Richmond – San Pablo Community Air Monitoring Plan
Steering Committee Meeting #3

May 15, 2019
Today’s Agenda

I. Welcome, Introductions and Roll Call

II. Agenda Review

III. Review of Steering Committee Deliberation Process

IV. What We Know: Health Outcomes in the Richmond-San Pablo Area

V. What We Know: Air Quality in the Richmond-San Pablo Area

VI. Group Mapping Activity

VII. Next Steps

VIII. Public Comments
Review of Steering Committee Deliberation Process
Deliberation Process

• 35 Steering Committee Members

• Quorum:
  • Majority (51% or 18 members) of active voting members are present; and
  • A majority (51%) of those present represent people who live in the Richmond-San Pablo area.
Deliberation Process

Is 51% (18 Committee members) of the Steering Committee in attendance?

Yes

Are 51% of Committee members in attendance designated as representatives of Richmond - San Pablo residents?

Yes

No, there is NOT a quorum; votes will NOT be held.

No

No, there is NOT a quorum; votes will NOT be held.

No

Yes, there IS a quorum; votes may be held.
General Votes: Simple Majority

• For all votes except charter amendments, the majority vote determines the outcome (51% or more)

• Members who abstain from voting will NOT be counted as part of the total number of votes.

• In a tie, the final decision will be made by the Co-Lead Team.
  • Co-Lead Team members will discuss and take a separate vote to determine the outcome, and report back to the Steering Committee.
Charter Amendment Votes

- A **two-thirds majority** (66%) is required to amend the Charter.

- Members who abstain from voting will NOT be counted as part of the total number of votes.
4. **Roles and Responsibilities**

*Community Steering Committee Members*

Steering committee members will be responsible for assisting Air District and community co-leads in developing the Richmond-San Pablo Community Air Monitoring Plan, in accordance with the California Air Resources Board’s Community Air Protection Blueprint\(^1\). Committee members may be asked to assist in identifying air pollution issues and sources of air pollution in the area, and in reviewing air quality data and local health impact studies to assist in developing the Plan.

*Co-Leads*

The Steering Committee will be supported by a team of co-leads comprised of **one to three** [changed to] **five** community leaders and the Air District. The co-lead team will provide infrastructure support to the Steering Committee and the air monitoring plan development. The community leads will be local to the Richmond-San Pablo Area and can be one trusted organization or a small collective or coalition of individuals.

The co-lead team will be responsible for providing necessary background materials for steering committee members, developing meeting agendas, coordination with the meeting facilitator, and for leading Steering Committee activities. The co-lead team will also be responsible for providing technical support and other relevant technical assessment information to the Steering Committee.
Who will win the 2019 NBA championship?

A. Golden State Warriors
B. Trailblazers
C. Bucks
D. Raptors
Would you like to vote to amend the Charter to expand the number of community member Co-Leads from 3 to 5?

A. Yes, I would like to amend the Charter.
B. No, I do not want to amend the Charter.
C. I abstain.
What We Know: Health Outcomes in the Richmond-San Pablo Area
Air Quality and Health Outcomes: What we Know, What to Do

Rohan Radhakrishna MD, MPH, MS
Chair – Family and Adult Medicine
Deputy Health Officer, Contra Costa County
Overview

• How are West Contra Costa County communities affected by air quality? Who’s most affected?

• What are the environmental contributors?

• What more can we do?
HEALTH IMPACTS OF AIR POLLUTION

- Impaired lung growth in children
- Increased asthma, coughs and bronchitis
- Impairment of brain development in babies and small children
- Low birth weight and adverse birth outcomes
- Heart attack and stroke
- Upper respiratory track irritation and infection
- Worsening of existing health problems in people with chronic disease

PEOPLE MOST SUSCEPTIBLE

- Children
- Pregnant women and unborn children
- Elderly people
- People with chronic disease
Outdoor Air Pollution & Health

Particulate air pollution, including smoking, wild fires and point source or motor vehicle exhaust, lead to impairment of lung function, an effect that occurs in a few minutes.

1. Stressed Lung triggers the brain and heart raising blood pressure
2. Inflammation triggers vessel damage and clotting
3. Air Sac (alveoli) damage decreases lung function and increases risk of heart/lung disease and infections

Sources: CDPH 2019
Air Pollution & Adverse Birth Outcomes

1. Low Birth Weight
2. Pre-term Birth
3. Small for Gestational Age

Meta-analysis showed very mild effect size (CO, NO2, NOx, O3, PM2.5, PM10, or SO2)

Still controversial

Sources: Shah and Balkhair, 2011; Nieuwenhuijsen et al., 2013; Pedersen et al., 2013. Guo et al 2019)
Outdoor Air Pollution and Asthma

• Proximity to roads with heavy traffic may contribute to:
  • New onset (in children and adults)
  • Exacerbation (in children and adults)
  • Increased risk of ED visits and hospitalizations due to asthma (in children)
  • Black carbon (particulates), organic compounds and heavy metals from traffic pollution all contribute to asthma risk and severity

Outdoor Air Pollution and Asthma

• Proximity to point sources of pollution may contribute to asthma severity:
  • Risk of asthma attack is associated with residing near a grain mill (odds ratio (OR) = 1.35), petroleum refinery (OR = 1.44), asphalt plant (OR = 1.23), or power plant (OR = 1.28) (all p's < 0.05).
  • Residence near major air emissions sources (>100 tons/year) increased asthma attack risk by 108% (p < 0.05).

Resources

Cal Enviro-Screen

CDPH CCB: CA Community Burden

Healthy Places Index

California Community Burden of Disease and Cost Engine (CCB):
An emerging toolset for epidemiologic analysis and scientific insight, exploring the intersection between health disparities and place.
Emergency Department Visit Rate
Myocardial Infarction (2011-2013)
Diesel Particulate Matter
Richmond Region Percentile
Traffic Results
Richmond Region Percentile
Toxic Releases Results
Richmond Region Percentile
Ozone Pollution has worsened in recent years

Particulate Pollution has worsened in recent years

Asthma Severity is above the Healthy Person 2020 target levels

Asthma ED Visits per 10,000 Residents by Age Compared to California and HP2020 Targets, 2014

Source: California Healthy Breathing; Office of Statewide Health Planning and Development
Asthma hospitalizations are more frequent among African-Americans

Asthma Hospitalizations by Race/Ethnicity, 2014

Age-adjusted Hospitalization Rate
Contra Costa County

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<tr>
<th>Race / Ethnicity</th>
<th>Age-adjusted Rate Per 10,000 residents</th>
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<td>Asian</td>
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<tr>
<td>Latino</td>
<td>8.1</td>
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<tr>
<td>White</td>
<td>6.3</td>
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<tr>
<td>African American</td>
<td>26.0</td>
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Source: California Breathing, Contra Costa County Asthma Profile, September 2016
Asthma Disproportionately Affects the Poor

Percentage of Population Below 200% of the Federal Poverty Level, 2007-2011

Age-adjusted Asthma Emergency Department Visit Rates Among Children by Zip Code, 2014

Figure 10: Percentage Of Population Below 200% Of The Federal Poverty Level, 2007–2011

Asthma disproportionately affects the poor.
Air Quality Affects Health
Air Quality is Worsening
Health Outcomes are Worse in CCC
and even worse in West CCC

Is there hope?
Cleaner Air = Healthier Lungs
USC Researchers find less pollution in LA area is associated with better lung function in children

USC CHILDREN'S HEALTH STUDY

2,120 Children | 5 SoCal Communities

WHAT WAS MEASURED?

Lung function
3 groups of kids were tested from 11-15 years of age.
Group 1 was tested: 1994-1998
Group 2 was tested: 1997-2001
Group 3 was tested: 2007-2011

Pollution
Pollution levels across So Cal have been measured for a period spanning 20 years starting in 1994.

Particles: Coarse (PM10), Fine (PM 2.5)
Gases: Nitrogen Dioxide (NO2), Ozone (O3)
The major findings of the study were:

- Lung function deficits associated with nitrogen dioxide, atmospheric acidity, PM 2.5 and PM10.
- Children living in high ozone communities, who are especially active, are up to three times more likely to develop asthma.
- Children living near roadways with high traffic have an increased risk for asthma diagnosis.
- Short-Term exposures to elevated ozone levels associated with increase (up to 1.3 million per year) in school absences from respiratory illnesses and asthma attacks.
- Children who move to cleaner communities have improvements in lung function growth rates. This means that even small reductions in air pollution can have immediate benefits to the long-term respiratory health of children living in polluted communities.

POLLUTION DOWN, LUNG HEALTH UP

Air quality in the Los Angeles basin, as measured in five cities by USC researchers, improved over two decades. That provided a more healthful environment for children’s growing lungs.

**AIR POLLUTION**
- Nitrogen dioxide
- Fine particles
- 33%
- 47%

**CHILDREN’S LUNGS**
- In 1998, nearly eight of 100 15-year-olds had significant lung deficits.
- By 2011, only about 3 1/2 of 100 15-year-olds had significant lung deficits.

Source: USC Children’s Health Study

USC Graphic by Molly Zisk
Indoor Air Quality and Asthma

- **Inadequate ventilation**, which increases exposure to indoor and outdoor air pollution and increases moisture and mold, is associated with an increased risk of respiratory symptoms, cardiovascular disease, and cancer.\(^7\)

- **Improper heating and cooling** combine with temperature extremes from climate change that can exacerbate illnesses or cause death.\(^9\)

- **Indoor moisture and mold** contribute to respiratory diseases, such as asthma.\(^6\)

- **Pests**, such as cockroaches and rodents, are connected to a range of communicable and respiratory diseases.\(^8\)

- **Stress from unhealthy housing conditions** can have mental health impacts, including depression.\(^10\)
Community messaging during unhealthy air days (wildfire smoke, ozone, etc.)

AIR QUALITY IN THE BAY AREA IS UNHEALTHY FOR PEOPLE WITH RESPIRATORY CONDITIONS

- People with pre-existing respiratory illnesses like asthma should reduce outdoor activities
- Everyone, especially children, should reduce physical exertion

For current air quality in your area visit airnow.gov or sparethear.org
Developing a robust wildfire smoke emergency response plan

Identify, support and promote “Cleaner Air Centers” as daytime respite locations for homeless and those with poor indoor air quality

Develop robust messaging aligned with messaging from state and regional agencies

Develop automated text messaging to send to asthma patients during smoke events
Additional Actions:

- CCHP Home Visiting Nurse Pilot
- Green and Healthy Homes Initiative - weatherization
- Board of Supervisors Ad Hoc Committee on Childhood Asthma
  - Bring stakeholders together to develop overall strategy
- Children’s Leadership Council
  - Kickoff meeting March 27, 2019
- Support a state wellness fund for chronic disease prevention
  - Possibly funded by a sugar sweetened beverage tax
- Build healthy living into the county general plan revision
  - Bike lanes, parks, public transportation
  - Reduce point sources of pollution (i.e. industry)
  - Reduce mobile sources of pollution (diesel, gasoline vehicles)
- Address the affordable housing crisis
  - Help homeless become housed
  - Help those in substandard housing move to better, healthier housing
Causation can be hard to pinpoint
Correlation is strong enough to mitigate air pollution for better human health
What We Know: Air Quality in the Richmond-San Pablo Area
What we know about Air Quality in the Richmond/San Pablo Area

• Patterns of how air moves around the Richmond/San Pablo area, and how that influences air quality

• Air quality information from measurements
  • Monitoring locations
  • Patterns and trends of PM$_{2.5}$ and air toxics

Dan Alrick
Bay Area AQMD
Typical spring to summer wind flow at the surface

- Winds from the south across Richmond, stronger in the afternoon & early evening (commonly referred to as onshore winds)

- Winds typically much lighter in the late night & morning
Typical autumn to winter wind flow at the surface

- Winds are generally from the north across Richmond (commonly referred to as offshore winds)

- Note: During stormy periods, winds are generally stronger & from the south or southwest (opposite of direction shown on map)
Vertical mixing and inversions

- Air quality is typically better during windy periods with good vertical mixing (storms moving through)

- Air quality is typically worse during stagnant periods when vertical mixing is reduced by temperature inversions

Good vertical mixing: Temperatures decrease with elevation

Poor vertical mixing: Layer of temperature increase with elevation
Air Monitoring Sites

• Full regulatory site at San Pablo

• Air monitoring has historically been focused around Chevron

• Air District is summarizing existing data sets, including from the Community Monitoring Stations
24-hour Average PM$_{2.5}$ Concentrations

- San Pablo
- North Richmond
- Atchison Village
- Point Richmond

Wildfires
Data validation issue
Temporary local source?

24-hr PM$_{2.5}$ NAAQS
PM$_{2.5}$ data follow similar day-to-day patterns, driven by regional air quality and meteorology.

Local sources may cause one station to temporarily show higher PM$_{2.5}$ than others stations.
Annual averages are similar across stations (within 2-3 µg/m³), with San Pablo slightly higher than the other stations but within typical error range of the instrumentation.

Increases in 2017 & 2018 are largely attributable to wildfire smoke.
• Annual averages across stations within 2-4 μg/m³, with Oakland West higher than the other stations
• 2016 was a notably stormy year, resulting in lower PM$_{2.5}$ concentrations regionally
• Increases in 2017 & 2018 are largely attributable to wildfire smoke
Another way to track air quality trends over time or geography is with Design Values, a measure used by EPA to determine whether areas are in attainment of air quality standards.
Air District measures air toxics data (such as benzene and toluene) on a 1-in-12 day schedule.

- Measured data are generally low with occasionally higher readings.

- These measurements are designed for longer-term toxics trends analysis, and not necessarily detection of very localized or temporary sources.
Air District measures air toxics data (such as benzene and toluene) on a 1-in-12 day schedule.

- Measured data are generally low with occasionally higher readings, sometimes driven by events such as wildfires.

- Benzene measurements at Richmond and San Pablo have been comparable and follow a seasonal cycle (higher in winter).
Where to Download Data

• PM$_{2.5}$ and Air Toxics data for regulatory air quality monitors across the United States can be downloaded here: https://aqs.epa.gov/aqsweb/airdata/download_files.html
  • Scroll down to “Daily Summary Data” section
    • Then scroll down to “Particulates” for PM$_{2.5}$ data
    • Then scroll down to “Toxics, Precursors, and Lead” for air toxics data

• Or, PM$_{2.5}$ (and other criteria pollutants) can be downloaded for selected regulatory monitors here: https://www.epa.gov/outdoor-air-quality-data/download-daily-data
Questions?

Contact:
Dan Alrick
Principal Air and Meteorological Monitoring Specialist
dalrick@baaqmd.gov
Additional Resources

Air quality data and tools:
- National current air quality data (EPA/AirNow) - [www.airnow.gov](http://www.airnow.gov)
- Local current air quality data (Air District) - [www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data](http://www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data)
- Historical air quality data (EPA) - [https://www.epa.gov/outdoor-air-quality-data](https://www.epa.gov/outdoor-air-quality-data)
- Air quality trends (EPA) - [https://www.epa.gov/air-trends](https://www.epa.gov/air-trends)
- National emissions inventory (EPA) - [https://gispub.epa.gov/neireport/2014/](https://gispub.epa.gov/neireport/2014/)
- National air toxics assessment (EPA) - [https://www.epa.gov/national-air-toxics-assessment](https://www.epa.gov/national-air-toxics-assessment)
- Real time geospatial data viewer (EPA) - [https://www.epa.gov/hesc/real-time-geospatial-data-viewer-retigo](https://www.epa.gov/hesc/real-time-geospatial-data-viewer-retigo)

Air quality and health:
- Particulate matter and health effects (EPA) - [https://www.epa.gov/pm-pollution](https://www.epa.gov/pm-pollution)
- Hazardous air pollutants and health effects (EPA) - [https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants](https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants)

Screening tools:
- Healthy Places Index - [https://healthyplacesindex.org/](https://healthyplacesindex.org/)
- Tracking California - [https://trackingcalifornia.org/](https://trackingcalifornia.org/)

Links to AB-617 pages:
- Community Air Protection Program homepage (CARB) - [https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program](https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program)
Average 24-hr Benzene, 2014-2018 (ppb)

- 0.00 - 0.10
- 0.11 - 0.20
- 0.21 - 0.30
- 0.31 - 0.40

Maximum 24-hr Benzene, 2014-2018 (ppb)

- 0.76 - 1.00
- 1.01 - 1.25
- 1.26 - 1.50
- 1.51 - 1.75
- 1.76 - 2.00

(Data binned at equal intervals)
(Data binned as quartiles)
Group Activity
Activity Objectives

• Identify the areas or pollutants that the community is concerned about

• Discuss high-priority areas for monitoring

• Discuss monitoring approaches

Interactive map in Google Maps with shareable URL: https://bit.ly/2HcNav5
Data layers on the map include:

- Air District permitted facilities locations
- Air monitoring locations
- Health burden census-tract data
  - Asthma percentiles*, cardiovascular disease percentiles*, and low birth weight percentiles* (CalEnviroScreen 3.0)
  - Life expectancy percentiles* (Healthy Places Index)
- Sensitive receptors data for Contra Costa County
  - Schools
  - Child care
  - Senior care
  - Hospitals/clinics
- Air District regional modeling for PM$_{2.5}$, diesel PM, and cancer risk

*Percentiles across census tracts in California. A census tract at the 75$^{th}$ percentile for asthma has worse asthma rates than 75% of census tracts in California.
CalEnviroScreen 3.0 Indicators

**Pollution Burden**
- Exposures
  - Ozone
  - PM2.5
  - Diesel PM
  - Pesticide Use
  - Traffic
  - Drinking Water Contaminants
  - Toxic Releases from Facilities

**Population Characteristics**
- Sensitive Populations
  - Asthma
  - Cardiovascular Disease
  - Low Birth-Weight Infants

**Environmental Effects**
- Solid Waste Sites and Facilities
- Cleanup Sites
- Groundwater Threats
- Impaired Water Bodies
- Hazardous Waste Generators and Facilities

**Socioeconomic Factors**
- Poverty
- Unemployment
- Educational Attainment
- Linguistic Isolation
- Housing Burdened Low Income Households

**CalEnviroScreen Formula**

\[
\text{CalEnviroScreen Score} = \frac{\text{Average of Exposures and Environmental Effects*}}{\text{Average of Sensitive Populations and Socioeconomic Factors}}
\]
California Healthy Places Index

- Screening tool developed by the Public Health Alliance of Southern California: [https://healthyplacesindex.org/](https://healthyplacesindex.org/)
- County, city, and census tract level data

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<thead>
<tr>
<th>Category</th>
<th>Indicator(s)</th>
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<tr>
<td>Healthcare access</td>
<td>• Insured adults</td>
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<tr>
<td>Clean environment</td>
<td>• Ozone • PM$_{2.5}$ • Diesel PM • Drinking water contaminants</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>• Park access • Tree canopy • Supermarket access • Off-sales alcohol outlets • Retail density</td>
</tr>
<tr>
<td>Housing</td>
<td>• Uncrowded housing • Low-income renters • Low-income homeowners • Housing habitability • Homeownership</td>
</tr>
<tr>
<td>Transportation</td>
<td>• Automobile access • Active commuting</td>
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<tr>
<td>Education</td>
<td>• In preschool • In high school • Bachelor’s education or higher</td>
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Regional $\text{PM}_{2.5}$ and air toxics modeling

- The EPA’s Community Multiscale Air Quality (CMAQ) model was applied at 1-km grid resolution over the Bay Area.
- CMAQ uses gridded, hourly meteorological observations and emissions data to estimate annual average pollutant concentrations.
- CMAQ reports hourly pollutant concentrations for each grid cell in the modeling domain.
- $\text{PM}_{2.5}$ and air toxics were modeled for the entire year of 2016.
Discussion Questions

1. Identify areas that you are concerned about - no area is too big or too small. In other words, what are our needs for air quality monitoring and why?
   – For example, where are there important, sensitive receptors; health vulnerabilities; and/or key sources?

2. Which of the areas of concern and monitoring needs identified in Question 1 should we prioritize and why?

3. What is your objective for collecting additional air quality information in the focus areas?
   – Example objectives include screening for hot spots, providing real time information to the public for personal decision making or conducting specialized monitoring to determine sources of elevated pollution.
Public Comments
Next Steps
Next Steps

• Next Steering Committee meeting:
  – June 19, 2019, 6-8 pm
  – San Pablo Library, Community Room

• RSVP for the June 19th meeting by June 12th
  – https://forms.gle/rHuJPgM5MJ2CCaRY8
Steering Committee Meeting Schedule

- June 19, 6:00 – 8:00 pm
- July 10, 6:00 – 8:00 pm
- August 14, 6:00 – 8:00 pm
- September 11, 6:00 – 8:00 pm
- October 9, 6:00 – 8:00 pm
- November 13, 6:00 – 8:00 pm
- December 11, 6:00 – 8:00 pm

To view Steering Committee agendas, minutes and PowerPoint presentations online, visit:

Richmond – San Pablo Community Air Monitoring Plan
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May 15, 2019