

Information on the Survey:

Participants of this study are the users of the Smoke Sense application. Users will be asked to establish their user profile through a “Profile Survey” (S1) and to report their weekly symptoms and behaviors related to wildfire smoke through a “Symptoms Report Survey” (S2). In the Health Behavior Module, they can answer questions related to specific wildfire related scenarios (S3). All questions will be answered with pull down menus accepting a single input or check boxes/buttons accepting multiple inputs.

In the Profile Survey (S1), we will ask participants 10 survey questions, basic demographics such as sex, age-group, race, and baseline health and activity information. The profile survey also asks for a preferred zipcode location (not necessarily the location of residence). Users can choose an option to “Allow the app to access GPS when Smoke Sense is in use” instead of “referred zipcode”. The app will not track GPS locations, only the preferred location will be saved and used to center map displays of smoke. Users will be given an option to receive notifications “I agree to receive notifications” [checkbox].

On Monday mornings, participants will receive a notification on their device inviting them to complete their weekly “Symptoms Report Survey” (S2) on health symptoms (Yes/No). If the participants answer “No”, no further questions will need to be answered. If the participant answers “Yes” participants will be asked to select from four groups of symptoms: Eyes & Ears; Respiratory, Nose & Throat; Cardiovascular; and Other. After selecting a symptom-group, participants will be asked to select a specific date of the symptom onset (calendar view), whether or not they were seen by physician (inpatient/outpatient); whether they used medication(s) (prescribed or over the counter); and whether they traveled further than 50 miles from their “preferred” location. If a participant has missed filling in the weekly survey they will be able to report previous answers up to four weeks. Along with the health symptom section, participants will be prompted with a question about smoke exposure and actions they took to reduce exposure (wear a mask) during the previous week. If no, the survey ends; if yes, the survey continues with a module about behavior during the past week. If a user does not respond in several consecutive weeks we will push a notification asking for the reason (too busy, not affected by smoke, etc).

Users will have the option to complete Health Behavior Module Questions (S3) that allow them to interact with scenarios and estimate the adoption of health protective behaviors for the affected public at large.

Consent to Participate Embedded in the Survey and App.

A following consent will be embedded with the survey and use of Smoke Sense app. Users will not be able to use the app without confirming willingness to participate.

“The purpose of this research is to understand the impact of wildfire smoke on health and the use of environmental monitors to communicate the likelihood of potential exposure. The approach we are testing uses mobile technology (i.e., “cell phone apps”) to facilitate real time exchange of information.

Participation is open to all individuals over 18 years of age who is interested, as long as they can use the app. The results of weekly survey and basic usage statistics across all participants will be provided back to the app and available to all users in real time. In addition, participants will be provided with environmental model predictions of smoke from large fires and recommended measures to reduce health impacts from wildfire smoke.

Participation is voluntary. Data obtained through widespread use of the Smoke Sense app will help researchers quantify health impacts experienced in communities during smoke events and gain understanding about how individuals access information and make decisions in order to improve health outcomes during smoke events. Data provided through survey responses and use of the app will not be linked to individual users. The study will end on October 31, 2017.

I agree to participate in the research study and certify that I am at least 18 years old.”

Survey Data Collected From Participants

The users will be asked to provide feedback through surveys. There will be two distinct surveys; (S1) Profile Survey, (S2) Weekly Symptoms and Behavior Survey. All questions will be answered with pull down menus accepting a single input or check boxes/buttons accepting multiple inputs.

Profile Survey-S1

Example questions for the profile survey.

- 1) Your sex:
 - a. Male
 - b. Female
 - c. Other

- 2) Your age?
 - 18-29
 - 30-39
 - 40-49
 - 50-64
 - 65+

- 3) What race/ethnicity best describes you? [checkbox]
 - a. White
 - b. African-American/Black
 - c. Asian/Pacific Islander
 - d. Native American
 - e. Hispanic/Latino
 - f. Other

- 4) What is your highest education level? [checkbox]

- a. High school degree, GED or less
 - b. Technical school, trade or vocational training
 - c. Bachelors, master's degree, doctorate or professional degree.
- 5) Has a health care provider ever diagnosed you with any of the following diseases: [checkbox, multiple answers]
- a. Asthma
 - b. Chronic Obstructive Pulmonary Disease (COPD)
 - c. Other respiratory disease
 - d. Hypertension and high blood pressure, other heart disease
 - e. Type II diabetes, metabolic syndrome, or obesity
 - f. Allergies related to the upper respiratory track, eyes, and ears
 - g. Other chronic disease
- 6) Do you commonly experience symptoms of: [check box, multiple answers] [please note that each symptom is aggregated and each answer is one bullet]
- Coughing, trouble breathing, shortness of breath, wheezing, asthma attacks, or similar
 - High blood pressure
 - Chest pain or tightness, rapid or irregular heartbeat, or similar
 - Stinging eyes, scratchy throat, or similar
 - Runny or stuffy nose, irritated sinuses, or similar
 - Tiredness, headaches, or similar
 - None of the above
- 7) On average when you are outside, how active are you?
- a. Mild (walking, standing)
 - b. Moderate (regular jog, gardening)
 - c. Very Active (run, bike daily, work outdoors)
 - d. Not Very Active

Please rate your level of agreement (50% of these questions will be retained based on pilot testing):

Strongly disagree ← → Strongly agree

I have been personally affected by smoke from wildfires.

My community is regularly impacted by smoke from wildfires.

Wildfire smoke is a threat to my health.

Wildfire smoke is a threat to the health of others (preexisting disease, age, occupation etc).

A few hours of wildfire smoke in the air can impact my health.

Short-term (a few hours) exposures to wildfire smoke are a concern to my health.

Persistent wildfire smoke conditions for days can impact my health.

Chronic exposures to wildfire smoke are a concern to my health.

I can take concrete steps to reduce my wildfire smoke exposure.

I know what to do to reduce my wildfire smoke exposure.

Information resources help me protect myself from the health impacts from wildfire smoke.

Information alerts are likely to help me reduce my exposure to wildfire smoke.

Data from air pollution monitors help me to understand pollution levels in general.

Data from air pollution monitors help me to understand what I see and smell when there is wildfire smoke.

I have thought “a lot” about how I can reduce my wildfire smoke exposure.

If there is wildfire smoke in the air, I will think about how to protect my health.

Health impacts of wildfire smoke can last for days and weeks.

Before considering reducing wildfire smoke exposure, I need more information on:

whether smoke impacts my health

whether specific measures will help my health

whether the measure was recommended by a trusted source

the effort required for a specific measure

the monetary costs of a specific measure

Weekly Survey - S2

The second survey is repeatable; on Monday mornings participants will receive notification on their device inviting them to complete their weekly survey on health symptoms (Yes/No). If the participants answer “No”, no further questions will need to be answered. If the participant answers “Yes” participants will be asked to select from four groups of symptoms: Eyes & Ears; Respiratory, Nose & Throat; Cardiovascular; Other:

- 1) Record your health symptoms [multiple choices 4 categories, individual symptoms are listed as examples, do not choose individuals symptoms]

Eyes and Ears (category 1)

[list examples] Stinging, itching or watery eyes, ear infections, allergic symptoms, or similar.

Respiratory, Nose and Throat (category 2)

[list examples] Runny or stuffy nose, scratchy throat, irritated sinuses, coughing, trouble breathing normally, shortness of breath, wheezing, asthma attack, allergic symptoms, or similar.

Cardiovascular (category 3)

Fast or irregular heart rate, pain or tightness in the chest, high blood pressure, or similar.

Other (category 4)

Tiredness, dizziness, viral infections, other.

For each outcome category, participants will be asked to click on days of the week that best approximate the onset of symptoms.

Each question should have a submenu:

Have you been treated by physician during the smoke episodes (unscheduled meeting)?

- a. Yes, Inpatient visit
- b. Yes, Outpatient/Clinic visit
- c. No

Did you use medication to treat your symptoms?

- a. Prescription
- b. Over the counter

- 2) Did you travel more than 50 miles from your “preferred” location when you experienced symptoms [Yes/No]

Behavioral Survey Module of the Weekly Survey

As part of the weekly survey, participants will also be asked whether they have experienced a significant smoke episode during the last week [Yes/No].

- 3) Did you experience a significant smoke event while using this app?
If [No] survey ends
If [Yes] then following additional questions are asked:

- 4) Did you smell smoke outside your home/workplace/school during this time?
 - Not at all
 - 1-2 days
 - 3+ days
- 5) Did you smell smoke inside of your home?
 - Not at all
 - 1-2 days
 - 3+ days
- 6) Did you reduce exposure by
 - Leaving the area
 - Using a mask
 - Using an air cleaner
 - Avoided going to work/school [days]
 - Avoided normal outdoor recreation [days]
 - Stayed indoors [days]
- 7) What source did you find most reliable/useful/informative? [pulldown]
 - TV, local news and print
 - Search Engines (Google, yahoo)
 - State and Local Agencies
 - AirNow
 - Smoke Sense
 - Social Media (FB, Twitter, ..)
 - Other
- 8) Did you find reliable/useful/informative source?
 - Yes
 - No

An additional question will be asked if the participant has not responded to their weekly survey for more than 2 weeks

- 9) Good morning "Nickname", we haven't received your weekly surveys recently, we would like to ask you is it because
 - a. You haven't been affected by smoke
 - b. Too busy
 - c. Technical difficulties

Screenshot



Smoke Sense

WEEK 3 OF 16



Smoke Sense

Health Behavior Module Questions- S3 (pilot testing needed for version efficacy):

1. A room HEPA (high efficiency particulate air) filter can remove 99.97% of particles in indoor air.

What percentage of people who experience wildfire smoke do you think use this kind of room air filter in their house (during a smoke incident)?

During a wildfire smoke episode, (e.g. James/Mary) (used a/forgot to turn on the) portable HEPA room air cleaner in his/her bedroom and had a (comfortable/terrible) night's sleep.

During a wildfire smoke episode, using a portable room air cleaner may improve health and personal comfort, especially for people with heart, lung, or breathing issues.

During a wildfire smoke episode, without use of an air cleaner, indoor air contains more outdoor pollution, which can harm health, decrease comfort and do damage to people's hearts, lungs, and breathing.

With that in mind, what percentage of people who experience wildfire smoke should use this kind of room air filter in their house (during a smoke incident)?

Assuming this situation applied to you, how likely are you to use a room air filter in your house?

Not at all likely, Somewhat unlikely, Unsure, Somewhat likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

2. Setting your car ventilation to "recirculate", especially during a wildfire smoke episode, can dramatically reduce the outside pollution that enters your car.

What percentage of people who experience wildfire smoke do you think set their car ventilation to "recirculate" (during a smoke incident)?

During a wildfire smoke episode, (e.g. James/Mary) set his/her car ventilation to "recirculate" during his entire commute, gaining almost an hour of cleaner air to breathe/avoiding about an hour of breathing polluted air.

During a wildfire smoke episode, keeping car windows closed (not letting outside air into your car) and using recirculate for the air will help you breathe in cleaner air/avoid polluted air.

With that in mind, what percentage of people who experience wildfire smoke should set their car ventilation to "recirculate" (during a smoke incident)?

Assuming this situation applied to you, how likely are you to set your car ventilation to "recirculate"?

Not at all likely, Somewhat unlikely, Unsure, Somewhat likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

3. Doing exercise or strenuous activity outdoors during a smoke event can more than double the amount of harmful particles you breathe per minute.

What percentage of people who experience wildfire smoke do you think avoid outdoor exercise/strenuous activity (during a smoke incident)?

During a wildfire smoke episode, (e.g. James/Mary) decided to do/went for his/her normal outdoor jog on an indoor treadmill instead and felt great after/more discomfort than usual, including shortness of breath.

During a wildfire smoke episode, exercising indoors (vs. outdoors) and otherwise avoiding strenuous activity outdoors may improve your personal comfort/prevent harmful health outcomes.

With that in mind, what percentage of people who experience wildfire smoke should avoid outdoor exercise/strenuous activity (during a smoke incident)?

Assuming this situation applied to you, how likely are you to exercise or do strenuous activity indoors rather than outdoors?

Not at all likely, Somewhat unlikely, Unsure, Somewhat likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

4. During a smoke event, less pollution enters the house if you are able to keep the windows closed (and run your air conditioning).

What percentage of people who experience wildfire smoke do you think keep their windows closed (during a smoke incident)?

Elevated pollution levels from wildfire smoke can linger in a house for several hours. (James/Mary) closed the windows and ran the AC for a while to improve the air quality/reduce the pollution before his/her dinner party guests showed up.

Elevated pollution levels from wildfire smoke can linger in a house for several hours. Taking a few minutes can improve the air quality/decrease the pollution risk for a few hours.

With that in mind, what percentage of people who experience wildfire smoke should keep their windows closed (during a smoke incident)?

Assuming this situation applied to you, how likely are you to keep your windows closed?

Not at all likely, Somewhat unlikely, Unsure, Somewhat likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

5. A properly fitted N95 respirator mask blocks 95% of small particles in the air.

What percentage of people who experience wildfire smoke (and have to spend time outside during a smoke incident) do you think use an N95 respirator mask?

(James/Mary) had to be outdoors during a smoke event. He/She wore/did not wear his/her properly fitted N95 mask and felt good/lousy at the end of the day.

If you must be outside during a smoke event, wearing a properly fitted N95 mask will improve the quality of the air you breathe/reduce the risk of bad health outcomes.

With that in mind, what percentage of people who experience wildfire smoke should wear a properly fitted N95 mask (if they must be outside during a smoke incident)?

Assuming this situation applied to you, how likely are you to wear a properly fitted N95 mask?

Not at all likely, Somewhat unlikely, Unsure, Somewhat likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

6. Smoke from a wildfire typically deposits ash on surfaces (both near and far away) and can include harmful components.

What percentage of people who need to clean up after a wildfire smoke incident do you think use protective gear?

(James/Mary) saw ash in areas he/she needed to clean following a smoke event. He/She wore protective gear to safeguard his/her health/reduce the risk of bad health outcomes.

If you need to clean areas with ash following a smoke event, wearing protective gear can safeguard your health/reduce your risk of bad health outcomes.

With that in mind, what percentage of people who need to clean up after a wildfire smoke incident should use protective gear?

Assuming this situation applied to you, how likely are you to use protective gear for ash cleanup?

Not at all Likely, Somewhat Unlikely, Unsure, Somewhat Likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

7. Smoke from wildfires can travel hundreds of miles, affecting people far away from the fire itself.

What percentage of people who experience wildfire smoke do you think actively try to reduce their smoke exposure, even when a fire is not “directly” in their area?

(James/Mary) saw the news report about wildfires down the coast and went about his/her normal day. He/She didn't bother to think about the windows, the gas stove, and whether to use candles, or do vacuuming. At the end of the day, he/she noticed how bad the air was inside.

(James/Mary) saw the news report about wildfires down the coast and planned his/her day to reduce smoke exposure. To increase his/her comfort, he/she did indoor activities with closed windows and kept the indoor air clean by not using the gas stove, burning candles, or vacuuming.

Planning your activities and controlling the air you breathe can improve comfort and health, even when a fire is not “directly” in your area.

Planning your activities and controlling the air you breathe can reduce bad health outcomes, even when a fire is not “directly” in your area.

What percentage of people who experience wildfire smoke should actively try to reduce their smoke exposure, even when a fire is not “directly” in their area?

Assuming this situation applied to you, how likely are you to reduce your smoke exposure, even when a fire is not “directly” in your area?

Not at all Likely, Somewhat Unlikely, Unsure, Somewhat Likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

8. Smoke from wildfires can frequently trigger air quality warnings. Usually these warnings accurately reflect how bad the air is but sometimes, they can overestimate or underestimate pollution levels.

What percentage of people who experience wildfire smoke do you think take air quality warnings into consideration when trying to understand pollution impact?

The news report about wildfires had no warning about air quality so (James/Mary) figured it was safe to go about their day as usual. Unfortunately, the sensor reading was delayed and an air quality warning should have been triggered.

The news report about wildfires had an associated warning about air quality so (James/Mary) figured it was important to take health related precautions for the day. Unfortunately, the sensor reading was inaccurate and the air quality warning should not have been triggered.

Heeding air quality warnings can improve comfort and health by encouraging behavior changes with respect to the air you breathe.

Ignoring air quality warnings can decrease comfort and put health at risk by not considering behavior changes with respect to the air you breathe.

What percentage of people who experience wildfire smoke should take air quality warnings into consideration when trying to understand pollution impact?

Assuming this situation applied to you, how likely are you to take air quality warnings into consideration when trying to understand pollution impact?

Not at all Likely, Somewhat Unlikely, Unsure, Somewhat Likely, Very Likely

Check reasons below that might make it less likely for you to do this:

Cost (monetary), Effort (Amount of Time), Forgetting, Not enough benefit, No benefit, Other

AirScore/AirGrade questions:

The Air Quality Score/Grade is a way to tell you how clean or polluted your air is, and what associated health effects may be a concern for you. Think of the score as [a yardstick that runs from 0 to 500]/ [an exam score that runs from 0 to 100]/[a letter grade that ranges from A to F]. [The higher the Air Quality Score, the greater the level of pollution and the greater the health concern] / [The higher the Air Quality Score, the cleaner the air is and the lower the health concern]/[Poorer letter grades indicate greater level of pollution and greater health concern]. Additionally, a color range accompanies the score (example graphic with 6 colors and health effects messaging).

Optional Statement: Imagine that the average Air Quality Score/Grade in your community over the last week was [Low =125, 75, C] [Medium = 75, 85, B] [High = 25, 95, A].

Imagine the air quality today is (3 different Air Quality Scores to be displayed):

[15][97][A+,][42][91][A-], [52][89][B+], [99][80][B-], [103][79][C+], [153][69][D+], [175][65][D], [199][60][D-], [201][59][F]

The Air Quality today is:

Very Polluted, Somewhat Polluted, In Between, Somewhat Clean, Very Clean

The health risk is:

Very High, Somewhat High, Moderate, Somewhat Low, Very Low

Symptoms I might experience if there is a smoke event related to the air quality today are (checkbox):

Coughing, trouble breathing, wheezing, asthma attacks, or similar

High blood pressure

Chest pain or tightness, rapid or irregular heartbeat, or similar

Stinging eyes, scratchy throat, or similar

Runny or stuffy nose, irritated sinuses, or similar

Tiredness, headaches, or similar

None of the above