



# South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178  
(909) 396-2000 • www.aqmd.gov

## **HYBRID LOCAL GOVERNMENT & SMALL BUSINESS ASSISTANCE ADVISORY GROUP MEETING**

### **Advisory Group Members**

Mayor Carlos Rodriguez, LGSBA Chair (Board Member)  
Senator Vanessa Delgado (Board Member)  
Supervisor Janice Rutherford (Board Member)  
Felipe Aguirre  
Council Member Rachele Arizmendi, City of Sierra Madre  
Paul Avila, P.B.A. & Associates  
Geoffrey Blake, Metal Finishers of Southern California  
Todd Campbell, Clean Energy  
LaVaughn Daniel, DancoEN  
John DeWitt, JE DeWitt, Inc.  
Bill LaMarr, California Small Business Alliance  
Rita Loof, RadTech International  
Eddie Marquez, Roofing Contractors Association  
David Rothbart, Los Angeles County Sanitation Districts

**Friday, September 9, 2022 ♦ 11:30 a.m.**

**Pursuant to Assembly Bill 361, the South Coast Air Quality Management District Local Government & Small Business Advisory Group meeting will be held at 11:30 a.m. on Friday, September 9, 2022, through a hybrid format of in-person attendance in the Dr. William A. Burke Auditorium at the South Coast AQMD Headquarters, 21865 Copley Drive, Diamond Bar, California, and/or virtual attendance via videoconferencing and by telephone.**

**Given health and safety concerns, the meeting format may be changed to full remote via webcast. Please refer to South Coast AQMD's website for information regarding the format of the meeting, updates if the meeting is changed to a full remote via webcast format, and details on how to participate:**

**<http://www.aqmd.gov/home/news-events/meeting-agendas-minutes>**

**ELECTRONIC PARTICIPATION**  
**(Instructions provided at bottom of the agenda)**

*Join Zoom Webinar Meeting – from PC or Laptop*  
<https://scaqmd.zoom.us/j/92459924491>

**Zoom Webinar ID:** 924 5992 4491 (applies to all)

**Teleconference Dial In**  
+1 669 900 6833

**One tap mobile**  
+16699006833, 92459924491#

**Audience will be allowed to provide public comment in person or through Zoom connection or telephone.**

**PUBLIC COMMENT WILL STILL BE TAKEN**

Phone controls for participants: The following commands can be used on your phone's dial pad while in Zoom Webinar meeting:

- \*6 - Toggle mute/unmute
- \*9 - Raise hand

## AGENDA

*Members of the public may address this body concerning any agenda item before or during consideration of that item (Gov't Code Section 54954.3(a)). If you wish to speak, raise your hand on Zoom or press Star 9 if participating by telephone. All agendas for regular meetings are posted at South Coast AQMD Headquarters, 21865 Copley Drive, Diamond Bar, California, at least 72 hours in advance of the regular meeting. Speakers may be limited to three (3) minutes total for all items on the agenda.*

### **CALL TO ORDER**

1. Call to Order/Opening Remarks  
*(No Motion Required)* *Mayor Carlos Rodriguez  
Committee Chair*

### **ACTION ITEM:**

2. Approval of August 12, 2022 Meeting Minutes  
*(Motion Required)*  
*[Attachment 1]* *Mayor Carlos Rodriguez  
Committee Chair*

### **DISCUSSION ITEMS (Items 3 through 5):**

3. Review of Follow-Up/Action Items  
*Staff will review the follow-up/action items identified in the previous meeting.*  
*(No Motion Required)* *Derrick J. Alatorre  
Deputy Executive Officer  
Legislative, Public Affairs & Media*
4. Health Effects of Criteria Pollutants  
*Staff will present a brief summary of Appendix I of the Revised Draft 2022 AQMP, Health Effects Analysis*  
*(No Motion Required)*  
*[Attachment 2]* *Sarah Rees  
Deputy Executive Officer  
Planning, Rule Development &  
Implementation*
5. End-of-Year Summary Report on State Legislature's and Governor's Actions during 2022 Legislative Session  
*Staff will provide an end-of-legislative-year summary report on the actions of the State Legislature and Governor, including items relating to the budget and South Coast AQMD sponsored bills and bills of interest.*  
*(No Motion Required)* *Philip Crabbe III  
Senior Public Affairs Manager  
Legislative, Public Affairs &  
Media*

**OTHER MATTERS:**

6. Other Business

*Any member of this body, or its staff, on his or her own initiative or in response to questions posed by the public, may ask a question for clarification, may make a brief announcement or report on his or her own activities, provide a reference to staff regarding factual information, request staff to report back at a subsequent meeting concerning any matter, or may take action to direct staff to place a matter of business on a future agenda. (Gov't Code Section 54954.2)*

7. Public Comment Period

*At the end of the regular meeting agenda, an opportunity is provided for the public to speak on any subject within the Local Government and Small Business Assistance Committee's authority that is not on the agenda. Speakers may be limited to three (3) minutes each.*

8. **Next Meeting Date** - Friday, October 14, 2022, at 11:30 a.m.

**ADJOURNMENT**

**Document Availability**

*All documents (i) constituting non-exempt public records, (ii) relating to an item on an agenda for a regular meeting, and (iii) having been distributed to at least a majority of the Committee after the agenda is posted, are available by contacting Van Doan at (909) 396-3117 or send the request to [kdoan@aqmd.gov](mailto:kdoan@aqmd.gov).*

**Americans with Disabilities Act and Language Accessibility**

*Disability and language-related accommodations can be requested to allow participation in the Local Government and Small Business Assistance Advisory Group meeting. The agenda will be made available, upon request, in appropriate alternative formats to assist persons with a disability (Gov't Code Section 54954.2(a)). In addition, other documents may be requested in alternative formats and languages. Any disability or language-related accommodation must be requested as soon as practicable. Requests will be accommodated unless providing the accommodation would result in a fundamental alteration or undue burden to the South Coast AQMD. Please contact Van Doan at (909) 396-3117 from 7:00 a.m. to 5:30 p.m., Tuesday through Friday, or send the request to [kdoan@aqmd.gov](mailto:kdoan@aqmd.gov).*

## **INSTRUCTIONS FOR ELECTRONIC PARTICIPATION**

### **Instructions for Participating in a Virtual Meeting as an Attendee**

As an attendee, you will have the opportunity to virtually raise your hand and provide public comment.

Before joining the call, please silence your other communication devices such as your cell or desk phone. This will prevent any feedback or interruptions during the meeting.

**Please note:** During the meeting, all participants will be placed on Mute by the host. You will not be able to mute or unmute your lines manually.

After each agenda item, the Chair will announce public comment.

A countdown timer will be displayed on the screen for each public comment. If interpretation is needed, more time will be allotted.

**Once you raise your hand to provide public comment, your name will be added to the speaker list. Your name will be called when it is your turn to comment. The host will then unmute your line.**

### **Directions for Video ZOOM on a DESKTOP/LAPTOP:**

- If you would like to make a public comment, please click on the “**Participants**” button on the bottom of the screen.
- A list of participants will appear on the right side of the screen. At the bottom of the list, please click on the grey “**Raise Hand**” button.
- This will signal to the host that you would like to provide a public comment and you will be added to the list.

### **Directions for Video Zoom on a SMARTPHONE:**

- If you would like to make a public comment, please click on the “**Participants**” button on the bottom of your screen.
- A new screen will pop up with the list of participants. Look for the “**Raise Hand**” button on the screen and click the button.
- This will signal to the host that you would like to provide a public comment and you will be added to the list.

### **Directions for TELEPHONE line only:**

- If you would like to make public comment, please **dial \*9** on your keypad to signal that you would like to comment.



# South Coast Air Quality Management District

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## LOCAL GOVERNMENT & SMALL BUSINESS ASSISTANCE ADVISORY GROUP FRIDAY, AUGUST 12, 2022 MEETING MINUTES

### MEMBERS PRESENT:

Senator Vanessa Delgado (Board Member)  
Supervisor Janice Rutherford (Board Member)  
Felipe Aguirre  
Council Member Rachele Arizmendi, City of Sierra Madre  
Paul Avila, P.B.A. & Associates  
Geoffrey Blake, Metal Finishers of Southern California  
Todd Campbell, Clean Energy  
LaVaughn Daniel, DancoEN  
John DeWitt, JE DeWitt, Inc.  
Bill LaMarr, California Small Business Alliance  
Rita Loof, RadTech International  
Eddie Marquez, Roofing Contractors Association  
David Rothbart, Los Angeles County Sanitation Districts

### MEMBERS ABSENT:

Mayor Carlos Rodriguez, LGSBA Chair (Board Member)

### OTHERS PRESENT:

Mark Abramowitz  
Ken Chawkins  
Harvey Eder  
Mark Taylor, Board Member Consultant (*Rutherford*)

### SOUTH COAST AQMD STAFF:

Susan Nakamura, Chief Operating Officer  
Derrick Alatorre, Deputy Executive Officer  
Sujata Jain, Deputy Executive Officer/Chief Financial Officer  
Sarah Rees, Deputy Executive Officer  
Lisa Tanaka O'Malley, Assistant Deputy Executive Officer  
Jillian Wong, Assistant Deputy Executive Officer  
Victor Yip, Assistant Deputy Executive Officer  
Daphne Hsu, Principal Deputy District Counsel  
Karin Manwaring, Senior Deputy District Counsel  
Philip Crabbe III, Senior Public Affairs Manager  
Sang-Mi Lee, Planning and Rules Manager

Mark Henninger, Information Technology Manager  
Anthony Tang, Information Technology Supervisor  
Van Doan, Air Quality Specialist  
Britney Gallivan, Air Quality Specialist  
Roupen Karakouzian, Financial Analyst  
De Groeneveld, Senior Information Technology Specialist

**Agenda Item #1 – Call to Order/Opening Remarks**

Supervisor Janice Rutherford called the meeting to order at 11:30 a.m.

For additional details of the Local Government & Small Business (LGSBA) Advisory Group Meeting, please refer to the Webcast at [Live Webcast \(aqmd.gov\)](https://aqmd.gov) at 0:07.

**Agenda Item #2 – Approval of June 10, 2022 Meeting Minutes**

Supervisor Rutherford called for approval of the June 10, 2022 meeting minutes.

No public comment.

Motion to approve minutes made by Eddie Marquez; seconded by Bill LaMarr; approved.

Ayes: Aguirre, Avila, Campbell, Daniel, DeWitt, LaMarr, Loof, Marquez, Rothbart, Rutherford

Noes: None

Abstain: Arizmendi

Absent: Blake (during voting), Delgado (during voting), Rodriguez

For additional details, please refer to the [Webcast](#) beginning at 5:35.

**Agenda Item #3 – Review of Follow-Up/Action Items**

Derrick Alatorre, Deputy Executive Officer for Legislative, Public Affairs and Media, reviewed the action item from the June 10, 2022 meeting, which was to place on a future agenda a discussion on Assembly Bill (AB) 617.

No public comment.

For additional details, please refer to the [Webcast](#) beginning at 6:54.

**Agenda Item #4 – Update on Progress of 2022 LGSBA Goals and Objectives**

Mr. Alatorre presented an update on the progress of 2022 LGSBA Goals and Objectives, including a tentative list of discussion topics for upcoming meetings.

For additional details on the presentation and discussions, please refer to the [Webcast](#) beginning at 1:08:20.

**Agenda Item #5 – Fiscal Year 2022-23 General Fund Budget**

Sujata Jain, Deputy Executive Officer and Chief Financial Officer for Finance, presented an overview of the General Fund Budget, detailing staffing levels, expenditures, and revenues required to maintain current program commitments.

John DeWitt inquired if there were retrospective cost analysis for rules and regulations. Susan Nakamura, Chief Operating Officer, replied that retrospective cost analysis is not done; however, cost analysis is incorporated into rulemaking process. Sarah Rees, Deputy Executive Officer for Planning, Rule Development, and Implementation shared her experience at United States Environmental Protection Agency (USEPA) working on retrospective review and offered to provide previous USEPA and Congressional Research Service reports. Mr. DeWitt requested a one-page summary of those reports. For additional details, please refer to the [Webcast](#) beginning at 13:46.



***Action Item 1:** Provide a one-page summary of previous USEPA and Congressional Research Service retrospective review reports.*

Paul Avila asked if new staff receive the same pay and benefits as retiring staff. Ms. Jain replied that staff in the same pay grade receive the same salary; however, they may have different retirement plans with slightly different costs. For additional details, please refer to the [Webcast](#) beginning at 23:00.

Mr. LaMarr mentioned past building renovation projects and asked what the next costly project would be. Ms. Jain referenced a list of potential building maintenance projects on page #24 of the 2022-23 budget and indicated it would be completed as needed. For additional details, please refer to the [Webcast](#) beginning at 24:45.

Rita Loof referenced slide #6 and asked if the impact of fee increase on the business community has been reviewed. Ms. Jain replied there is a socioeconomic study when there is a fee increase. For additional details, please refer to the [Webcast](#) beginning at 27:38.

David Rothbart commented that it takes longer than usual to obtain permits and asked if the vacancy rate would change. Ms. Nakamura replied that the agency-wide vacancy rate is the same, but the Engineering & Permitting vacancy rate is lower as there has been improved efforts to increase engineering staff and reduce permit backlog. For additional details, please refer to the [Webcast](#) beginning at 31:28.

Harvey Eder commented on solar energy and engineers and asked if the budget includes the employment of solar engineers. Ms. Nakamura replied that the qualifications for engineers include an engineering degree, but does not specify the field. For additional details, please refer to the [Webcast](#) beginning at 34:42.

For additional details on the presentation and discussions, please refer to the [Webcast](#) beginning at 8:35.

**Agenda Item #6 – Draft 2022 Air Quality Management Plan (AQMP) Overview**

Sang-Mi Lee, Planning and Rules Manager for Planning, Rule Development and Implementation, presented a summary of the draft 2022 AQMP development, including the strategy to attain the 2015 8-hour ozone National Ambient Air Quality Standard.

Mr. Rothbart discussed the AQMP, including non-attainment and South Coast Air Quality Management District, California Air Resources Board, and USEPA obligations. For additional details, please refer to the [Webcast](#) beginning at 49:48.

Ms. Loof referenced slide #10 and agreed that traditional approaches will not reduce emissions by the amount needed. She also referenced page #165 of the AQMP and suggested potential incentive options. For additional details, please refer to the [Webcast](#) beginning at 54:17.

Mr. LaMarr commented on Section 185 fees and the health impacts of ozone. Dr. Rees expressed agreement with Mr. LaMarr's comments on Section 185 fees and provided clarification on the health impacts of ozone. For additional details, please refer to the [Webcast](#) beginning at 58:52.

Mr. Eder commented on the 2022 AQMP. For additional details, please refer to the [Webcast](#) beginning at 1:06:00.

For additional details on the presentation and discussions, please refer to the [Webcast](#) beginning at 38:20.

**Agenda Item #7 – Other Business**

Ms. Loof expressed interest in receiving the summary of USEPA and Congressional Research Service retrospective review reports requested by Mr. DeWitt.

**Agenda Item #8 – Public Comment**

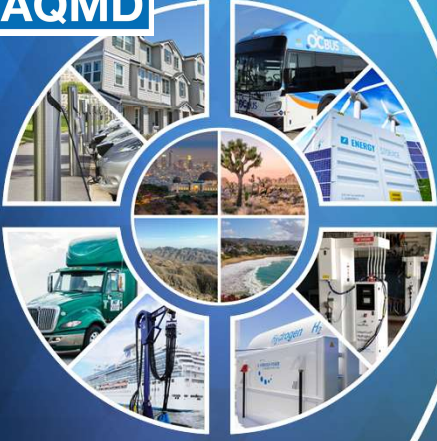

No public comment.

**Agenda Item #9 – Next Meeting Date**

The next regular LGSBA Advisory Group meeting is scheduled for Friday, September 9, 2022, at 11:30 a.m.

**Adjournment**

The meeting adjourned at 12:42 p.m.



# Health Effects of Criteria Air Pollutants

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## Local Government and Small Business Assistance Advisory Group Update

September 9, 2022

South Coast Air Quality Management District

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## Outline

-  Advisory Council Mechanics and Objectives
-  USEPA's recent review on PM2.5 and Ozone NAAQS
-  Health Effects of Criteria Air Pollutants
  - Particulate Matter (PM2.5)
  - Ozone (O<sub>3</sub>)
  - Nitrogen Dioxide (NO<sub>2</sub>)
  - Sulfur Dioxide (SO<sub>2</sub>)
  - Carbon Monoxide (CO)
  - Lead (Pb)
-  Next Steps and Discussion

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## Advisory Council

- California Health and Safety Code §40471(b) requires the Advisory Council to review the health impacts of air pollution during the development of an Air Quality Management Plan (AQMP)
- The current Advisory Council is formed to review and provide feedback on the health effects analysis to be included in the 2022 AQMP
- The 2022 AQMP is focused on attaining the 2015 ozone air quality standard but health effects from all criteria air pollutants are broadly covered

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## Advisory Council Membership

- Advisory Council includes 18 members



1 Governing Board Chair appointee serves as a liaison with the council to the Governing Board



12 members appointed by each member of the Governing Board



1 representative from each active advisory group:

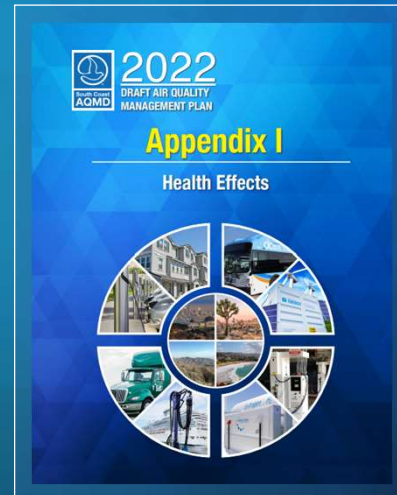
- Air Quality Management Plan Advisory Group
- Clean Fuels Advisory Group
- Environmental Justice Advisory Group
- Local Government and Small Business Assistance Advisory Group
- Scientific, Technical, and Modeling Peer Review Advisory Group

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## Health Effects Analysis

- Appendix I of the Draft 2022 AQMP discusses health effects of PM<sub>2.5</sub>, ozone and other criteria pollutants
- A draft Appendix I is available at <http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan>



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## USEPA's Recent Review on PM NAAQS

- On December 7, 2020, USEPA announced its decision to retain, without revision, the existing primary (health-based) and secondary (welfare-based) National Ambient Air Quality Standards (NAAQS) for particulate matter
- Currently, USEPA has primary and secondary standards for PM<sub>2.5</sub><sup>1</sup> and PM<sub>10</sub><sup>2</sup>

*1 - Annual average standards with levels of 12.0 µg/m<sup>3</sup> and 15.0 µg/m<sup>3</sup>, respectively; 24-hour standards with 98th percentile forms and levels of 35 µg/m<sup>3</sup>*

*2 - 24-hour standards with one-expected exceedance forms and levels of 150 µg/m<sup>3</sup>*

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## USEPA's Recent Review on PM NAAQS (cont'd)

- On June 10, 2021, USEPA announced it will reconsider the December 2020 decision to retain the standard
  - The evidence presented within the 2019 Integrated Science Assessment (ISA)<sup>1</sup> provides the scientific basis for the reconsideration of the 2020 PM NAAQS
- The Policy Assessment (PA) for the Reconsideration of PM NAAQS was released in May 2022
  - Primary standards could be lower
    - Annual average of 8-10  $\mu\text{g}/\text{m}^3$
    - 24-hour average of 25-30  $\mu\text{g}/\text{m}^3$

*1 - Along with the targeted identification and evaluation of scientific information in the ISA Supplement*

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## USEPA's Recent Review on Ozone NAAQS

- On December 23, 2020, USEPA completed its review of the full body of currently available scientific evidence and exposure/risk information and decided to retain the existing ozone NAAQS
- The existing primary and secondary standards, established in 2015, are 0.070 parts per million (ppm), as the fourth-highest daily maximum 8-hour concentration, averaged across three consecutive years
- On October 29, 2021 the USEPA announced that it will reconsider the 2020 decision to retain the ozone standard
- A draft Policy Assessment for the Reconsideration of Ozone NAAQS was released in April 2022

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## Pollutants Included in Health Effects Analysis

- 6 criteria pollutants
  - Particulate Matter (PM<sub>2.5</sub>)
  - Ozone (O<sub>3</sub>)
  - Nitrogen Dioxide (NO<sub>2</sub>)
  - Sulfur Dioxide (SO<sub>2</sub>)
  - Carbon Monoxide (CO)
  - Lead (Pb)



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## Sources of Information

- Previous Reviews<sup>1</sup>
- Most Recent USEPA Integrated Science Assessment (ISA) reviews
  - Ozone<sup>2</sup>, Carbon Monoxide<sup>3</sup>, Particulate Matter<sup>4</sup>, Nitrogen Oxides<sup>5</sup>, Sulfur Dioxide<sup>6</sup>, and Lead<sup>7</sup>
  - Policy Assessment for the Reconsideration for Particulate Matter NAAQS<sup>8</sup>
  - Draft Policy Assessment for ozone NAAQS<sup>9</sup>

1 - South Coast Air Quality Management District 1996, 2003, 2007, 2013b, 2016; 2 - USEPA, 2020; 3 - USEPA 2010; 4 - USEPA 2019; 5 - USEPA 2016; 6 - USEPA 2017; 7 - USEPA, 2013a; 8 - May 2022; 9 - April 2022

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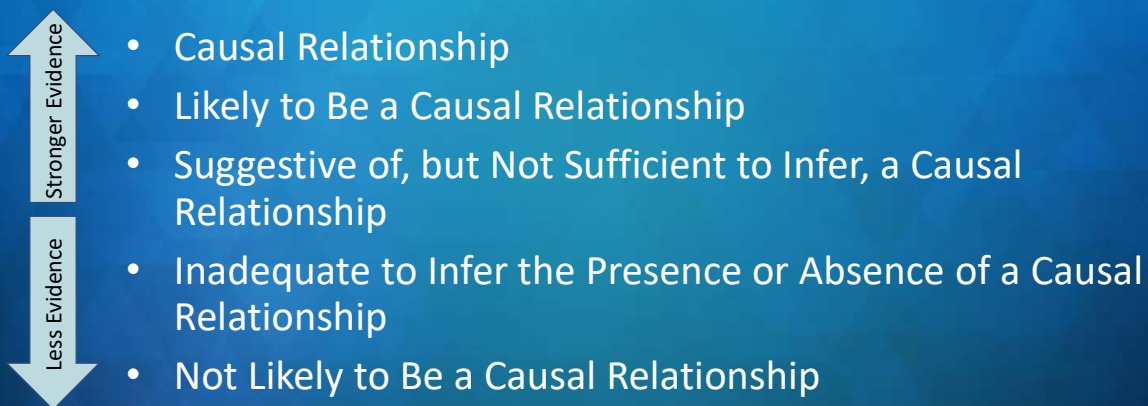
## Sources of Information (Cont'd)

- Additional reviews prepared by the California Air Resources Board and the California EPA Office of Environmental Health Hazard Assessment
  - Particulate Matter (California Air Resources Board and Office of Environmental Health Hazard Assessment 2002)
  - Ozone (California Air Resources Board and Office of Environmental Health Hazard Assessment 2005)
  - Nitrogen Dioxide (California Air Resources Board and Office of Environmental Health Hazard Assessment 2007)
- Recent literature (since the most current ISA)
- Large review articles on the health effects of air pollution (American Thoracic Society 1996a; Brunekreef et al. 2002).

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## USEPA's Weight of Evidence Descriptions for Causal Determination of Health Effects

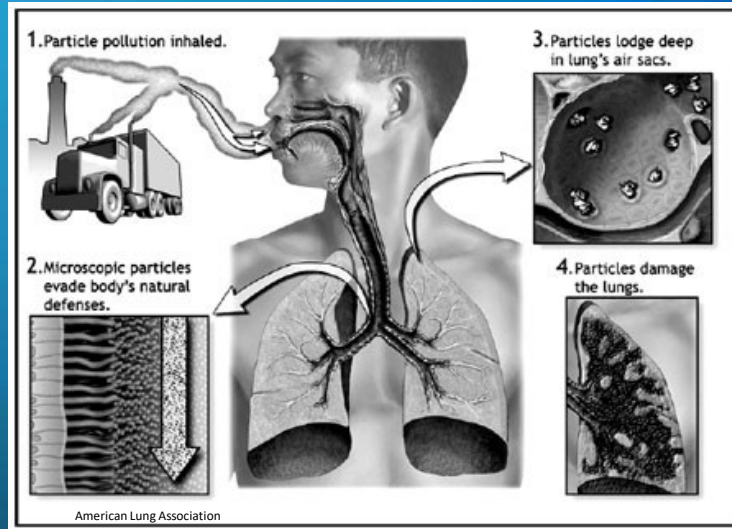
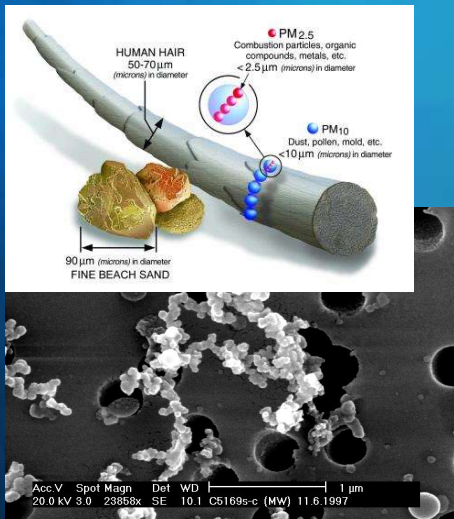


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# PM2.5



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# Health Effects Summary – PM2.5



## Short Term

- Cardiovascular Effects (Causal)
- Respiratory Effects (Likely Causal)

## Long Term

- Cardiovascular Effects (Causal)
- Respiratory Effects (Likely Causal)
- Nervous System Effects (Likely Causal)

## Short Term (Suggestive of Relationship)

- Metabolic Effects
- Nervous System Effects

## Long Term (Suggestive of Relationship)

- Metabolic Effects
- Reproductive and Development



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## Health Effects Summary – PM2.5 Respiratory Effects

### Short Term (Causal)

- Asthma exacerbation
- Chronic Obstructive Pulmonary Disease (COPD) Exacerbation
- Combined Respiratory-Related Diseases

### Long Term (Likely Causal)

- Lung development (lung function growth)
- Asthma development/prevalence in children
- Childhood wheeze
- Pulmonary inflammation



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## Health Effects Summary – PM2.5 Cardiovascular Effects

### Short Term (Causal)

- Heart Disease
- Heart Failure
- Cardiovascular related mortality (Arrhythmia, Thrombosis)

### Long Term (Causal)

- Cardiovascular Mortality
- Cardiovascular Morbidity



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## Health Effects Summary – PM2.5 Nervous System

### Long Term (Likely Causal)

- Neuroinflammation (hippocampus, cerebral cortex, hypothalamus)
- Morphologic changes (neurodegeneration)



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## Health Effects Summary – PM2.5 Cancer and Total Mortality

### Cancer (Likely Causal)

- Genotoxicity
- Epigenetic effects (i.e., hypo- and hypermethylation of DNA)
- Carcinogenic
- Increases in the risk of lung cancer incidence and mortality

### Total Mortality (Causal)



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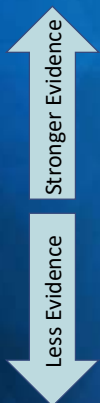
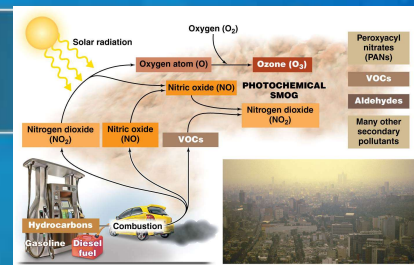
# Ozone



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## Health Effects Summary – Ozone



### Short Term

- Respiratory Effects (Causal)
- Metabolic Effects (Likely Causal)

### Short Term (Suggestive of Relationship)

- Cardiovascular Effects
- Total Mortality
- Central Nervous System Effects

### Long Term

- Respiratory Effects (Likely Causal)

### Long Term (Suggestive of Relationship)

- Cardiovascular Effects
- Metabolic Effects
- Total Mortality
- Reproductive Effects
- Central Nervous System Effects

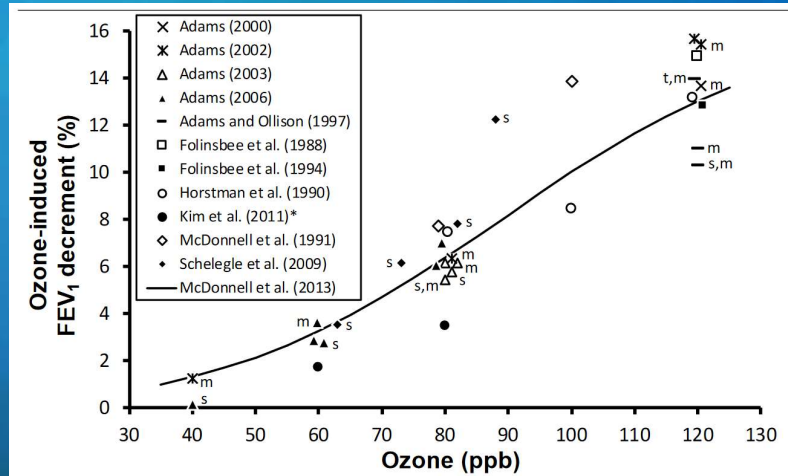


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## Health Effects Summary – Ozone Respiratory Effects

Comparisons of mean ozone-induced forced expiratory volume in 1 second (FEV1) decrements in young healthy adults following 6.6 hours of exposure to ozone



## Health Effects Summary – NOx



### Short Term

- Respiratory Effects (Causal)

### Long Term

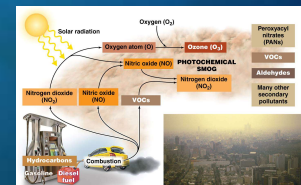
- Respiratory Effects (Likely Causal)
  - e.g., asthma

### Short Term (Suggestive of Relationship)



- Cardiovascular and Related Metabolic Effects
- Total Mortality

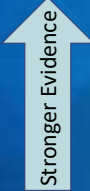
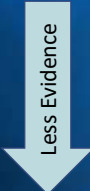
### Long Term (Suggestive of Relationship)

- Cardiovascular and Related Metabolic Effects
- Birth Outcomes
- Total Mortality
- Cancer



## Health Effects Summary – SO<sub>2</sub>

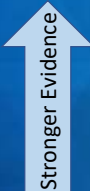




 Stronger Evidence	<b>Short Term</b> <ul style="list-style-type: none"> <li>Respiratory Morbidity (Causal)</li> </ul>	<b>Long Term</b>
	<b>Short Term (Suggestive of Relationship)</b> <ul style="list-style-type: none"> <li>Mortality</li> </ul>	<b>Long Term (Suggestive of Relationship)</b> <ul style="list-style-type: none"> <li>Respiratory Morbidity</li> </ul>
 Less Evidence		

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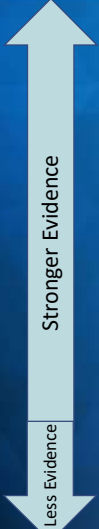
## Health Effects Summary – CO

 Stronger Evidence	<b>Short Term</b> <ul style="list-style-type: none"> <li>Cardiovascular Morbidity (Likely Causal)</li> </ul>	<b>Long Term</b>
	<b>Short Term (Suggestive of Relationship)</b> <ul style="list-style-type: none"> <li>Central Nervous System</li> <li>Respiratory Morbidity</li> <li>Mortality</li> </ul>	<b>Long Term (Suggestive of Relationship)</b> <ul style="list-style-type: none"> <li>Central Nervous System</li> <li>Birth Outcomes and Developmental Effects</li> </ul>
 Less Evidence		

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## Health Effects Summary – Lead

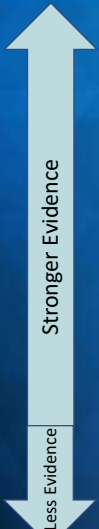


<p><b>Children (Causal)</b></p> <ul style="list-style-type: none"> <li>• Cognitive Function Decrements</li> <li>• Externalizing Behaviors: Attention, Impulsivity and Hyperactivity</li> </ul>	<p><b>Children (Likely Causal)</b></p> <ul style="list-style-type: none"> <li>• Externalizing Behaviors: Conduct Disorders in Children and Young Adults</li> <li>• Internalizing Behaviors</li> <li>• Auditory Function Decrements</li> <li>• Motor Function Deficits</li> </ul>	<p><b>Adults (Likely Causal)</b></p> <ul style="list-style-type: none"> <li>• Cognitive Function Decrements</li> <li>• Psychopathological Effects</li> </ul>
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## Health Effects Summary – Lead

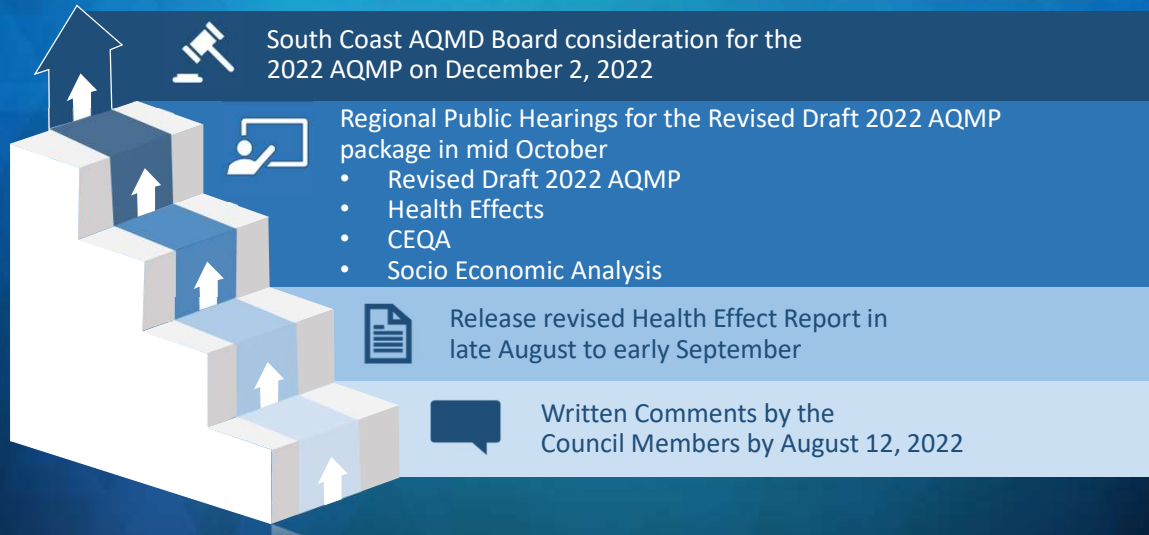


<p><b>Causal</b></p> <ul style="list-style-type: none"> <li>• Hypertension</li> <li>• Coronary Heart Disease</li> <li>• Decreased Red Blood Cell Survival and Function</li> </ul>	<ul style="list-style-type: none"> <li>• Altered Heme Synthesis</li> <li>• Development</li> <li>• Male Reproductive Function</li> </ul>
<p><b>Likely Causal</b></p> <ul style="list-style-type: none"> <li>• Atopic and Inflammatory Response</li> <li>• Decreased Host Resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Cancer</li> </ul>
<p><b>Suggestive of Relationship</b></p> <ul style="list-style-type: none"> <li>• Subclinical Atherosclerosis</li> <li>• Reduced Kidney Function</li> </ul>	<ul style="list-style-type: none"> <li>• Birth Outcomes (low birth weight, spontaneous abortion)</li> <li>• Female Reproductive Function</li> </ul>

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## Next Steps



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