

## Understanding Your Air Pollution Exposures

Now that you know how to setup your AirBeam, it's time to start using it to track your air quality. Begin by deciding whether you'll track air quality inside or outside your home, office, or business. If you have access to more than one AirBeam, it's recommended you monitor both indoors and outdoors simultaneously as this will enable you to compare the measurements and take action accordingly. For instance, if the air is more polluted inside your home than outside, open a window or run an air filter. If you only have one AirBeam that's fine too as it can be configured and reconfigured easily, so if you set it up to keep tabs on your indoor air quality one week, you can hang it outdoors the following week, and carry it around with you the week after that.

### MONITOR INDOORS OR OUTDOORS?

To start, think about your lifestyle to help decide whether indoor or outdoor monitoring will be most relevant to you.

Here are some examples of lifestyles where fixed indoor air quality monitoring would be most relevant:

- You work at home
- You cook regularly
- You use a fireplace or wood/pellet stove
- You burn candles, incense, or use air freshener
- You have a hobby that causes polluted air, e.g. carpentry
- You have a smoker in your household
- You have young children or someone in your household has a respiratory disease

Here are some examples of lifestyles where fixed outdoor air quality monitoring would be most relevant:

- You spend most of your time outdoors or away from home
- You live near an industrial facility or near known sources of pollution
- You live near a major roadway, port, railyard, or warehouse facility
- You live where there's construction activity nearby
- You live in an area impacted by wildfires
- Your neighbors use a fireplace, wood/pellet stove, outdoor boiler, or BBQ regularly

Regardless of where you decide to locate your AirBeam, follow the instructions for recording a fixed AirBeam session by [watching this video](#).

Once your AirBeam is up and running, the next step is to connect the dots between events and exposures. That is to say, when pollution levels rise is there a corresponding event that's responsible for polluting your air.

## INDOOR MONITORING ACTIVITY

If you're monitoring indoors, use the activity tracker template posted below to jot down what's happening hour-to-hour.

6AM Wake up  
7AM Make breakfast  
8AM Drop kids at school, meet Mary in the park for a jog  
9AM Shower, Tidy up the kitchen (burnt candle)  
10AM Start work  
11AM Opened windows for fresh air  
12PM Made lunch  
1PM Work Meetings  
2PM Work Meetings  
3PM Work Meetings  
4PM Pick up kids  
5PM Start Dinner  
6PM Wash Dishes  
7PM Throw Pottery  
8PM Throw Pottery  
9PM Put kids to bed  
10PM Listen to Podcast  
11PM Lights out  
12AM  
1AM  
2AM  
3AM  
4AM  
5AM

At the end of the day or week, reference your PM2.5 levels by graphing your session on the AirCasting app or website, compare the measurements to your activity log, and attempt to match events from your log to increases or decreases in PM2.5 levels. Did levels spike around meal prep? Did opening your windows increase or decrease PM2.5 levels? Did that cozy fire pollute your indoor air?

## OUTDOOR MONITORING ACTIVITY

If you're monitoring outdoors, compare the measurements from your AirBeam to the closest government monitoring station by following the step-by-step instructions posted below.

### *Search For & View Your Fixed AirCasting Session*

- Open a new tab inside the browser window and navigate to [aircasting.org](http://aircasting.org)
- At the top of the page, hover your mouse over the text reading "AirCasting" and select "AirCasting Maps" from the dropdown
- Click the "FIXED" tab at the top left-hand side of the AirCasting maps page
- By default, the "Parameter" selection will be "Particulate Matter". If this is not the default "Parameter" selection, please update it accordingly. The default "Sensor" selection will be "OpenAQ-PM2.5 ( $\mu\text{g}/\text{m}^3$ )". Update the "Sensor" selection to "AirBeam-PM2.5 ( $\mu\text{g}/\text{m}^3$ )".
- Under "Location", enter a city or zip code then select the correct suggestion from the dropdown.
- Click the refresh icon inside the "Time Frame" field to ensure you're searching for sessions recorded during the past year, including today.
- Under "Profile Names", enter your AirCasting profile name then select the correct suggestion from the dropdown.
  - Once you've completed your search, a list of session cards matching your search criteria will appear along the bottom of the screen and the map will display the location of your fixed session.
- Click on the map marker or card for your AirBeam session to view a graph of your PM2.5 measurements.
- Click and drag your mouse over the graph to zoom to a specific time frame or use the zoom buttons along the top of the graph. Drag the scroll bar along the bottom of the graph to make further adjustments to the time frame.

### *Search For & View Data from the Closest Government Monitoring Station*

- Open a new tab inside the browser window and navigate to [aircasting.org](http://aircasting.org)
- At the top of the page, hover your mouse over the text reading "AirCasting" and select "AirCasting Maps" from the dropdown
- Click the "FIXED" tab at the top left-hand side of the AirCasting maps page
- By default, the "Parameter" selection will be "Particulate Matter" and the "Sensor" selection will be "OpenAQ-PM2.5 ( $\mu\text{g}/\text{m}^3$ )". If these are not the default selections, please update them accordingly.
- Under "Location", enter a city or zip code then select the correct suggestion from the dropdown.

- Click the refresh icon inside the “Time Frame” field to ensure you’re searching for sessions recorded during the past year, including today.
  - Once you’ve completed your search, a list of session cards matching your search criteria will appear along the bottom of the screen and the map will display the location of each fixed session.
- Using the map, click on the air monitoring station located closest to where you recorded your mobile AirCasting session.
- Click and drag your mouse over the graph to zoom to a specific time frame or use the zoom buttons along the top of the graph. Drag the scroll bar along the bottom of the graph to make further adjustments to the time frame.

You now have two browser tabs open. One tab graphs the PM2.5 levels from your AirBeam while the second tab graphs the PM2.5 levels at the closest government monitoring station. Take note of when measurements from your AirBeam substantially exceed those from the government monitor and do some detective work to see if you can identify a source responsible for polluting your local air. Go outside and use your eyes, ears, and nose to detect where the air pollution might be coming from. Can you see smoke, do you smell any odors, or can you hear noises that might be related to an air pollution source?

### **WHAT LEVEL OF FINE PARTICULATE MATTER EXPOSURE IS CONSIDERED DANGEROUS?**

Long-term exposure to fine particulate matter or PM2.5 has been linked to a range of health problems including asthma and respiratory inflammation, lung cancer, heart attack, and stroke. The U.S. Environmental Protection Agency establishes the National Ambient Air Quality Standards (NAAQS) and Air Quality Index (AQI) on the best science available, which typically uses averaging time periods of 24 hours or longer when examining PM2.5 data and relating it to health outcomes. The AirCasting app and website uses the NAAQS standards for PM2.5 exposure and the AQI to relate colors to measurements: 0-12 ug/m3 is green, 13-35 ug/m3 is yellow, 36-55 ug/m3 is orange, and 55-150 ug/m3 is red. (The relationship between colors and measurements can be changed inside the AirCasting app and website.) These ranges/colors roughly correspond to increased health risks as the concentration of PM2.5 in the environment rises. However, there are some big caveats that should be noted. First, data shows that health effects occur at levels well below current regulatory thresholds, especially for the most toxic aerosols, like those from diesel exhaust. Second, as mentioned, most health studies have primarily examined long-term exposures to air pollution, not short-term exposures, leaving the potential health implications of such exposures unclear. Current health studies are only just beginning to establish the relationships between short-term exposures to fine and ultra-fine particles and health effects, including blood inflammation and increased likelihood of heart attack. Third, because AirBeam3 does not meet the US government’s performance or quality assurance requirements (there are no Federal Equivalency Method or Federal Reference Method low-cost, mobile instruments for measuring PM2.5 on the market) this introduces uncertainty in the interpretation of the AirBeam3’s particle measurements.

## HOW CAN I REDUCE MY EXPOSURES TO INDOOR AIR POLLUTION?

There is no straightforward answer to this question, but here are some tips:

- When cooking inside always use your vent hood, and if possible, open windows. If your vent hood doesn't vent to the outdoors, consider upgrading.
- Forgo using candles, incense, and air fresheners. They may smell nice, but they pollute your air.
- If possible, avoid using your fireplace or wood/pellet stove. It may seem cozy, but these are notorious air polluters.
- Use HEPA air purifiers and replace the filters according to schedule.
- If you have a central HVAC system, use MERV13 or higher filters and replace them according to schedule.
- If pollution levels are high outdoors, leave your windows closed.
- Wear a properly fitted, task appropriate mask if you're working with chemicals, paint, or materials or tools that produce dust and open your windows.
- Don't forget to dust and wash pillows, comforters, and kids stuffed animals. Dust is a form of pollution we don't always think about!
- Consider replacing your gas stove with an electric model. Although burning gas doesn't produce much particle pollution it does produce other air pollutants, such as nitrogen dioxide and carbon monoxide.