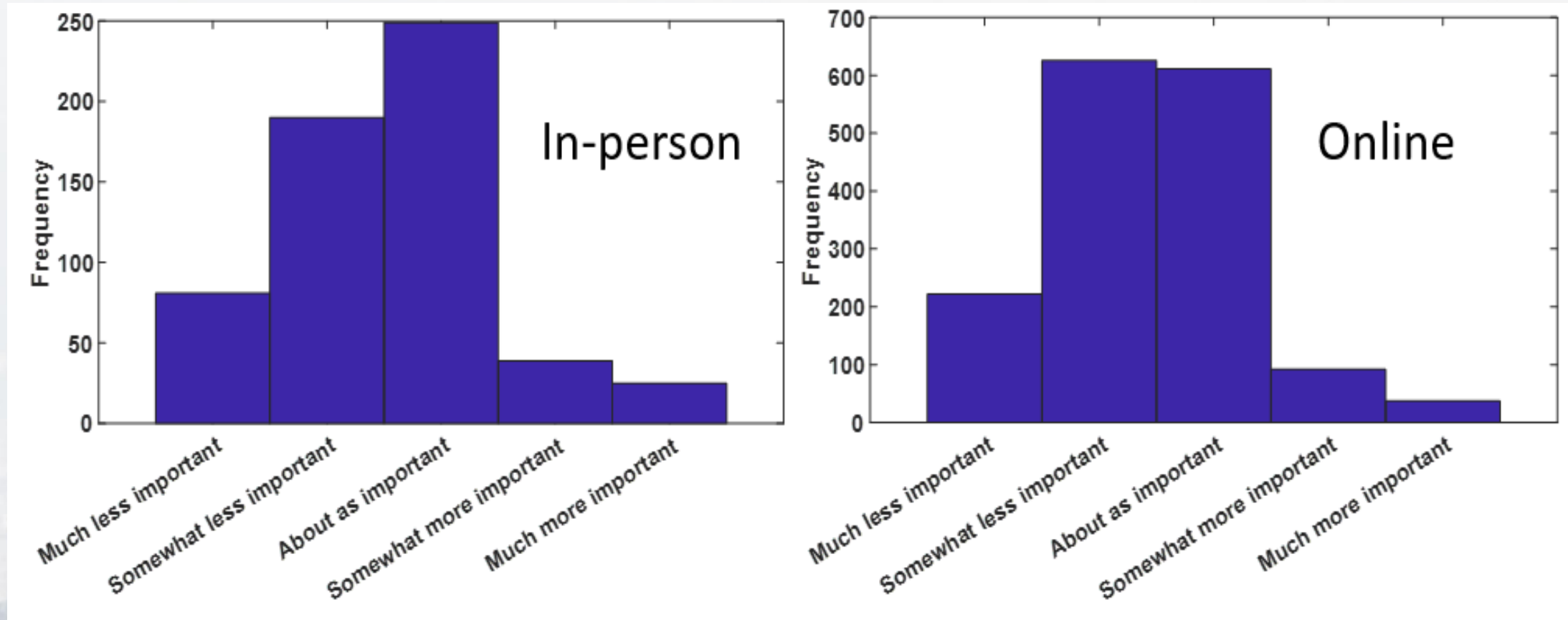
When would receiving a smoke warning message be most likely to impact your decision to limit or avoid outdoor activities *that same day*?

Preventative Actions to Reduce Health Impacts



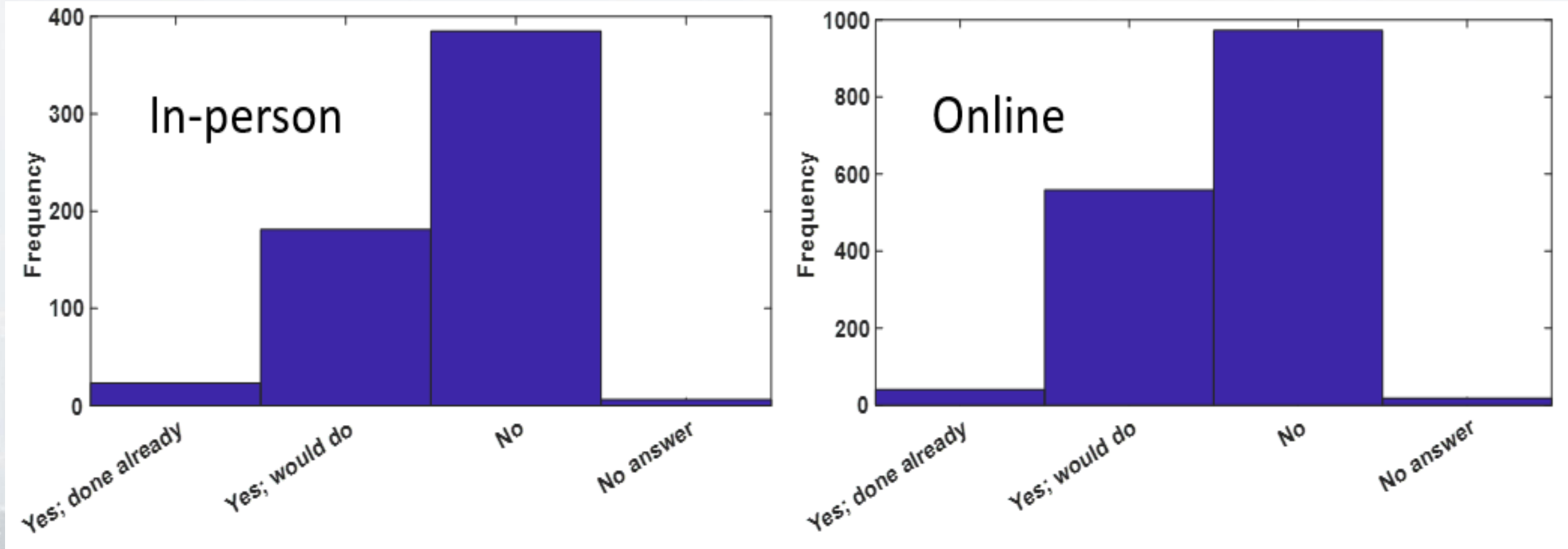
Will you take preventive actions to reduce smoke-related health impacts in the future?

Compare Smoke to Other Hazards



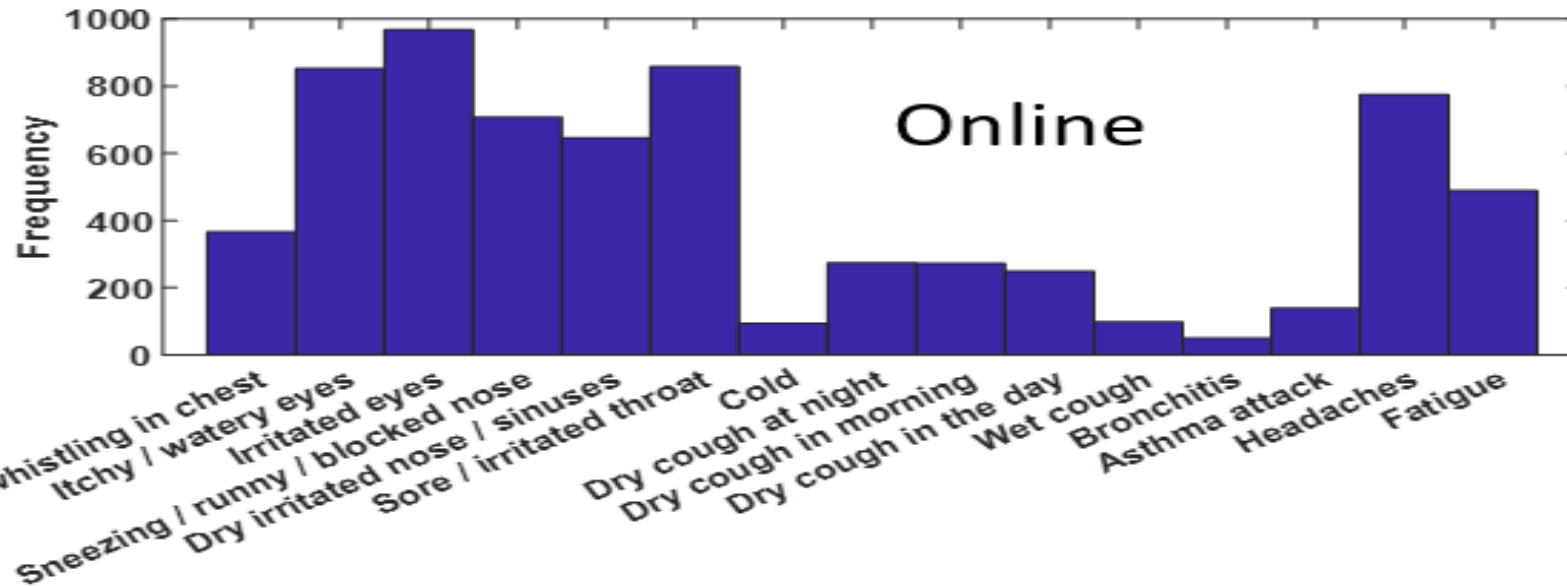
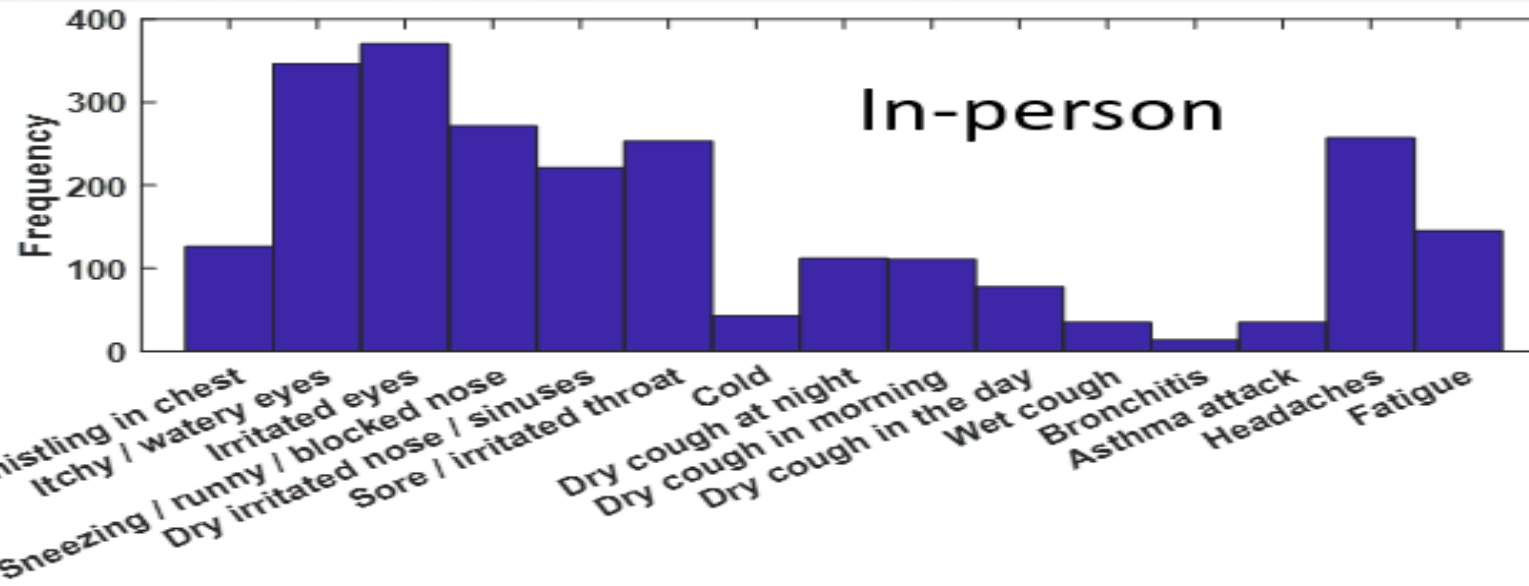
As a public health threat, are wildfire smoke events more important, less important, or about as important as other natural disasters, such as hurricanes or tornadoes?

Evacuation



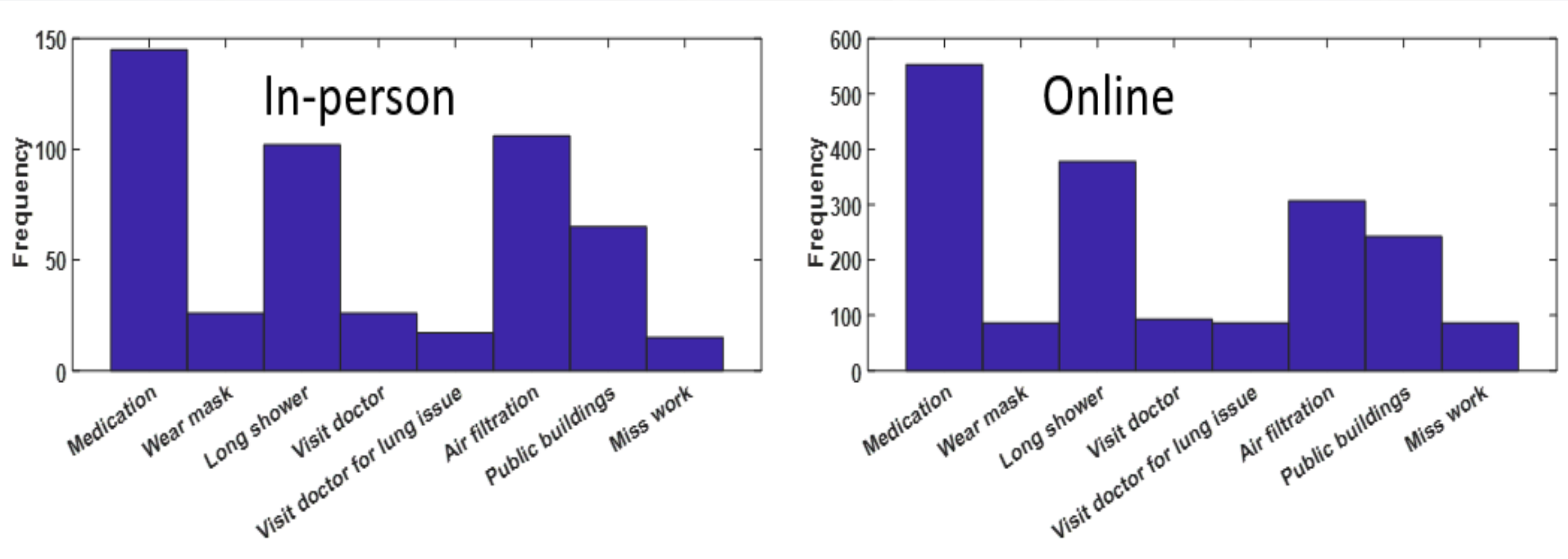
Would you consider evacuating your home only because of the wildfire smoke?

Smoke-Related Symptoms



Did you have any of the following symptoms during or a few days after one of the smoke events in the summer of 2018 in the Boise area / Treasure Valley?
[Check all that apply]

Mitigation Actions



Did you use/do any of the following to help with any symptoms during the smoke event? [Check all that apply]

Discussions

- Most people will reduce their outdoor activities during a smoke event for 1-2 days
- Short, direct messages are most preferred through TV, online new sources, State Agencies, and social media depending on participant demographics
- As the age increases, the willingness to reduce activities also increases
- The higher the education level, the more prone to reduce activities
- Majority (80%) of participants perceived smoke as hazard, but majority not willing to evacuate
- 93% of in-person and 81% of online survey participants observed at least one symptom

Questions



Mfowler@Forsgren.com for Mariah

Mojtabasadeqh@boisestate.edu for Moji



BOISE STATE UNIVERSITY

FORSGREN
Associates Inc.