

Weingart East LA YMCA

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

**Prepared by the
AirAware Team**



Photo of the Weingart East LA YMCA

Weingart East Los Angeles YMCA

AirAware Air Quality Monitoring Quarterly Report - # 3

May 2025 - July 2025

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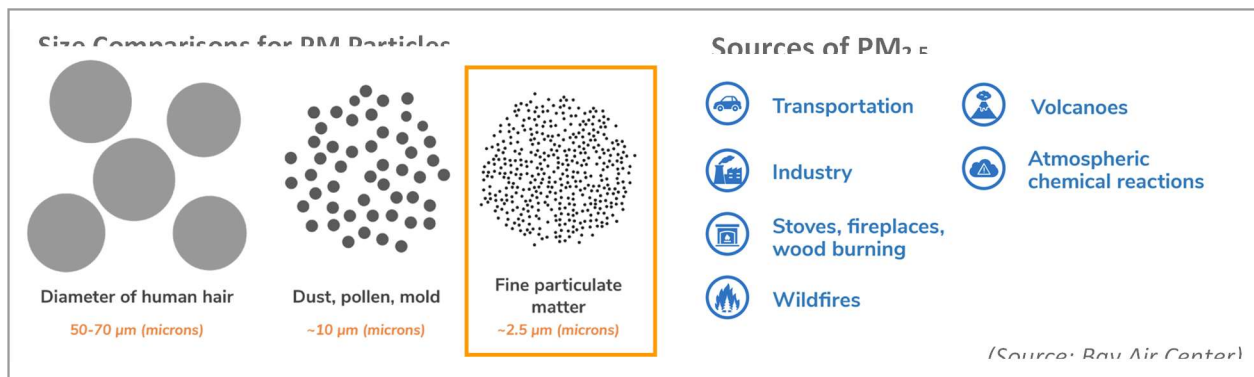
This report summarizes the recent air quality trends observed at the Weingart East Los Angeles YMCA, focusing on the differences between indoor and outdoor fine particulate matter (PM_{2.5}) and black carbon (BC) levels.

Key Takeaways

- PM_{2.5} levels varied across time and largely stayed within the Good and Moderate AQI range for outdoor and 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_{2.5} as during wildfires earlier in the year, highlighting the importance of non-wildfire sources of PM_{2.5} on air quality-related health impacts.
- The two multi-purpose rooms (MPR1 and MPR2) continue to have the highest indoor PM_{2.5} during higher pollution days than other indoor spaces. This may require further investigation by the YMCA.
- BC levels often rose on weekday mornings, likely caused by early morning traffic in the area. Indoor and outdoor levels of BC were similar to one another in May, and less similar in June and July.
- Indoor BC levels remained ~50% lower than outdoors, which is within the range of expected HVAC filtration efficiency (30%-80%), but should improve after the HVAC upgrade to at least 80%, making it cleaner indoors.

Background

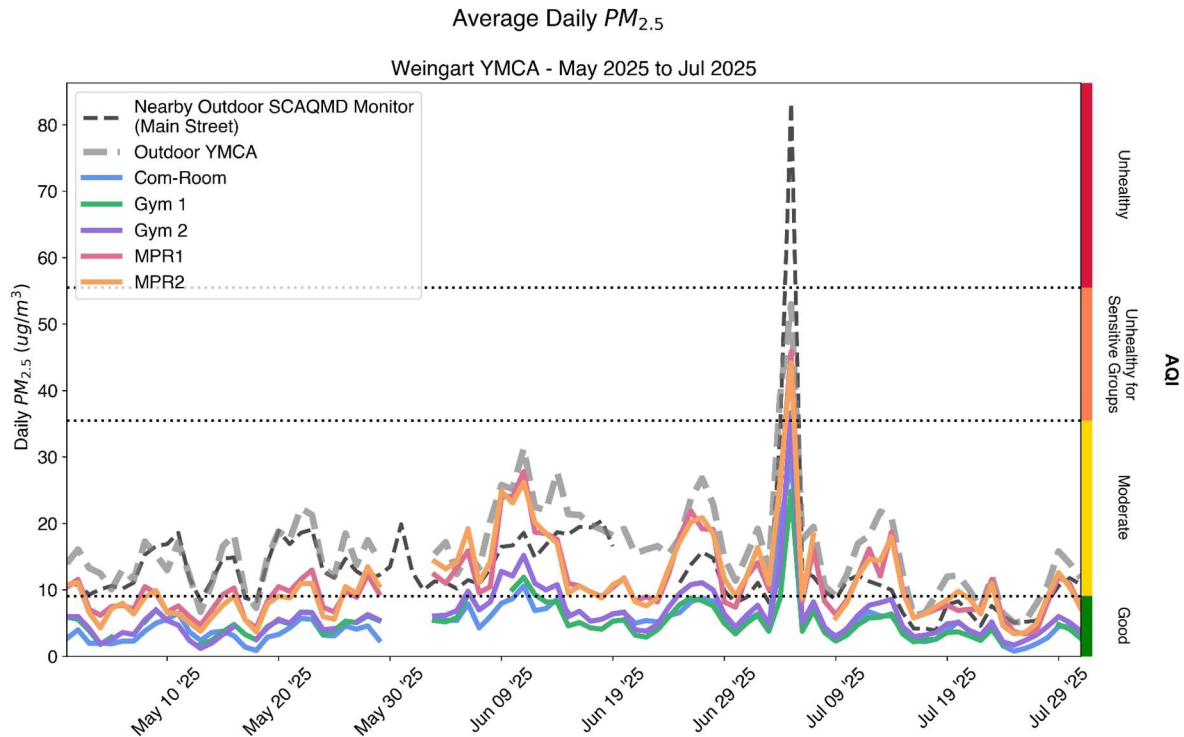
Particulate matter is an air pollutant made of tiny liquid and solid airborne particles that vary in size. Fine particulate matter (PM_{2.5}), measured at your YMCA, describes an important subset of particulate matter that is 2.5 microns and smaller in size (~30x smaller than the diameter of a human hair) and predominantly come 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. Black carbon (BC), which is also measured at this YMCA, is a subset of PM_{2.5} emitted from fossil fuel and biomass burning. A relevant urban source of BC is diesel exhaust. It has a wide range of negative respiratory, cardiovascular, and other health impacts, as well as detrimental climate effects.

Trends in Fine Particulate Matter (PM_{2.5})

Indoor and outdoor air quality monitoring at the Weingart 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 the nearest 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?

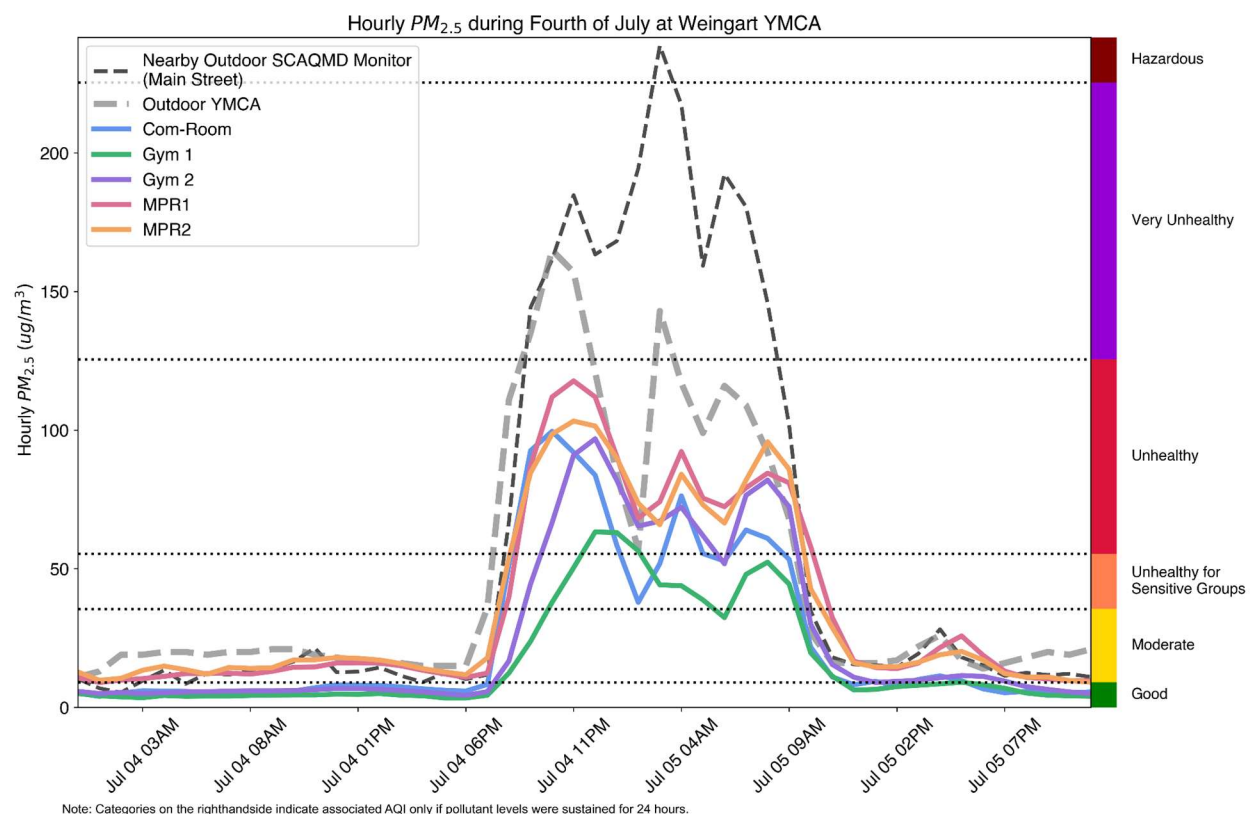
- From May 2025 to July 2025, PM_{2.5} levels varied across time, and largely stayed within the Good and Moderate AQI range. Indoor levels followed the rise and fall in outdoor air pollution, but at lower concentrations. The early July peak from Fourth of July Fireworks caused levels to reach Unhealthy for Sensitive groups outside the YMCA as well as in MPR1 and MPR2, while other rooms stayed in the lower Moderate AQI range. This event is discussed in more detail below.
- The two multi-purpose rooms (MPR1 and MPR2) continue to show levels in the Moderate AQI more frequently than other indoor areas (earlier data also showed this trend). This is explored further on page 5.

- The outdoor YMCA monitor often showed fairly similar to or slightly higher $PM_{2.5}$ levels than the nearest regulatory monitor from the South Coast Air Quality Management District (SCAQMD) 2.5 miles northwest, except in early July.¹

Impacts of Fourth of July Fireworks

- The highest $PM_{2.5}$ levels both indoors and outdoors occurred in early July due to Fourth of July firework-related emissions.

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



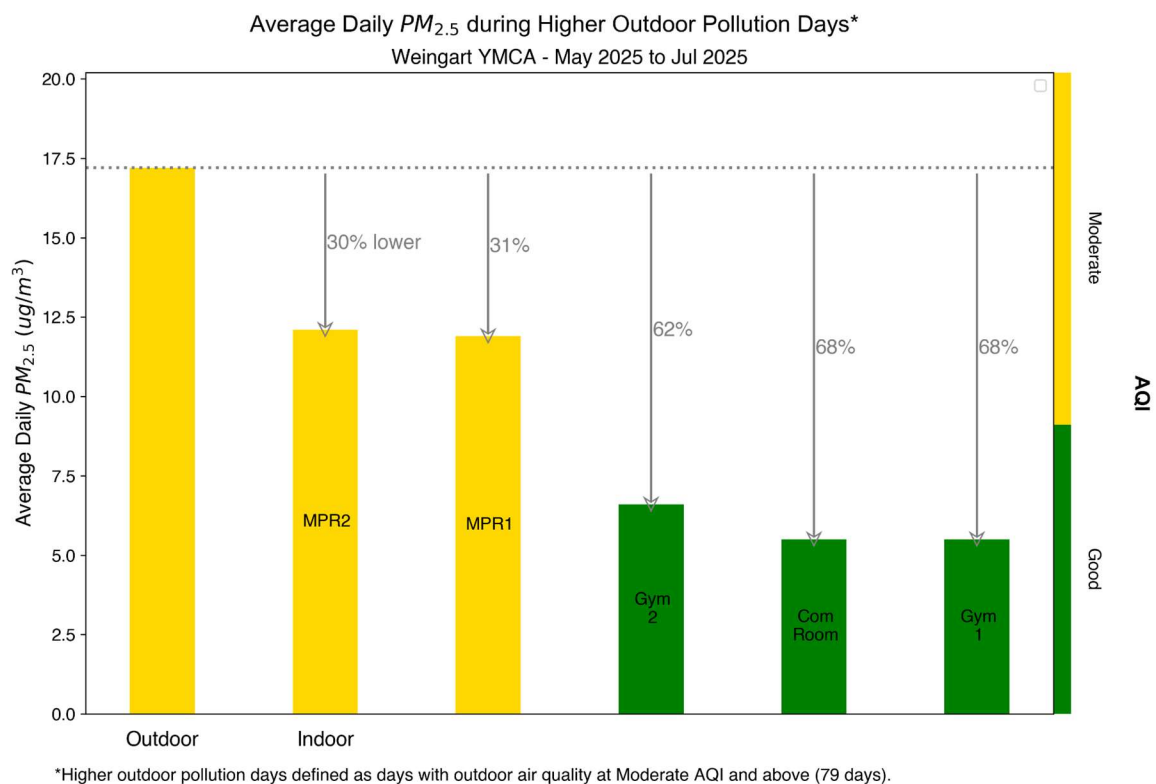
This plot shows average hourly $PM_{2.5}$ levels across time for both the indoor (solid color lines) and outdoor (dashed grey line) AirAware monitors from July 4th to July 5th 2025. Data from a nearby regulatory monitor from the South Coast Air Quality Management District (SCAQMD) is also included (dashed black line). 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, to provide health context, with the caveat that levels would need to be sustained for 24 hours to translate to the shown AQI. Times are shown in Standard Time (i.e. one hour behind Daylight Savings Time).

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

- These higher short-term hourly outdoor levels are similar to what was observed during the Eaton and Palisade wildfires in early January, highlighting the air quality-related health concerns of smoke from fireworks².
- 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, peaked around midnight, remained high until the morning of July 5th, and returned to cleaner air quality by 10AM.
- 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_{2.5}

The relationship between indoor and outdoor PM_{2.5} 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.



This bar chart compares average daily outdoor (left) and indoor (right) PM_{2.5} 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

² 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.

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.

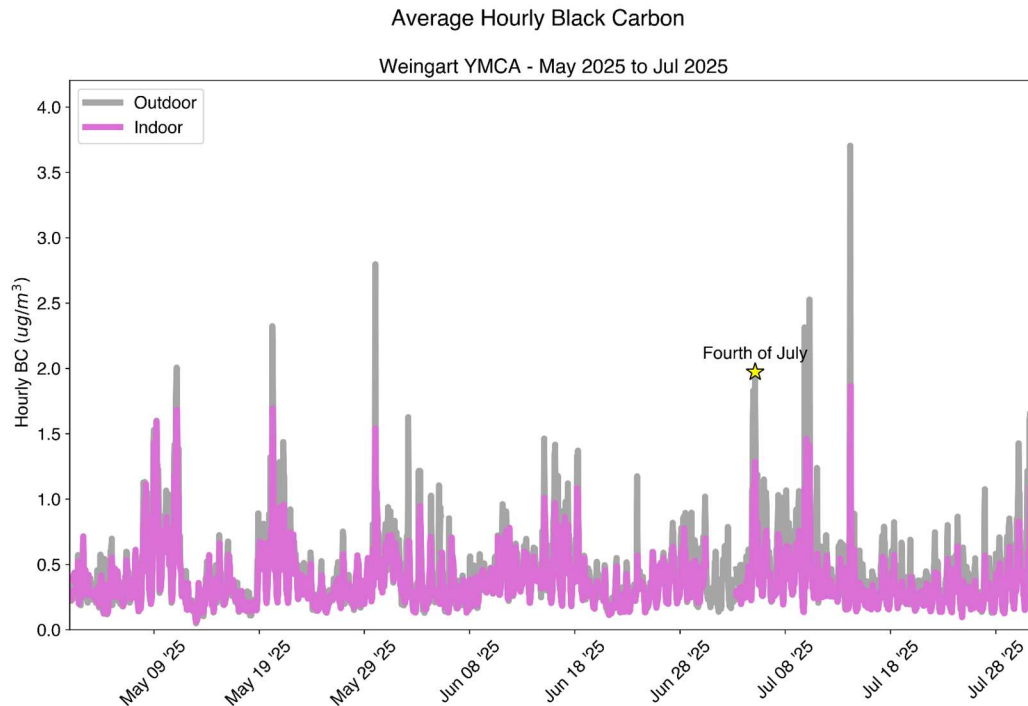
For this quarter, we are considering "higher" pollution days to be anything above Good AQI. This lets us draw conclusions about indoor and outdoor PM_{2.5} comparisons from more data. However, air pollution was acceptable during this time, and only one day saw outdoor levels in Unhealthy for Sensitive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

What does this chart tell us?

- On average, we would expect indoor levels to be between 30% and 80% lower than outdoor levels, depending on currently installed HVAC filtration. During this period, all average indoor levels during higher pollution days were within this expected range, though MPR1 and MPR2 were the most similar to outdoor levels. In general, this means the HVAC filtration system is working as expected for most spaces.
- This chart importantly highlights that indoor air quality in MPR1 and MPR2 is consistently the most impacted by outdoor air pollution than other indoor spaces. **What could be causing these elevated indoor levels?**

Trends in Black Carbon

Indoor and outdoor BC monitoring at the Weingart YMCA has been underway since early November 2024. This section explores the trends across time and space across late spring and early summer of 2025. **Note:** PM_{2.5} concentrations can be compared to the AQI, but BC does not have official health standards for comparison yet, which limits our review to concentrations only. While BC may appear lower in comparison than PM_{2.5}, health studies have shown that continued exposure at these lower levels can have detrimental health impacts.

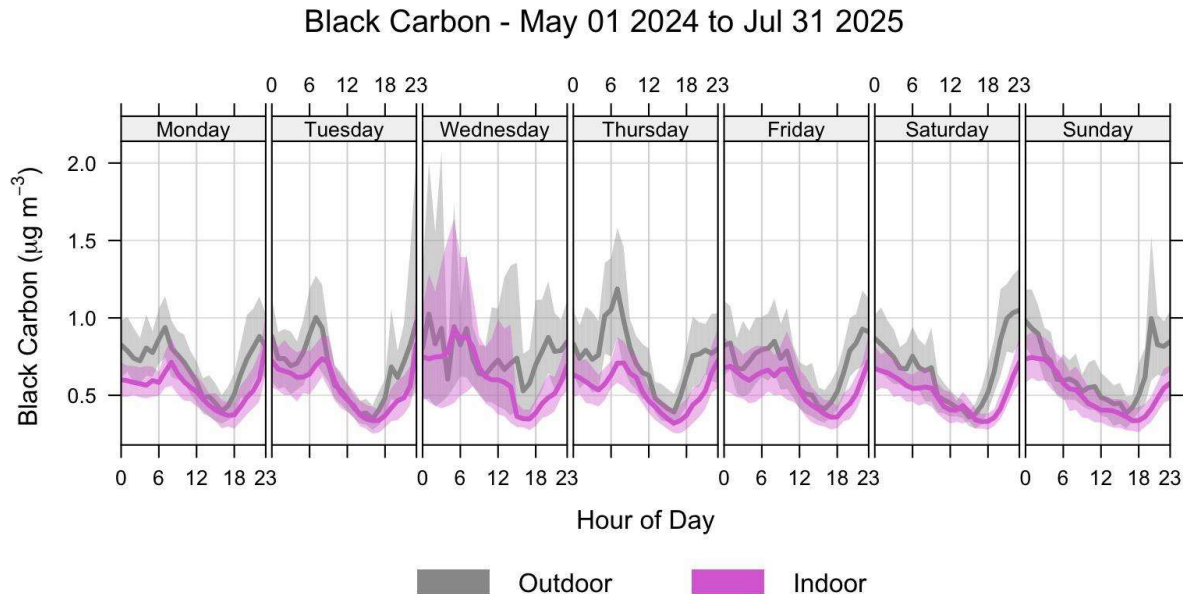


This plot shows average hourly BC levels across time for both the indoor (pink) and outdoor (grey) monitors from the beginning of May 2025 to the end of July 2025. Any gaps in the data are due to routine monitor maintenance or brief operational issues.

What does this chart tell us?

- Hourly BC levels varied across time, fluctuating across the day. Indoor levels followed the rise and fall of the outdoors, but were lower in concentration to varying extents. This relationship is explored more in the next chart.
- Fourth of July fireworks did contribute to a rise in BC, as indicated by the star, but higher levels occurred in May and later in July, highlighting that other sources of BC, such as local diesel traffic, have a greater and more consistent impact.
- Higher peaks all predominantly occurred in the early morning hours, ranging from 2AM - 8AM (in Daylight Savings Time), mostly occurred across weekdays, and occurred less frequently in June. This pattern is explored more in the next plot.

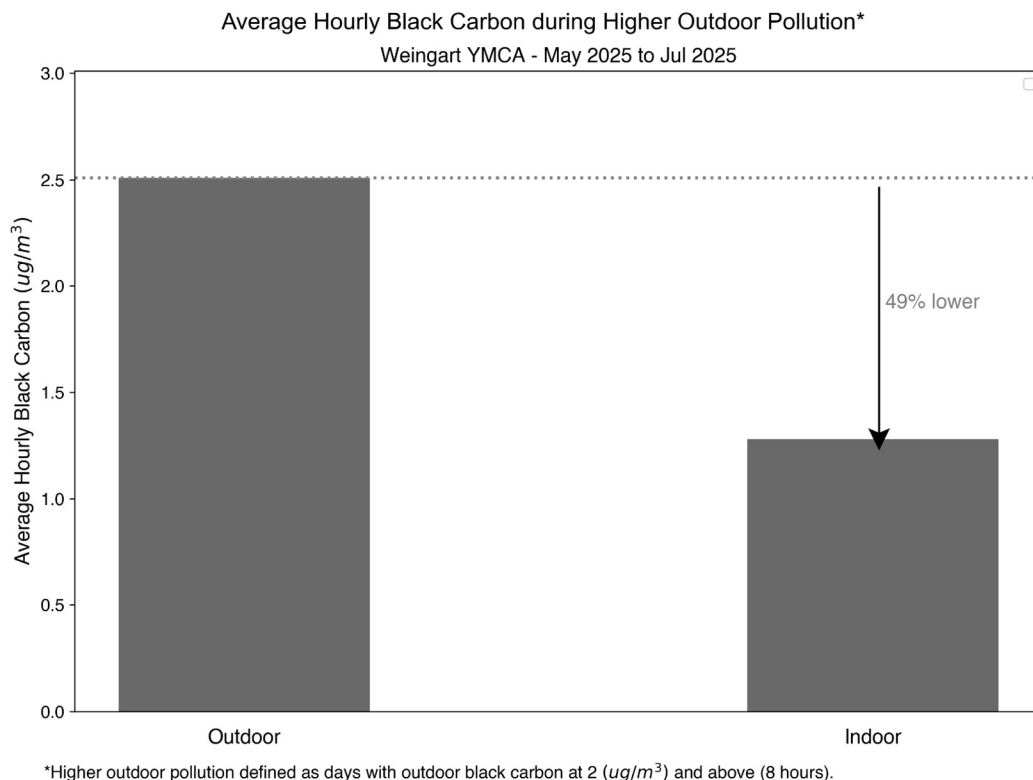
- Indoor BC levels were more similar to outdoor during May than the following months (4% lower than outdoor in May compared to an average of 14% for the rest of the period). This could be due to many factors, such as higher traffic levels, increased outdoor air infiltration due to changes in YMCA use or ventilation (e.g., window use), etc.



This plot shows the “average week of BC” for the quarter for both outdoor (grey) and indoor (pink) monitors. Levels are shown across different hours of the day and days of the week. The horizontal (x) axis uses 0-23hr notation, where 0=12AM, 18 = 6PM, and 23 = 11PM. All hours are shown in Standard Time (i.e., not Daylight Savings Time).

What does this chart tell us?

- BC levels follow a general trend across the day, rising gradually overnight and lowering in the afternoon. This is due to the natural changes in the atmosphere across the day (there is more ‘room’ for pollutants to mix during the daytime when temperatures rise and this phenomenon means concentrations are often lower - the opposite is true during the nighttime)
- The most frequent morning spikes in BC occurred on weekdays, and especially Monday through Thursday. Wednesdays and Thursdays continue to have the highest morning to afternoon levels of BC.



This bar chart compares average daily outdoor (grey) and indoor (pink) BC levels during periods of higher outdoor pollution. The arrow from the grey dashed line and coinciding percentage indicates how much lower the average indoor level is compared to outdoor BC.

What does this chart tell us?

- In general, we would expect indoor levels to be between 30% and 80% lower than outdoor levels on average, depending on currently installed HVAC filtration. For this period, the average level of indoor BC during higher outdoor pollution was within this expected range, but continues to be on the lower end. Indoor BC levels are expected to substantially improve (lower) after the HVAC upgrade.

Questions about Indoor Data

There were no noticeable instances of indoor sources or activities contributing to greater indoor BC levels within this period.

In the last two reports, we showed examples of the frequent spikes in indoor BC that exceeded outdoor levels. These peaks appear unrelated to outdoor levels, and often occurred overnight around 11PM, though they haven't reappeared since early February. Given the possible seasonality of these peaks, **what activities in the YMCA could be contributing to these trends** (these may be scheduled or automated)?

