

# **Corona-Norco Family YMCA**

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## **AirAware Air Quality Monitoring Quarterly Report (05/2025 – 07/2025)**



**Photo of the Corona-Norco Family YMCA**

**Prepared by the  
AirAware Team**

# Corona-Norco Family YMCA

## AirAware Air Quality Monitoring Quarterly Report - #3

May 2025 - July 2025

*Prepared by the AirAware team*

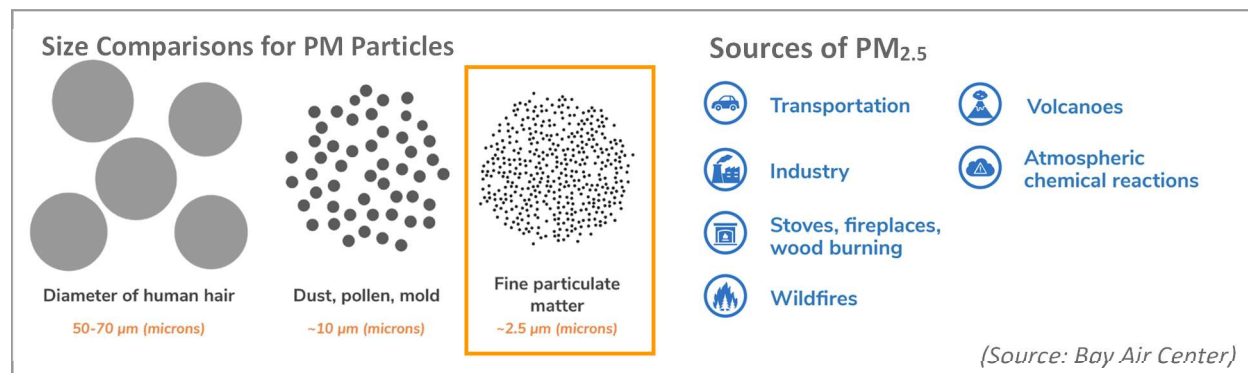
This report summarizes the recent air quality trends observed at the Corona-Norco Family YMCA, focusing on the differences between indoor and outdoor fine particulate matter (PM<sub>2.5</sub>).

### Key Takeaways

- PM<sub>2.5</sub> levels varied across time and largely stayed within the Moderate AQI range for outdoor and predominantly Good AQI for indoor conditions.
- Smoke from Fourth of July fireworks impacted indoor and outdoor air quality the most in this period, and caused similar short-term levels of PM<sub>2.5</sub> as during wildfires in late December 2024 and early January 2025, highlighting the importance of non-wildfire sources of PM<sub>2.5</sub> on air quality-related health impacts.
- Indoor levels during higher outdoor pollution days showed good HVAC filtration of outdoor particles, showing Good AQI indoors during Moderate AQI outdoors.
- There continue to be short periods where indoor PM<sub>2.5</sub> rises above outdoor levels. This may require further investigation by the YMCA.

### Background

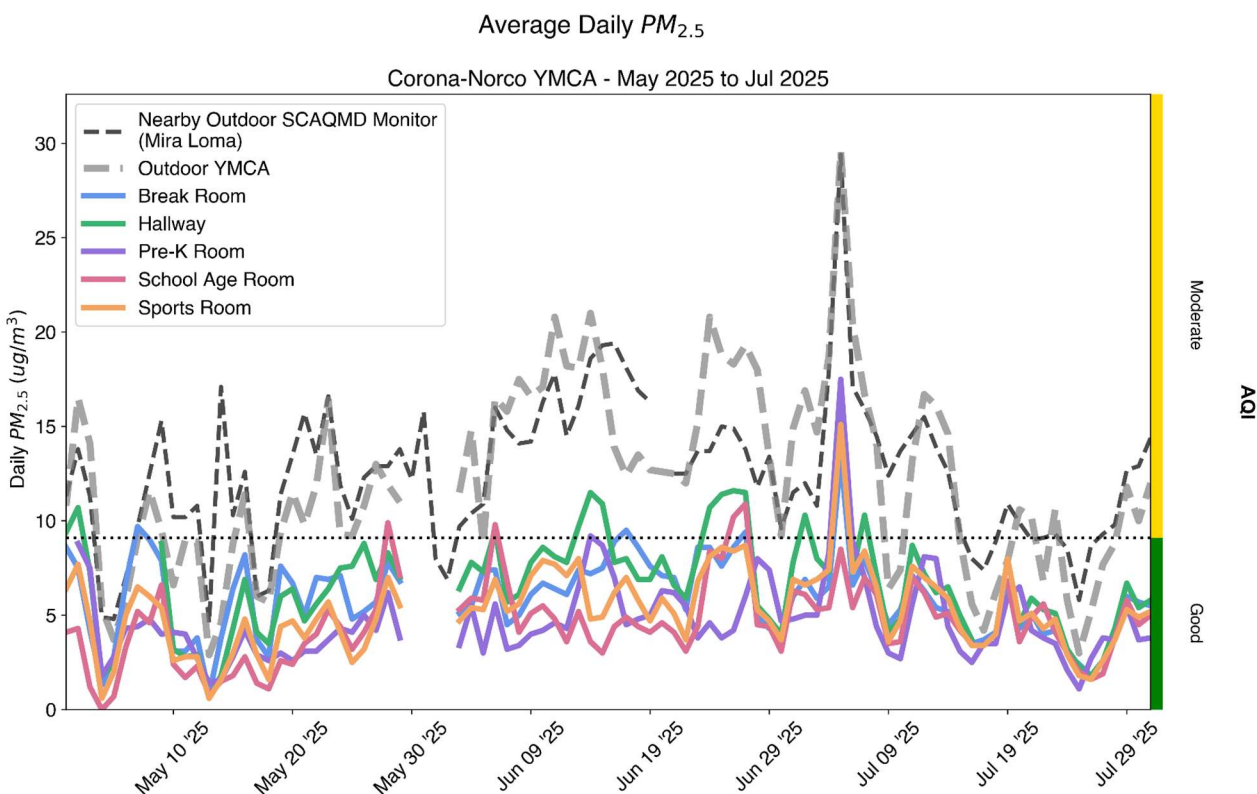
Particulate matter is an air pollutant made of tiny liquid and solid airborne particles that vary in size. Fine particulate matter (PM<sub>2.5</sub>), which is the focus of the AirAware project, describes an important subset of particulate matter that is 2.5 microns and smaller in size (~30x smaller than the diameter of a human hair) and predominantly comes from sources of combustion (burning of fuels), such as wildfires, residential wood burning, transportation, and industry.



Exposure to  $PM_{2.5}$  has various detrimental health effects, such as aggravated asthma, decrease in lung function, increase in respiratory symptoms, and nonfatal heart attacks or premature deaths in people with heart and lung disease. It also impacts the environment through reduced visibility, damaged vegetation, and reduced soil nutrients, among many other impacts.

## Trends in Fine Particulate Matter ( $PM_{2.5}$ )

Indoor and outdoor air quality monitoring at the Corona-Norco Family YMCA has been underway since late Fall 2024. This section explores the trends across time and space during late spring and early summer of 2025 (May-July).



This plot shows average daily  $PM_{2.5}$  levels across time for both the indoor (solid color lines) and outdoor (dashed grey line) AirAware monitors from the beginning of May 2025 to the end of July 2025. Data from a nearby regulatory monitor from the South Coast Air Quality Management District (SCAQMD) is also included (dashed black line). The Air Quality Index (AQI) categories coinciding with  $PM_{2.5}$  concentrations are shown on the right with bounds shown across the plot in dashed black lines, helping to provide health context. The YMCA-wide data gap in late May/early June was due to routine project maintenance (6-month collocation). Any additional gaps in the data are due to issues in power or WiFi/cellular connectivity.

### What does this plot tell us?

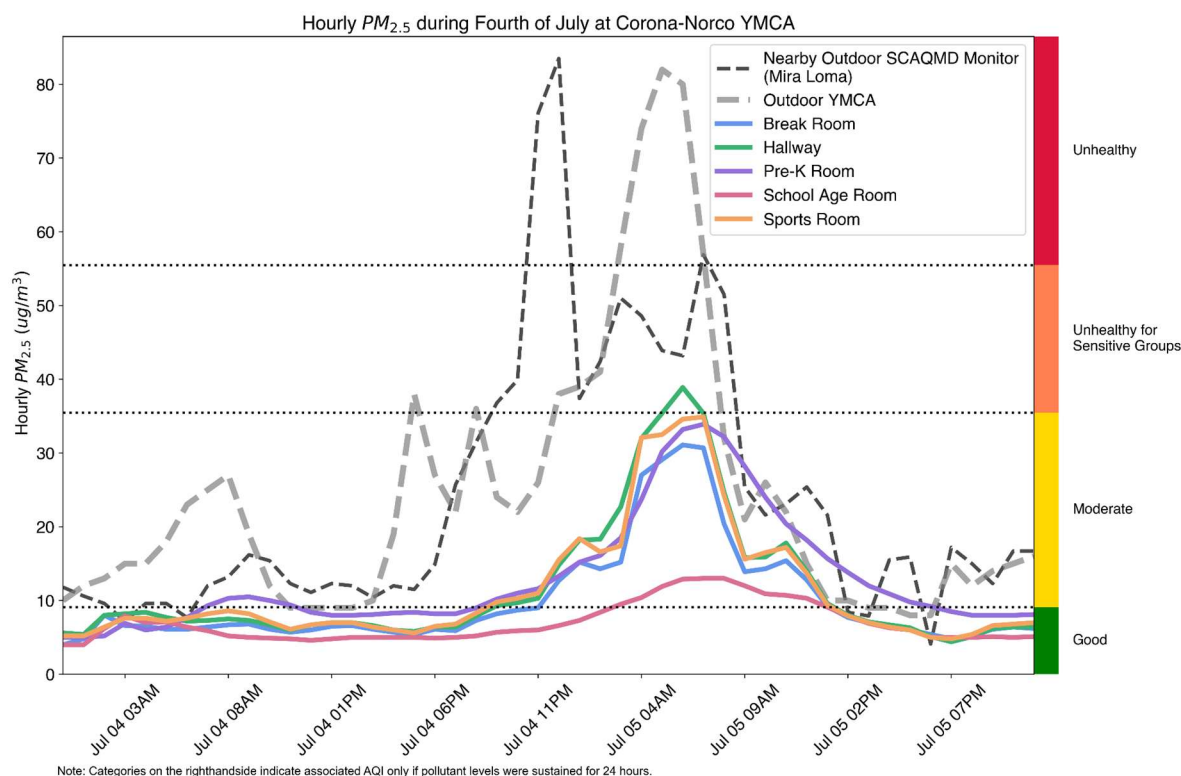
- From May 2025 to July 2025,  $PM_{2.5}$  levels varied across time, and largely stayed within the Moderate AQI range outdoors. Indoor levels followed the rise and fall in outdoor air pollution, but at lower concentrations, staying predominantly in the Good AQI range.
- Higher  $PM_{2.5}$  outdoor concentrations across June were likely due to smoke from the Cahuilla Fire in the southeast from June 10th to June 13th and Southern California and

Northern Mexico wildfires later in June. The highest  $PM_{2.5}$  levels both indoors and outdoors occurred in early July due to Fourth of July firework-related emissions, which is discussed in further detail below.

- The outdoor YMCA monitor often showed fairly similar or slightly higher  $PM_{2.5}$  levels than the nearest regulatory monitor from the South Coast Air Quality Management District (SCAQMD) 8 miles Northeast from the YMCA.<sup>1</sup>

### Impacts of Fourth of July Fireworks

The plot below zooms in on the hourly data and further shows how fireworks impacted air quality both outdoors and indoors.



This plot shows average hourly  $PM_{2.5}$  levels across time for both the indoor (solid color lines) and outdoor (dashed grey line) AirAware monitors from July 4th to July 5th 2025. Data from a nearby regulatory monitor from the South Coast Air Quality Management District (SCAQMD) is also included (dashed black line). Times are shown in Standard Time (i.e. one hour behind Daylight Savings Time).

- These higher short-term hourly outdoor levels are similar to the impact from wildfire smoke in late December 2024 and early January 2025, highlighting the air quality-related health concerns of smoke from fireworks<sup>2</sup>.

<sup>1</sup> The outdoor YMCA monitor has not been directly evaluated against the SCAQMD monitor, so we cannot draw conclusions about any differences between the two.

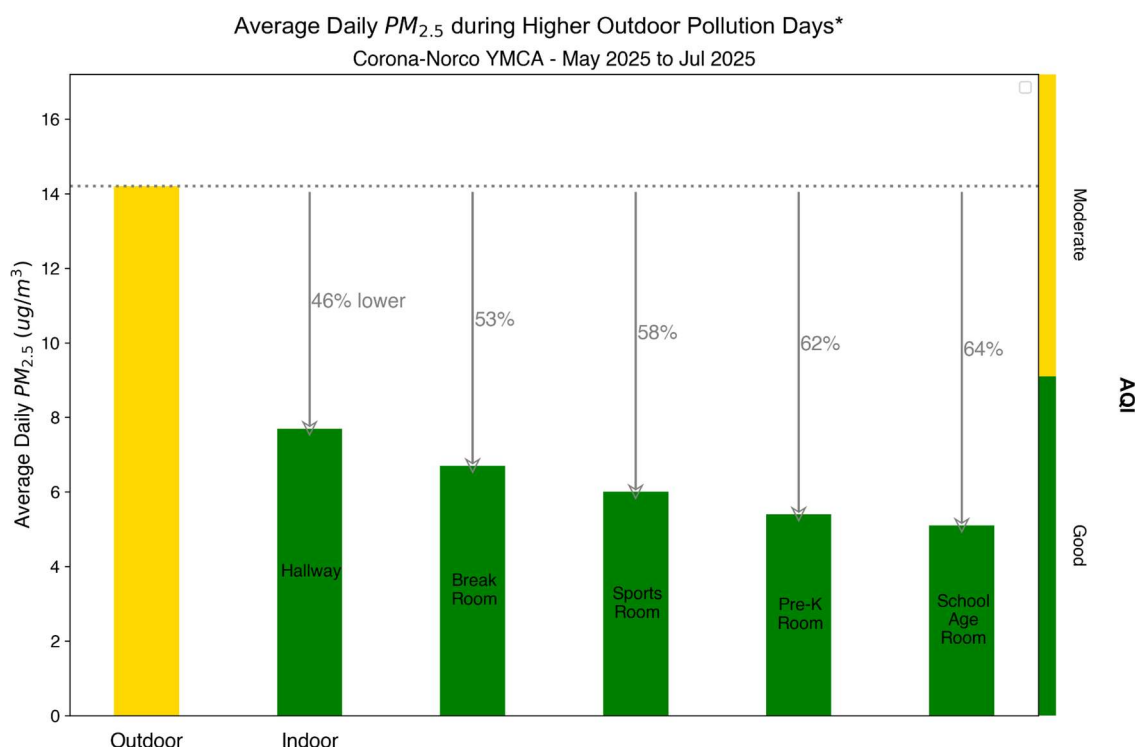
<sup>2</sup> This is just one piece of the health impact puzzle. Health impacts from PM are also informed by the chemical composition of the particles, which AirAware does not measure, but which will vary for wildfire and firework-related PM emissions.



- Outdoor and indoor air quality were impacted by firework-related emissions for a prolonged period (~17 hours). PM levels began to rise in the evening on July 4th, peaking at the Mira Loma SCAQMD monitor first around 9PM, followed by the outdoor YMCA monitor around 6AM on July 5th. Indoor PM<sub>2.5</sub> peaked around the same time and returned to cleaner air quality by the afternoon.
- The Break Room, Hallway, Pre-K Room, and Sports Room were impacted similarly by the firework emissions, reaching the upper levels of the Moderate AQI category, while the School Age room remained minimally impacted, staying within the lowest range of Moderate AQI.
- Indoor levels reached cleaner air quality at a similar rate across most rooms, apart from the Pre-k Room, which remained in the Moderate AQI until the evening on July 5th.
- While the YMCA was likely closed during most of these hours, the impacts to indoor air quality apply to other indoor environments and highlight the importance of filtration during these events as well. **Was your YMCA open during these hours?**

## Comparison of Indoor and Outdoor PM<sub>2.5</sub>

The relationship between indoor and outdoor PM<sub>2.5</sub> is important to explore as it can tell us how effective your YMCA's HVAC system is currently at filtering out particulate matter from outdoor sources and can help highlight indoor air quality concerns and any needs for HVAC improvement.



\*Higher outdoor pollution days defined as days with outdoor air quality at Moderate AQI and above (65 days).

The bar chart above compares average daily outdoor (left) and indoor (right) PM<sub>2.5</sub> levels during higher outdoor pollution days. The color of each bar chart coincides with an AQI category, and the arrows from the grey dashed line and coinciding percentages indicate how much lower average indoor levels are per room compared to outdoor. The indoor spaces are ordered from most to least similar to outdoor levels.

For this quarter, we are considering "higher" pollution days to be anything above Good AQI. This let us draw conclusions about indoor and outdoor PM<sub>2.5</sub> comparisons from more data. However, air pollution was acceptable during this time, and only one day saw outdoor levels in Unhealthy for Sensitive Groups or above.

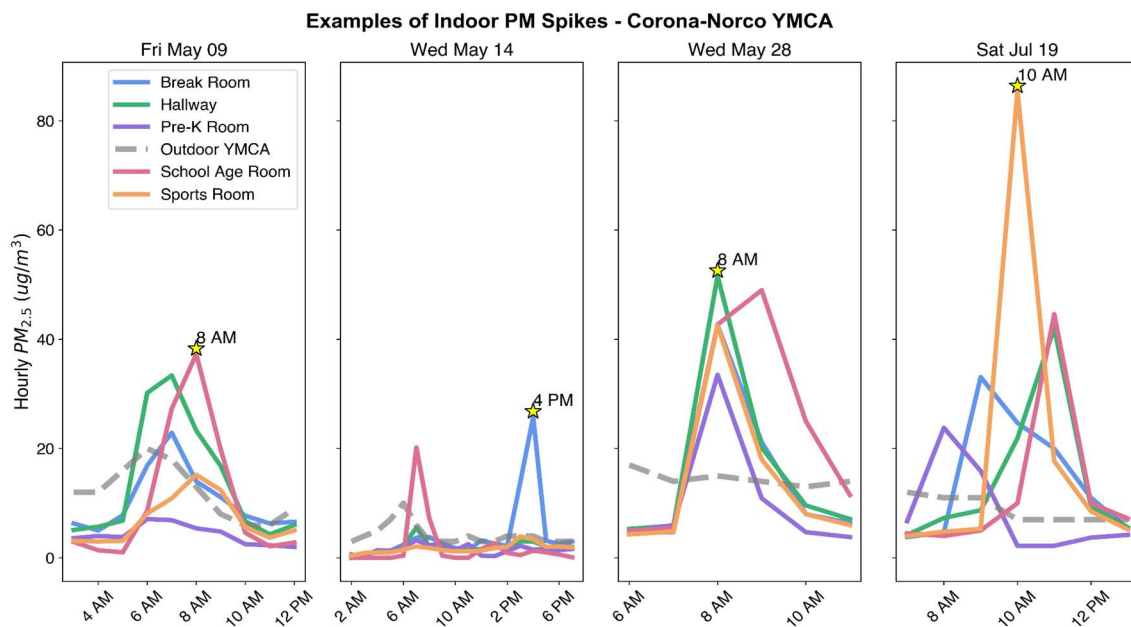
### What does this chart tell us?

- On average, we expect indoor PM<sub>2.5</sub> levels to be between 30% and 80% lower than outdoor levels on average, depending on currently installed HVAC filtration. For this second quarter, all average indoor levels during higher pollution days continue to be within the expected range. This means the HVAC filtration system is working as expected.

- When outdoor air quality was in the Moderate AQI, all indoor spaces were on average in the Good AQI, highlighting that the current HVAC system is effectively filtering outdoor particles from indoor air. Statistical analysis also showed that the averages across the rooms were similar.

## Questions about Indoor PM<sub>2.5</sub>

Indoor sources and activities can also contribute to higher indoor air quality levels, and exploring these trends can help identify contributing indoor activities or behaviors and provide insight on possible changes to improve indoor air quality.



*This plot shows examples of hourly indoor (solid color lines) and outdoor (dashed grey lines) PM<sub>2.5</sub> levels at the YMCA that are characteristic of indoor sources or activities that contribute to higher indoor air quality. All times are shown in Standard Time (i.e. one hour behind Daylight Savings Time).*

### What does this chart tell us?

- Across all the examples shown, except for May 14, all indoor spaces are shown rising above outdoor levels to varying degrees. These peaks often occurred during morning hours in May and July, with no instances in June. While the previous analysis report for February - April showed these indoor trends predominantly for the Break Room, Hallway, and Sports Room, these periodic indoor spikes now appear across all indoor spaces. We are still trying to determine what could be causing these periodic indoor spikes in PM<sub>2.5</sub>.
- On May 14th, two distinct peaks in indoor PM<sub>2.5</sub> occurred, first in the School Age Room in the morning, followed by the Break Room in the evening. No other indoor spaces rose above outdoor levels on this day.

