워싱턴주 아동 및 청소년을 위한 대기질 관련 활동 가이드

Washington State Department of HEALTH

아동과 청소년(18세 이하)을 미세먼지($PM_{2.5}$)로부터 보호하기 위한 공중 보건 모범 사례는 다음과 같습니다. 이 가이드는 학교, 보육 시설, 운동 연습 및 경기, 방과 전 및 방과 후 프로그램, 캠프, 현장 학습, 기타 야외 프로그램 및 활동에 적용됩니다.

현재 및 예상 대기질은 AirNow.gov에서 확인하거나, 산불 연기가 발생하는 경우에는 wasmoke.blogspot.com을 확인하십시오.
(부록 A 참조)

실외 대기질 지수(AQI) PM2.5

활동 기간	양호 (0-50 AQI)	중간 (51-100 AQI)	민감군 건강에 유해함 (101-150 AQI)	건강에 유해함, 매우 유해함 또는 위험함 (≥151 AQI)
15분 ~ 1시간 (예: 쉬는 시간, 체육 시간, 일반적으로 실외에서 진행되는 수업)	제한 없음.	건강상의 문제가 있는 아동과 청소년은 활동에 참여하지 않거나 실내에 머물 수 있도록 허용. 필요 시 해당 아동 및 청소년의 활동 강도 제한.	실외 활동은 중간 강도로 제한. 건강상의 문제가 있는 아동과 청소년의 경우, 활동 강도를 더욱 낮추거나 필요 시 대기질이 더 안전한 구역으로 이동.	실외 활동을 취소하거나 대기질이 더 안전한 구역, 즉 공기 정화 장치가 있는 실내 또는 기타 장소로 이동. 실내 PM2.5 수치가 높을 경우 실내 활동은 가벼운 강도로 제한.
1 ~ 4시간 (예: 운동 경기 및 연습)	제한 없음.	건강상의 문제가 있는 아동과 청소년은 활동에 참여하지 않거나 실내에 머물 수 있도록 허용. 필요 시 해당 아동 및 청소년의 활동 강도 제한.	가벼운 강도의 활동으로 제한하거나 중간 강도의 활동을 총 1시간 이내로 제한. 활동 강도와 시간을 변경할 수 없는 경우, 실외 활동을 취소하거나 대기질이 더 안전한 구역, 즉 실내 또는 기타 장소로 이동하는 것을 고려. 건강상의 문제가 있는 아동 및 청소년의 경우, 필요 시 시간이나 강도를 추가적으로 제한.	실외 활동을 취소하거나 대기질이 더 안전한 구역, 즉 공기 정화 장치가 있는 실내 또는 기타 장소로 이동. 실내 PM2.5 수치가 높을 경우 실내 활동은 가벼운 강도로 제한.
4시간 이상 (예: 야외 학교 또는 프로그램, 주간 캠프, 숙박 캠프)	제한 없음.	건강상의 문제가 있는 아동 및 청소년은 필요 시 대기질이 더 안전한 구역, 즉 실내 또는 기타 장소로 이동. 건강상의 문제가 없는 아동과 청소년은 활동에 참여하지 않거나 실내에 머물 수 있도록 허용하고, 활동 강도를 제한.	가벼운 강도의 활동으로 제한하고 총 활동 시간은 4시간 미만으로 제한. 활동 강도와 시간을 변경할 수 없는 경우, 실외 활동을 취소하거나 대기질이 더 안전한 구역, 즉 실내 또는 기타 장소로 이동. 건강상의 문제가 있는 아동 및 청소년의 경우, 필요 시 시간이나 강도를 추가적으로 제한.	실외 활동을 취소하거나 대기질이 더 안전한 구역, 즉 공기 정화 장치가 있는 실내 또는 기타 장소로 이동. 실내 PM2.5 수치가 높을 경우 실내 활동은 가벼운 강도로 제한.

추가 고려 사항

활동을 실내로 이동할 때에는 창문과 문을 닫습니다. 이때 실내가 너무 덥지 않도록 주의합니다. *부록 D를 참조하십시오.*

실내 공기 정화 시스템으로 높은 실내 PM2.5 수치를 낮출 수 있습니다. *부록 C를 참조하십시오.*

실내 PM2.5 수치를 측정하는 방법은 *부록 B를 참조*하십시오.

활동 시간 계산 시 이동 시간을 포함하여 고려하십시오.

모든 아동과 청소년(18세 이하)은 민감군으로 간주됩니다. 건강 관련 고려 사항에는 천식 및 기타 폐 질환, 심장 질환, 당뇨병, 호흡기 감염(예: 호흡기 세포 융합 바이러스(RSV) 및 폐렴) 등이 포함되나 그에 국한되지 않습니다.

Washington State Department of HEALTH

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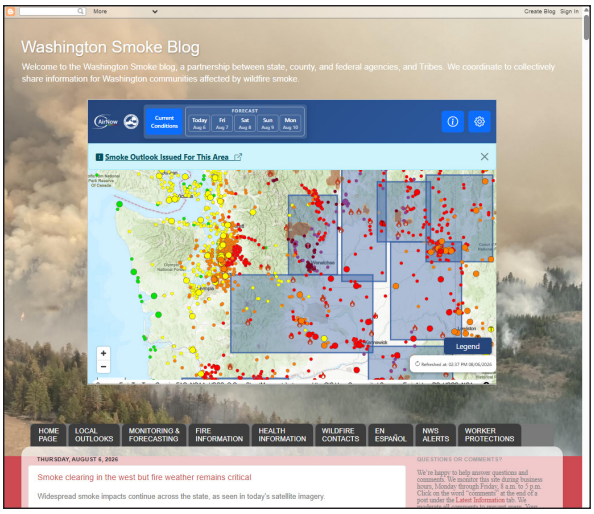
본 문서를 다른 형식으로 요청하려면 1-800-525-0127로 전화하십시오. 청각 장애가 있는 고객은 전화 711(Washington Relay) 또는 이메일 doh.information@doh.wa.gov로 연락하시면 됩니다.

PM2.5 발생원	주요 $PM_{2.5}$ 발생원은 일반적으로 따뜻한 계절에는 산불 연기, 추운 계절에는 가정 난방으로 발생하는 연기이지만, 지역에 따라 다릅니다. 다른 발생원으로는 차량 배기가스, 산업체 배출가스, 계획 소각 등이 있습니다.
아동 건강 및 위험 증가	아동과 청소년은 같은 체중의 성인보다 더 많은 공기를 들이마시기 때문에 $PM_{2.5}$ 흡입으로 인해 발생할 수 있는 건강상의 영향에 더욱 민감합니다. 이는 아동과 청소년의 대기 오염 총 노출량을 증가시킵니다. 또한 호흡기는 대략 21세까지 발달합니다. 천식 및 기타 폐 질환, 심장 질환, 당뇨병 등 건강상의 문제가 있는 아동 및 청소년은 건강상의 문제가 없는 아동에 비해 응급실을 방문하거나 입원할 위험이 더 높습니다. 아동 및 청소년은 또한 학업 성취도 저하, 신경 발달상의 문제, 성인기에 만성 질환에 걸릴 위험도 있을 수 있습니다. 천식이 있는 아동은 Asthma Action Plan(천식 행동 계획)을 따라야 합니다.
증상	$PM_{2.5}$ 노출 증상으로는 눈 따가움, 기침, 목과 코의 염증, 피로, 두통, 천명, 호흡곤란 등이 있습니다. 증상을 모니터링하십시오. 증상이 악화되면 의사의 진료를 받아야 합니다. 증상은 $PM_{2.5}$에 노출된 후 일주일 동안 지속되거나 나타날 수 있습니다.
신체 활동	Centers for Disease Control and Prevention(CDC, 질병통제예방센터)의 권고에 따르면, 6세에서 17세 사이의 아동 및 청소년은 건강을 위해 매일 한 시간 이상 운동하는 것이 좋습니다. Washington Administration Code(WAC, 워싱턴주 행정법) 110-300-0360(2)(c)는 극한 날씨를 제외하고 아동 보육 프로그램에서 최소한의 실외 활동/활동적인 놀이를 포함할 것을 요구합니다. $PM_{2.5}$ 수치가 높을 경우, 특히 며칠 또는 몇 주 동안 지속되는 경우에는 안전한 실외 활동을 위해 예방 조치가 필요합니다. 운동할 때는 더 깊게 숨을 쉬고 폐로 더 많은 공기를 들이마시기 때문에 더 많은 대기 오염물질을 흡입하게 됩니다. 휴식할 때와 비교하면, 아동 및 청소년의 호흡률은 가벼운 강도의 신체 활동 중에는 2배 이상, 중간 강도의 활동 중에는 4배 이상, 고강도 활동 중에는 8배 이상 증가합니다. 강도 수준은 각자가 느끼는 힘듦의 정도와 관련이 있으며 개인마다 다르지만, 예를 들면 다음과 같습니다. » 가벼운 강도 활동: 보드게임, 캐치볼, 블록 쌓기 » 중간 강도 활동: 놀이터 기구 오르기, 피구, 땅따먹기, 골프, 체조, 사방치기, 세발자전거/자전거 가볍게 타기, 악단, 중간 속도 또는 빠른 속도의 걷기, 농구 슛 던지기, 소프트볼/야구, 탁구, 배구, 웨이트 트레이닝, 요가 » 높은 강도 활동: 에어로빅 댄스, 농구, 치어리딩, 수영, 미식축구, 조깅, 점핑잭, 줄넘기, 가라테, 경보, 달리기, 축구, 수영, 테니스, 격렬한 자전거 타기 자세한 목록은 Centers for Disease Control and Prevention(CDC, 질병통제예방센터)의 지침서 '신체 활동 강도 측정 방법'을 참조하십시오.
노출 줄이기	$PM_{2.5}$ 오염이 증가하면서, 건강 보호를 위해 점차 모든 행동이 더욱 중요해지고 있습니다. 실외 신체 활동의 시간과 강도를 제한하고(예: 휴식 시간 늘리기), 가능하다면 실내에 머물고 실내 공기를 깨끗하게 유지해야 합니다. 학교, 집, 이동 시간을 포함하여 밤낮으로 아동이 오염에 노출되는 총 시간을 고려해야 합니다. 걷거나, 자전거를 타거나, 창문을 열고 버스를 타는 것은 실외에 있는 시간입니다. 일부 아동들은 가정에서 깨끗한 공기를 마시지 못할 수도 있습니다.
마스크 및 호흡기 보호구	산불 연기를 피할 다른 방법이 없을 때는 National Institute for Occupational Safety and Health(NIOSH, 미국국립산업안전보건연구원) 승인을 받은 N95 마스크 또는 기타 미세먼지 차단 호흡기 보호구를 착용하는 것이 한 가지 방법이 될 수 있습니다. NIOSH 승인 호흡기 보호구는 아주 어린 아동들에게 적합한 사이즈로는 나오지 않으며, 아동에게 광범위하게 사용하기 위한 테스트를 거치지는 않았습니다. 효과적으로 사용하기 위해서는 사이즈가 잘 맞는 적합한 보호구를 선택해야 합니다. 아동의 호흡기 보호구 사용에 관한 Western States PEHSU 지침(PDF)을 참조하십시오. NIOSH에 대한 자세한 정보는 여기에서 확인하십시오.
대기질 모니터링 및 저가형 센서	**실외 공기 모니터링:** 산불 연기로 인한 오염 외에 대기 오염에 관해서는 AirNow.gov의 대기 오염 예보 및 정부 기관 모니터링 자료를 활용하십시오. 산불 연기에 관한 정보는 Washington Smoke Blog를 참고하십시오. Smoke Blog는 저가형 센서는 물론, 워싱턴주에서 산불이 잘 발생하는 시기에 산불 연기에 대한 가장 관련성 높은 예측 정보를 제공합니다. 부록 A를 참조하십시오. **실내 공기 모니터링:** 실내 활동을 위해 저가형 실내 센서를 사용할 수 있습니다. 보정되지 않은 센서 데이터를 AQI와 비교하지는 마십시오. 시설 전반적으로 실내 및 실외의 센서 데이터를 비교하십시오. 부록 B를 참조하십시오.
실내 대기질	$PM_{2.5}$ 수치가 높거나 장기간 동안 대기질이 좋지 않을 경우, $PM_{2.5}$가 건물 내부로 스며들기 때문에 실내 대기질 개선을 위한 조치를 취하는 것이 더욱 중요합니다. 실내 $PM_{2.5}$ 수치가 실외보다 낮은지 확실히 모르겠다면, 실내외 수치가 비슷하다고 가정하고 노출을 줄이기 위한 조치를 강화하십시오. 실내 공기 정화(MERV 13 이상의 입자 여과 기능을 갖춘 냉난방 환기 설비(HVAC) 시스템 또는 HEPA 휴대용 공기 청정기)로 실내 $PM_{2.5}$ 수치를 줄일 수 있습니다. 오존을 생성하거나 이온화 및 플라즈마와 같은 추가 기술이 적용된 공기 청정기는 사용하지 마십시오. 휴대용 공기 청정기를 참조하십시오. 부록 C를 참조하십시오.
성인 직원 및 자원봉사자	성인 직원 및 자원봉사자도 대기 오염에 의한 영향을 받을 수 있습니다. 자세한 내용은 입자 공해에 관한 워싱턴 대기질 안내를 참조하십시오. 산불 연기 속에서 일하는 야외 작업자에 대한 정책은 Washington State Department of Labor & Industries(WA L&I, 워싱턴주 노동산업부)의 산불 연기 작업장 안전 및 보건 웹페이지를 참조하십시오.
학교 폐쇄	실내 $PM_{2.5}$ 수치를 125.5µg/m3(AQI 201) 미만으로 유지할 수 없는 경우, 학교 및 시설 폐쇄를 고려하십시오. 고려해야 할 요소들이 포함된 산불 연기로 인한 학교 폐쇄 지침 요약(PDF)을 참조하십시오.
리소스	**웹사이트:** Washington State Department of Health(WA DOH, 워싱턴주 보건부)의 화재 연기와 건강, WA DOH의 실내 대기질, United States Environmental Protection Agency(EPA, 미국 환경보호청)의 Air Quality Flag Program(대기질 경보 프로그램). 기술 지원 문의: airquality@doh.wa.gov.

Appendix A: Outdoor Air Quality Monitoring for Decision Making During Wildfire Smoke Events

Wildfire smoke can fluctuate throughout the day, or it can linger and be stable. It is difficult to predict. This makes it challenging to plan activities in advance. Forecasts and current measurements can inform your decision-making around canceling, modifying, delaying, or ending activities early. For longer duration activities, check measurements throughout the day. When decisions need to be made several hours in advance, it may not reflect conditions at the time of the activity.

The Washington Smoke Blog (https://wasmoke.blogspot.com) is the best source of outdoor air quality information when making decisions about outdoor activities when there is wildfire smoke. Use a combination of forecasts and current measurements from agency monitors and/or outdoor low-cost air sensors, as described below. Your regional clean air agency may have additional information for your area.



For activities planned in advance, use forecasts for your area or in the area the activity is occurring. Forecasts up to 5 days in advance, including the current day, are available on the WA Smoke Blog map by regions during wildfire season. The forecasts for the first 2 days are more accurate than for days 3-5. Written blog posts and comments often include additional forecast information. Keep in mind that forecasts are for daily (24-hr) conditions, and the real-time conditions may be better or worse due to fluctuations throughout the day.

In the hours leading up to the activity (or throughout the day for long duration activities, such as summer camp), track the current measurements as described below.

Important: *Low-cost sensor measurements on their own can be very inaccurate during wildfire smoke events. It is important to follow the steps below to view low-cost sensor data on public agency websites, where it has been adjusted for wildfire smoke. We do not recommend using private or third-party websites (including third-party weather apps) where the data may not have been verified and adjusted.*

To view current outdoor air quality data near you:

Step 1:

Use the Fire and Smoke Map on the WA Smoke Blog (https://wasmoke.blogspot.com) or on the "Smoke" tab of the AirNow app.

Step 2:

Find the agency $PM_{2.5}$ monitor (larger circles, or medium-size circles labeled with a "T" on the map) and/or low-cost $PM_{2.5}$ sensor (smaller circles on the map)") closest to your event. Low-cost $PM_{2.5}$ sensors are commercially available devices that can be operated by anyone. Low-cost sensors are generally less accurate than the agency monitors, and since many are operated by members of the public, their performance, siting, and maintenance are unknown. One exception is the SensWA sensors, which are low-cost sensors operated by Ecology. The data from SensWA sensors are generally more reliable than other low-cost sensors. Low-cost sensor data can be inaccurate, but on the WA Smoke Blog and Fire and Smoke Map, sensor data are adjusted for wildfire smoke.

The monitor and sensor data you view on the map will be more or less similar to your actual location based on how far away the monitor/sensor is from your location and other factors. Consider differences in elevation, terrain, wind direction, and weather between your location and the monitor/sensor location. For example, a nearby monitor/sensor in a location with similar elevation and weather and is not separated from your location by a ridge, will probably provide

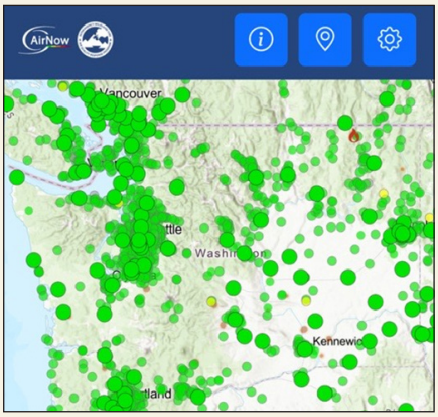
better information for your location than a monitor/sensor that is on the other side of a ridge or at a different elevation, like in a valley. You might find that you need a sensor at your specific location. As of 2025, outdoor Purple Air and Clarity sensors are displayed on the EPA Fire and Smoke map.

Remember to also consider the air quality along routes of transit that people will be exposed to when they travel to and from your event.

The markers on the map show the color of the NowCast Air QualiIy Index (AQI) hazard level, which is approximately based on the conditions over the past few hours and is updated hourly. For tracking data over the last 30 minutes, see steps 3 and 4.

Click or tap on the monitor (larger circle) or low-cost sensor marker (smaller circle) closest to your event

(Screenshots are from the "Smoke" tab of the AirNow phone app, May 2025.)



A window like this should pop up

Current NowCast AQI number

Current NowCast AQI category

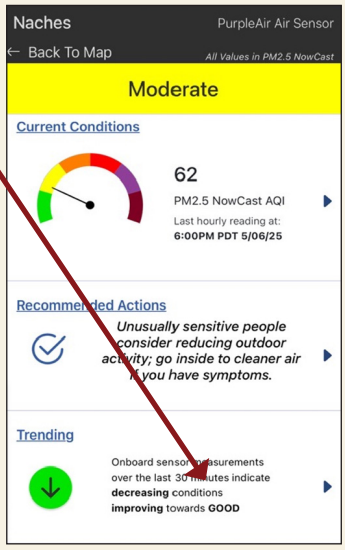
Recent trend *(click or tap here for more information on the trend)*

To view the NowCast AQI number, click or tap on the monitor or sensor marker. A new window should pop up, showing you the NowCast AQI number and category, as well as a trend (air quality is getting better, getting worse, or staying the same). Click or tap on the "trend" icon to see more information about the trend.

In addition to using a forecast and NowCast AQI for planning purposes, use the trend information to make a decision about activities happening within about an hour. This is especially important if the current conditions are changing quickly or seem different from the forecast or the NowCast AQI. The trend shows how recent values compare to the NowCast. If the recent values are higher, then the trend is increasing (worsening air quality). If the recent values are lower, the trend is decreasing (improving air quality). The AQI Trend category is what was observed in the past 30 minutes for sensors and monitors with sensors nearby, or from the last hourly concentration for monitors without sensors nearby.

Use this AQI category to decide about activities happening within about the next hour. If more than one category is displayed, use the higher (worse) category.

(Screenshots are from the "Smoke" tab of the AirNow phone app, May 2025.)



In Step 2 (above): Click or tap on the "trend" icon. This will take you to a more detailed view, as shown to the left.

Step 3:

Use this Trending AQI category to decide about activities happening within about the next hour. If more than one category is displayed, use the higher (worse) category.

Step 4:

Repeat step 3 every 30 minutes, or sooner if it appears that conditions are changing rapidly and change your activity decisions accordingly.

Example scenario 1:

You are deciding whether to have outdoor recess, and you do not need to make this decision in advance. Earlier in the morning, the NowCast AQI category was "Unhealthy." Now it is time for recess and the current Trending AQI category is "Moderate." Based on the Trending AQI category of "Moderate" you decide to have outdoor recess but allow children and youth with health conditions to opt out or stay indoors.

Example scenario 2:

You are deciding whether to hold an athletic event and this decision must be made several hours in advance due to the logistics involved. The forecast for the day is "Unhealthy for Sensitive Groups" but the NowCast is "Unhealthy." You decide to follow the guidance for the "Unhealthy" category. This is a challenging decision because the air quality conditions could change by the time of the event, but because you need to plan several hours in advance, you decide to cancel using the best information that you have.

Alternatively, you decide to move forward with planning the activity with the understanding that it may not be possible. You check the Trending AQI category at the start time of the activity and decide based on that AQI category. If you decide to start the event, you continue checking the Trending AQI category every 30 minutes to see if the AQI category worsens and the event needs to end early.

Example scenario 3:

You are planning a day of summer camp. Based on the forecast of "Good" the day before, you had planned a day of high intensity activity. Prior to starting the activity, you check the Trending AQI category, and it is "Moderate." Therefore, you come up with an alternate activity indoors for children and youth with health conditions, and those without health conditions who wish to opt out of the high intensity activity. You continue checking the Trending AQI category every 30 minutes to see if the high intensity activity needs to be modified later in the day.

Why does my sensor/commercial weather app/sensor map display different AQI numbers or colors from what I see on the Washington Smoke Blog, Fire and Smoke map, or AirNow?

» Sensors use a variety of averaging times to display the AQI, for example the Purple Air map default is to show the AQI level from the last 10 minutes. The numbers on government sites, such as AirNow and the Fire and Smoke Map, use a NowCast averaging time of 3-12 hours. If the air quality is changing rapidly, the two numbers could be very different.

» Even when a correction factor is applied to sensors (for example, Purple Air data on the Fire and Smoke Map), sensors are less accurate than government air quality monitors.

» A commercial site or device may use a different color scheme or AQI category cut-off than the official AQI.

» Sometimes the air quality is different even over a short distance. If your closest agency monitor is not very close, your local air quality measured by a nearby sensor may be different than the air quality around the agency monitor.

Appendix B: Indoor Air Quality Monitoring

A portable handheld sensor can show how indoor $PM_{2.5}$ levels vary throughout a facility. A stationary indoor sensor can track changes in indoor air quality over longer periods. See Wildfire Smoke Guidance for Canceling Events or Activities and Closing Schools section "Indoor $PM_{2.5}$ Measurement in Schools" for more information about using indoor sensor data for decisions that need to be made in advance. Use the information below for immediate decision-making.

If you don't have an indoor air sensor:
If you're not sure whether indoor $PM_{2.5}$ levels are lower than outside, assume levels are similar and increase steps to reduce exposure, including filtration methods. Using a low-cost sensor can give you a better idea of your indoor $PM_{2.5}$ levels. If you're considering purchasing a low-cost $PM_{2.5}$ sensor, check the performance evaluations developed by the South Coast AQMD. A Field R-squared value near 1 and a relatively low Field MAE indicate a better-performing sensor.

If you do have an indoor air sensor and/or a portable handheld sensor:
Low-cost sensors can be used to take $PM_{2.5}$ measurements to check indoor air quality. They are generally less accurate than agency air monitors, though correction factors can be applied to reduce bias. Sensor measurements can vary in three important ways: whether correction factors are applied (for example, a Purple Air that is used indoors with the US EPA correction factor applied), the time interval used for data averaging, and whether the sensor displays the AQI or the $PM_{2.5}$ concentration in µg/m3 units. To the extent possible, only compare data that is similar in these three ways (e.g., do not compare uncorrected sensor data to corrected sensor data or AQI breakpoints; do not compare real-time sensor data to longer-term averages). EPA provides a calculator to convert between $PM_{2.5}$ concentrations and AQI values: https://www.airnow.gov/aqi/aqi-calculator.

If indoor sensor shows...	...then...
Corrected real-time or 10-minute PM2.5 concentrations in µg/m3	» Compare sensor data to 10-minute or 1-hour data from Washington Smoke Blog or Fire and Smoke Map (see screenshots below). » Prior to each decision-point (e.g., before starting indoor recess or indoor PE class), check that the indoor real-time or 10-minute PM2.5 concentration is not elevated when deciding about activity intensity. During smoke periods, the threshold of 35.5 µg/m3 is a useful target of indoor concentration (the lower the better). Check sensor measurements again every 30 minutes and change activity decisions accordingly.
Uncorrected real-time or 10-minute PM2.5 concentrations in µg/m3	» No direct comparison to the AQI or a specific target concentration is possible. » Instead, compare indoor and outdoor sensor measurements to each other to estimate indoor concentrations. For example, if the indoor PM2.5 sensor measurements are half of the outdoor PM2.5 sensor measurements, assume that the indoor PM2.5 concentrations are half what is reported by the nearest 10-minute or 1-hour data from Washington Smoke Blog or Fire and Smoke Map (see screenshots below). » Example: outdoor sensor measurement = 100 µg/m3 and indoor sensor measurement = 50 µg/m3, so indoor is half of outdoors. • Washington Smoke Blog measurement = 76 µg/m3 → new indoor concentration estimate is half of 76, which is 38 µg/m3. • Use this new indoor concentration estimate: Prior to each decision-point (e.g., before starting indoor recess or indoor PE class), check that the indoor real-time or 10-minute PM2.5 concentration is not elevated when deciding about activity intensity. During smoke periods the threshold of 35.5 µg/m3 is a useful target of indoor concentration (the lower the better). Check sensor measurements again every 30 minutes and change activity decisions accordingly.

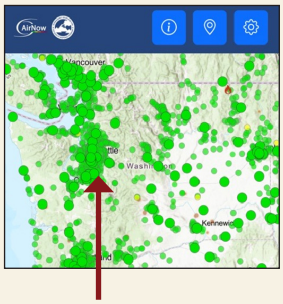
When indoor $PM_{2.5}$ concentrations are higher than outdoor, opening windows can help clear out indoor $PM_{2.5}$. When outdoor $PM_{2.5}$ concentrations are higher than indoor, closing windows can help keep $PM_{2.5}$ out. At the same time, pay attention to the indoor and outdoor temperatures when opening or closing windows to keep it from becoming too hot or cold indoors (See Appendix D). When opening windows, continue checking sensor measurements every 30 minutes.

If you have a portable handheld sensor:

When outside $PM_{2.5}$ levels reach "Unhealthy for Sensitive Groups," assess variation across the building(s)

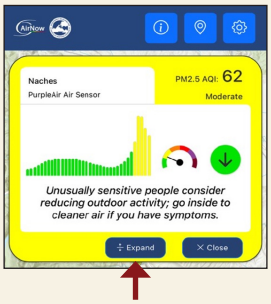
- Include measurements in rooms used by children and youth that are expected to have worse ventilation or indoor air quality (like no air filtration), rooms where physical activity is usually more vigorous (like the gym), rooms with external doors opened frequently, any external buildings (like portables), and rooms with children who may be more sensitive to air pollution.
- Wait for sensor measurements to stabilize in each room (about 1-2 minutes for measurements that appear to change in real-time on a screen).
- Repeat the portable sensor measurements in different conditions, such as changes in occupancy, and repeat prior to each decision-point.
- If you have more than one option for where to hold indoor recess, use a portable sensor to choose the location with lower $PM_{2.5}$.
- Prioritize steps to reduce exposure in the rooms with highest $PM_{2.5}$ levels.

How to get 10-minute (corrected sensor data) or hourly (agency monitor) $PM_{2.5}$ concentrations from the Washington Smoke Blog or Fire and Smoke Map:



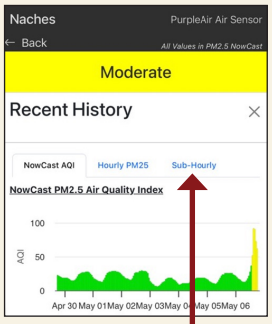
1. Click or tap on the monitor (larger circle) or low-cost sensor (smaller circle) closest to you

(Screenshots are from the "Smoke" tab of the AirNow phone app, May 2025.)

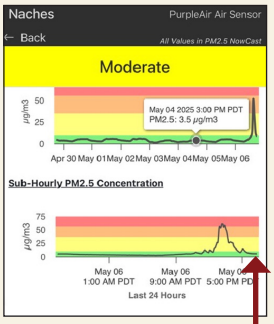


2. A window like this should pop up. Click or tap on "Expand."

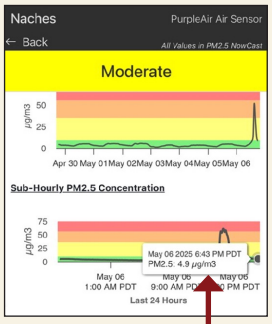
   Scroll down within the pop-up window to get to "Recent History". Click or tap on "Recent History."



3. Select the "Sub-Hourly" tab if available, otherwise select "Hourly PM25"



4. Tap, click, or hover on the end of the graph



5. This number is **NOT THE AQI**. This is the PM2.5 measurement. Note that the time of the most recent measurement may lag behind.

Indoor air pollution is made up of outdoor air pollution that comes inside, and pollution that comes from indoor sources. Consider monitoring for air pollutants besides $PM_{2.5}$, such as carbon monoxide (CO) and carbon dioxide (CO2).

Appendix C: Improving Indoor Air Quality

During outside air pollution events, reducing additional air pollution as much as possible to reduce exposures is especially important. To help reduce exposure, limit both outdoor activities, like vehicle idling, other vehicle emissions, and outdoor burning, as well as indoor activities, like frying without kitchen exhaust, smoking or vaping, using household chemicals, vacuuming without a HEPA filter, or burning candles.

Outside $PM_{2.5}$ gets indoors through windows, doors, small openings, and some ventilation systems. Buildings with well-maintained and enhanced filtration (i.e., MERV 13 or higher) on ventilation system air intakes have improved indoor air quality and should run the HVAC fan continuously. Supplementing with HEPA portable air cleaners or DIY box fan filters can reduce PM2.5 in single rooms. Use HEPA portable air cleaners that have a smoke Clean Air Delivery Rate (CADR) equal to at least 2/3 the room square footage (an **AHAM Verifide** smoke CADR is best), and uses HEPA and carbon filtration only (look for models listed as "mechanical" on the **CARB-Certified** air cleaner list). Do not use ozone generators, ionizers, UV, or other additive technologies in air cleaners because these technologies can add harmful pollutants to indoor air. See **Portable Air Cleaners** for more information and a list of air cleaners that meet WA DOH recommendations. For additional information, see **Improving IAQ and Ventilation in Schools During Wildfire Smoke Events** and **ASHRAE Protecting Building Occupants from Smoke**.

Extreme heat can overlap with wildfire season. Have plans for keeping buildings cooler to avoid the need to open windows during wildfire smoke if there is no air conditioning. See **Cooling Indoor Spaces Without AC**.

If wildfire smoke events are occurring at the same time as transmission of respiratory viruses, such as COVID-19 or other respiratory infections, it is important to balance the risk of both hazards when bringing children and youth inside to reduce exposure to smoke. Indoor air filtration mitigates the risk of both smoke and respiratory viruses. To bring in outdoor air, track the air quality and open windows and doors a few times a day when outdoor $PM_{2.5}$ is in the Good AQI category or better than indoors. To decide when to open and close window and doors, it is best to use the most recent air quality information, such as the Trending AQI category (see Appendix A) or 10-minute or hourly data (see Appendix B). You can find outdoor air quality information at AirNow.gov or during wildfire smoke events at the **Washington Smoke Blog**. For more information, see **WA DOH's Recommendations for wildfire smoke and respiratory viruses (PDF)**.

Appendix D: Considerations for when Heat and Poor Air Quality Overlap

Heat affects everyone differently. Some individuals may be more susceptible to heat-related illness due to factors such as their environment, level of activity, age, access to financial resources, or underlying health conditions – including the use of some medications that may reduce the body's ability to regulate temperature. Children are especially vulnerable to heat-related illness because they are often active and their bodies are still developing.

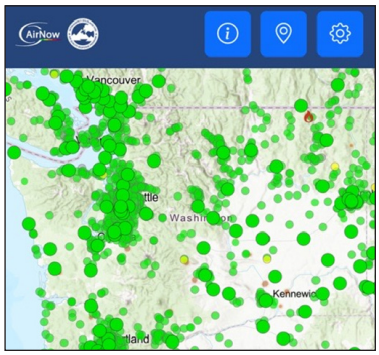
When someone is exposed to both extreme heat and poor air quality at the same time, the health impacts can be more severe than they would be separately. It is important to track conditions and forecasts of both air quality and heat.

The National Weather Service **HeatRisk forecast** provides a quick view of the risk posed by heat for the next seven days. HeatRisk is portrayed in a numeric (0 – 4) and color (green, yellow, orange, red, or magenta) scale, which is similar in approach to the Air Quality Index (AQI). HeatRisk provides one value each day for a location that indicates the approximate level of heat risk concern, along with identifying groups who are most at risk.

It can be a challenge to keep smoke from coming indoors when it's hot, especially without air conditioning, when windows are used for cooling. Pay attention to rising temperatures, as heat-related illnesses can occur quickly and can be life threatening. Rooms used by students or staff must be kept reasonably free of "excessive heat" (**Chapter 246-366 WAC**). School learning spaces should be no hotter than 79 °F (see guidance from **U.S. EPA**, following ASHRAE Standard 55, with some differences by season and humidity).

If it's hot indoors during poor air quality, use these steps to help stay cool and safe:

- Close windows and curtains or shades during the day. Use portable fans (be aware that fans are not effective for cooling when the temperature is above 95 degrees).
- Turn off sources of heat, such as kilns, ovens, and electronics.
- Stay hydrated, especially with water. Avoid sugary drinks since these can be dehydrating.
- Teach staff to recognize and prevent heat- and smoke-related illnesses.
- Track the air quality (See Appendix A) and monitor indoor temperatures. Ideally, only open windows when the outdoor air quality improves and it is cooler outside than inside. When checking the air quality to decide when to open and close windows and doors, it is best to use the most recent information, such as the Trending AQI category (see Appendix A) or 10-minute or hourly data (see Appendix B). However, opening windows during poor outdoor air quality may be necessary to maintain safe temperatures indoors. Open an additional door or window to be most effective and provide a cross draft. Keep safety protocols in mind when opening doors and windows. If possible, relocate to a cooler indoor space and take steps to filter indoor air (See Appendix C).



- Limit, modify, or move strenuous indoor and outdoor activities. If relocating indoors, go to a place that is cooler and has cleaner air. When student-occupied indoor areas are excessively hot or are smoky, discuss partial or full school facility closures with administrators and local health jurisdictions. For smoke, see **Summary Wildfire Smoke Guidance for Closing Schools**.
- For updated information on cooling centers in your community, visit **Washington 2-1-1**. Provide cooling center and cleaner air center information to families.

Consider whether to cancel, move, or reschedule outdoor activities and indoor activities taking place in uncooled locations without air filtration. This is especially important for activities taking place during the hottest period of the day. If possible, shift the times for activities to times of day that are cooler and have better air quality. However, sometimes the coolest part of the day can also be the smokiest. Also see the Washington Interscholastic Activities Association's Heat Index Policy.

For more information, see:

Cooling Indoor Spaces Without Air Conditioning (PDF)

DOH's hot weather safety guidance

About Heat and Your Health | Heat Health | CDC

CDPH Extreme Heat Guidance for Schools

Tips and Action Plans for Children and Teens with Asthma | Heat Health | CDC

Heat and Athletes | Heat Health | CDC

HeatRisk v2.6 - Understanding HeatRisk

For adult staff and volunteers: WA L&I's Outdoor Heat Exposure Rules for outdoor workers.

Washington State Department of HEALTH

DOH 334-332 August 2026

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