

# AIR QUALITY HEALTH BURDEN IN SAN FRANCISCO

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BRANCH
- BAAQMD PUBLIC  
WORKSHOP ON AB 617
- JUNE 20, 2018



**POPULATION HEALTH DIVISION**  
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

# Effects of Common Air Pollutants

## RESPIRATORY EFFECTS



- Symptoms:**
- Cough
  - Phlegm
  - Chest tightness
  - Wheezing
  - Shortness of breath

**Increased sickness and premature death from:**

- Asthma
- Bronchitis (acute or chronic)
- Emphysema
- Pneumonia

**Development of new disease**

- Chronic bronchitis
- Premature aging of the lungs



Alveoli filled with trapped air

### How Pollutants Cause Symptoms

**Effects on Lung Function**

- Narrowing of airways (bronchoconstriction)
- Decreased air flow

**Airway Inflammation:**

- Influx of white blood cells
- Abnormal mucus production
- Fluid accumulation and swelling (edema)
- Death and shedding of cells that line airways



Airway Inflammation

**Increased Susceptibility to Respiratory Infection**



Normal



Lung with respiratory infection

## CARDIOVASCULAR EFFECTS



**Symptoms:**

- Chest tightness
- Chest pain (angina)
- Palpitations
- Shortness of breath
- Unusual fatigue

**Increased sickness and premature death from:**

- Coronary artery disease
- Abnormal heart rhythms
- Congestive heart failure
- Stroke

### How Pollutants Cause Symptoms



Normal heart rhythm

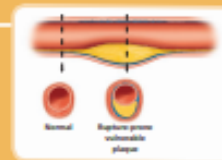
Abnormal heart rhythm

**Effects on Cardiovascular Function**

- Low oxygenation of red blood cells
- Abnormal heart rhythms
- Altered autonomic nervous system control of the heart

**Vascular Inflammation**

- Increased risk of blood clot formation
- Narrowing of vessels (vasoconstriction)
- Increased risk of atherosclerotic plaque rupture



Normal

Exposure prompts atherosclerotic plaque



Reduce your risk by using the Air Quality Index (AQI) to plan outdoor activities – [www.airnow.gov](http://www.airnow.gov)

AQI Levels of Health Concern	AQI Values	What Action Should People Take?
Good	0-50	Enjoy Activities
Moderate	51-100	People unusually sensitive to air pollution: Plan strenuous outside activities when air quality is better
Unhealthy for Sensitive Groups	101-150	<b>Sensitive Groups:</b> Cut back or reschedule strenuous outside activities Ozone: People with lung disease, children and older adults and people who are active outdoors Particulate Pollution: People with heart or lung disease (including diabetes), older adults and children Carbon Monoxide: People with heart disease and possibly infants and fetuses Nitrogen Dioxide: People with lung disease, children and older adults Sulfur Dioxide: Active children and adults with asthma
Unhealthy	151-200	Everyone: Cut back or reschedule strenuous outside activities <b>Sensitive groups:</b> Avoid strenuous outside activities
Very Unhealthy	201-300	Everyone: Significantly cut back on outside physical activities <b>Sensitive groups:</b> Avoid all outside physical activities





San Francisco  
Health Improvement Partnership

SFHIP Strategic Priorities

San Francisco Data

Useful Tools

About SFHIP

Our Partners

### What's New?

SFHIP is moving into action around our new Strategic Priorities. The 2016 - 2017 Strategic Priorities are part of a broader citywide plan that supports the health and wellness of San Francisco residents. Our city has a long tradition of engaging the community in our planning, from identifying policy changes to improving health outcomes (e.g. reduced rates of smoking and new HIV infections). Together, we have developed new ways to measure the health of our residents, our communities, and our environment.

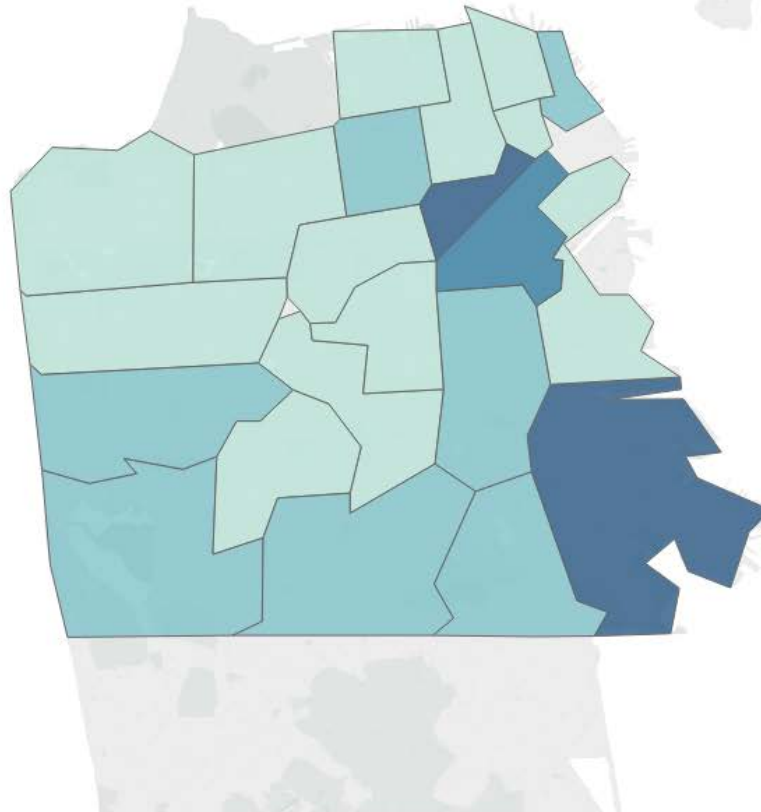
[Click here to learn more!](#)



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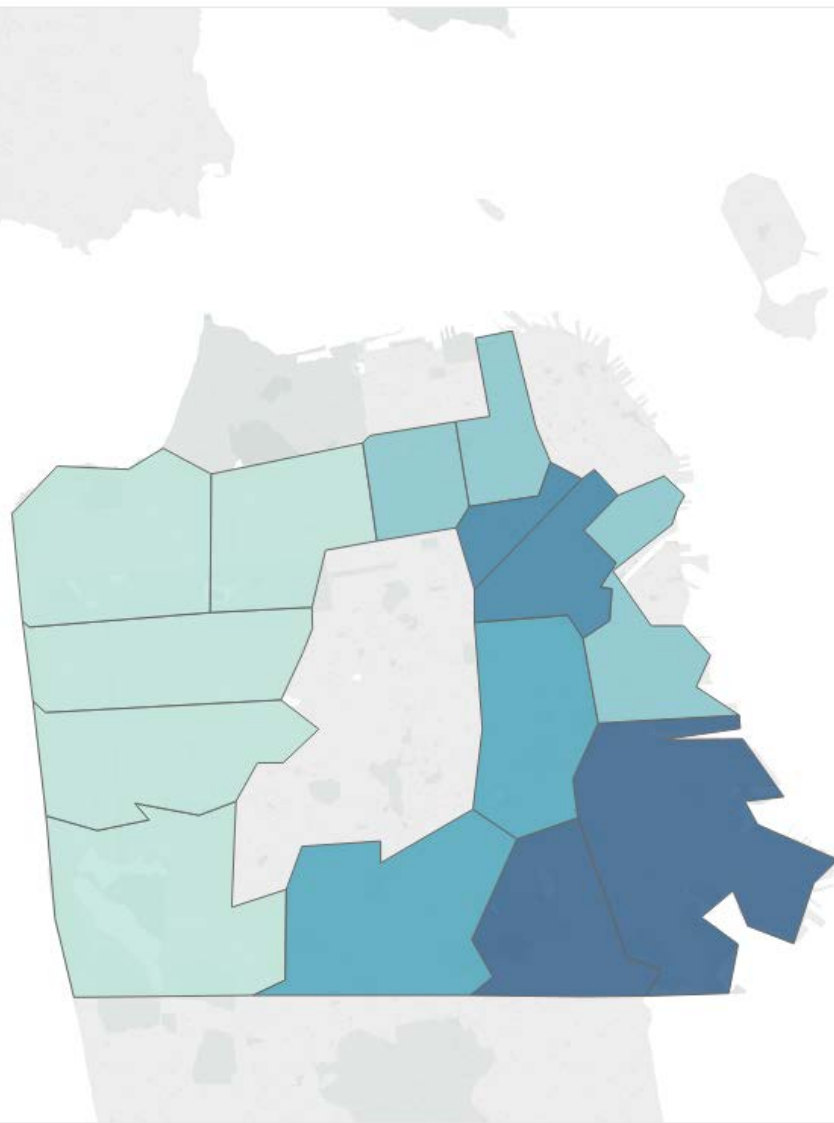
The SFHIP Collective Impact Partnership researches and publishes the Community Health Needs Assessment every three years: <http://www.sfhip.org>

Age Adjusted Rates of Hypertension (Primary Dx) Hospitalizations per 10,000 Residents (Adults 18+): 2012 - 2016



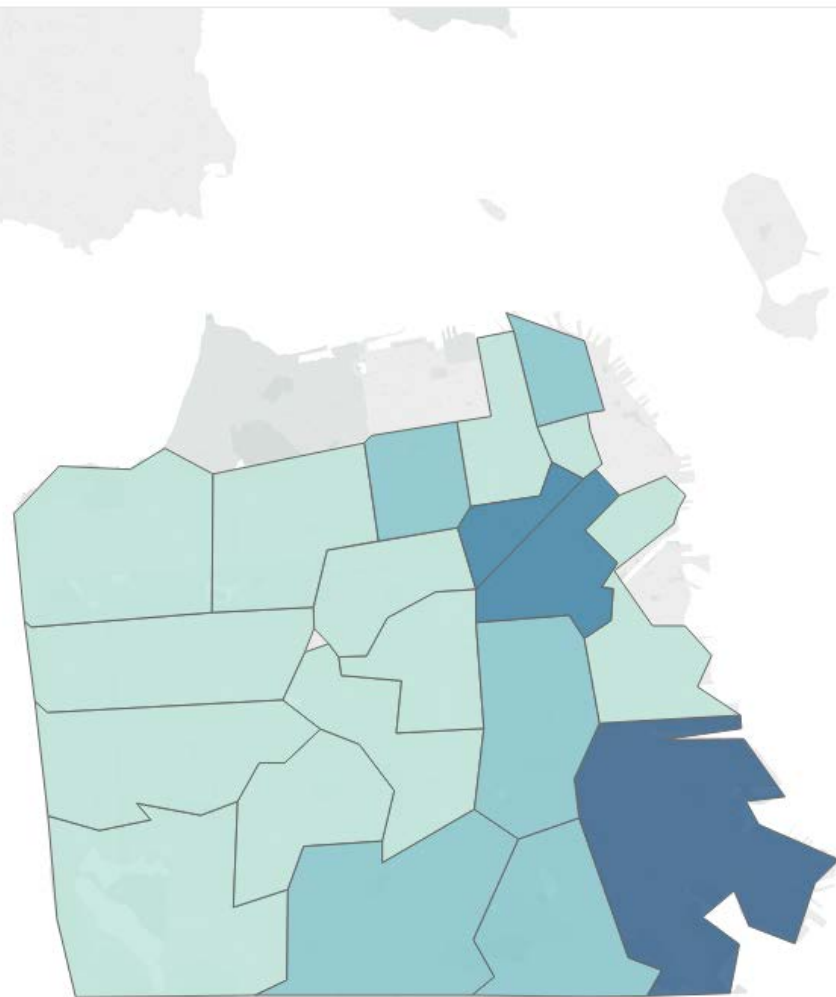


Age Adjusted Rates of Asthma (Primary Dx) Hospitalizations per 10,000 Residents (Minors 0-17):: 2012 - 2016

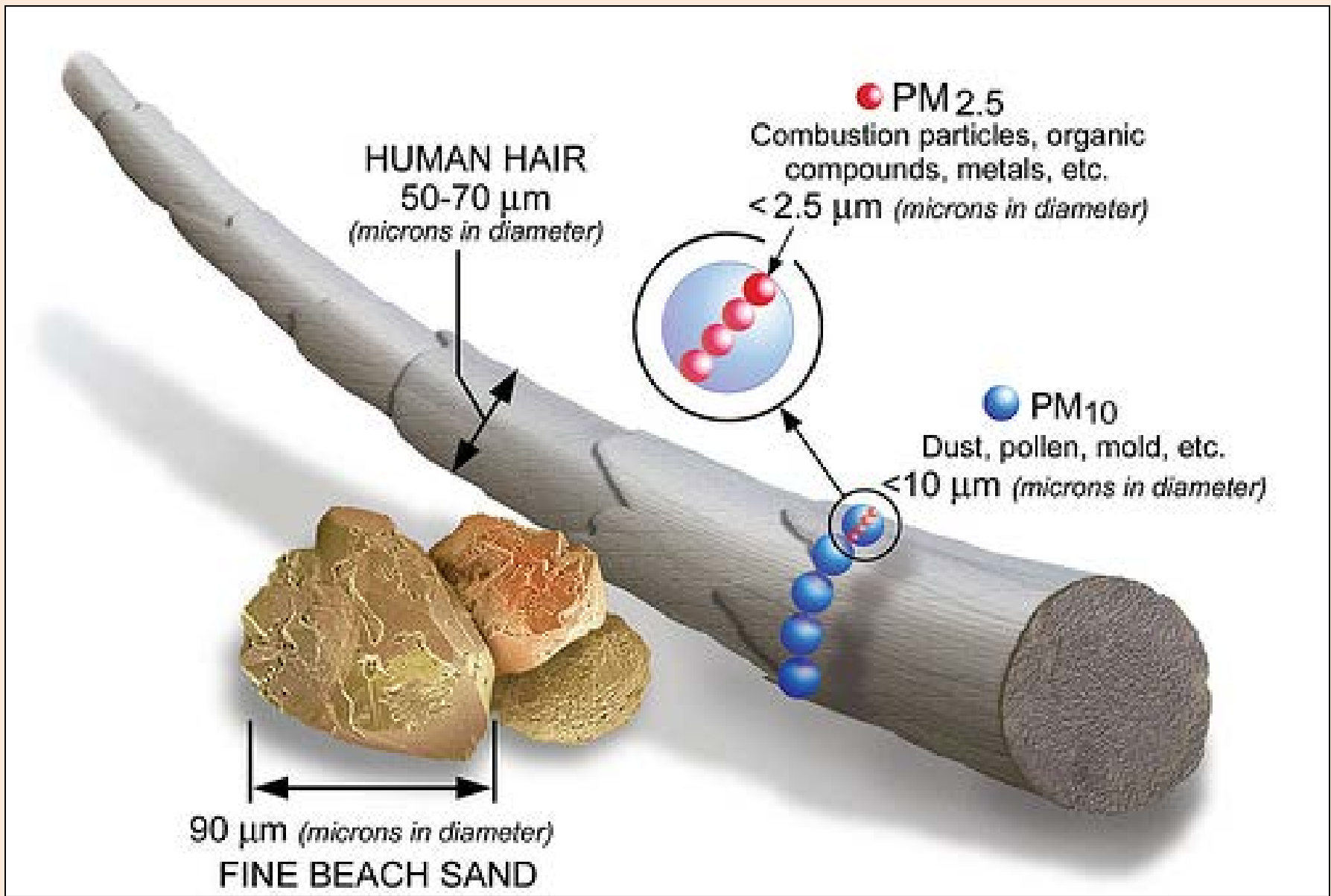


Age Adjusted Rate  
1.562 8.955

Age Adjusted Rates of Asthma (Primary Dx) Hospitalizations per 10,000 Residents (Adults 18+): 2012 - 2016



Age Adjusted Rate  
1.50 14.34







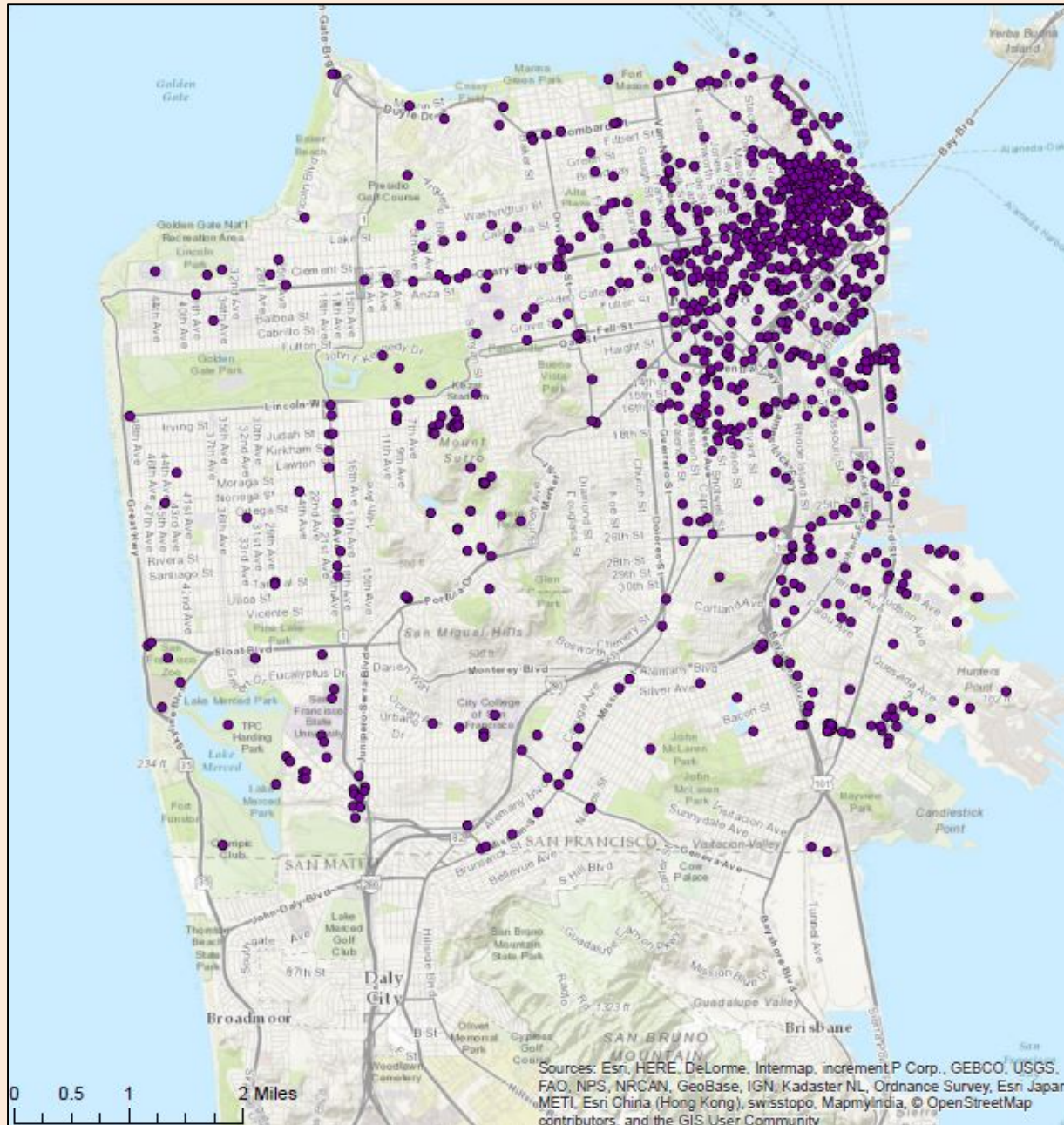
# MEASUREMENT STUDY TO EVALUATE CONTROLS FOR REDUCING IN-HOME POLLUTANT EXPOSURES AT HOMES NEAR HIGH TRAFFICKED ROADWAYS



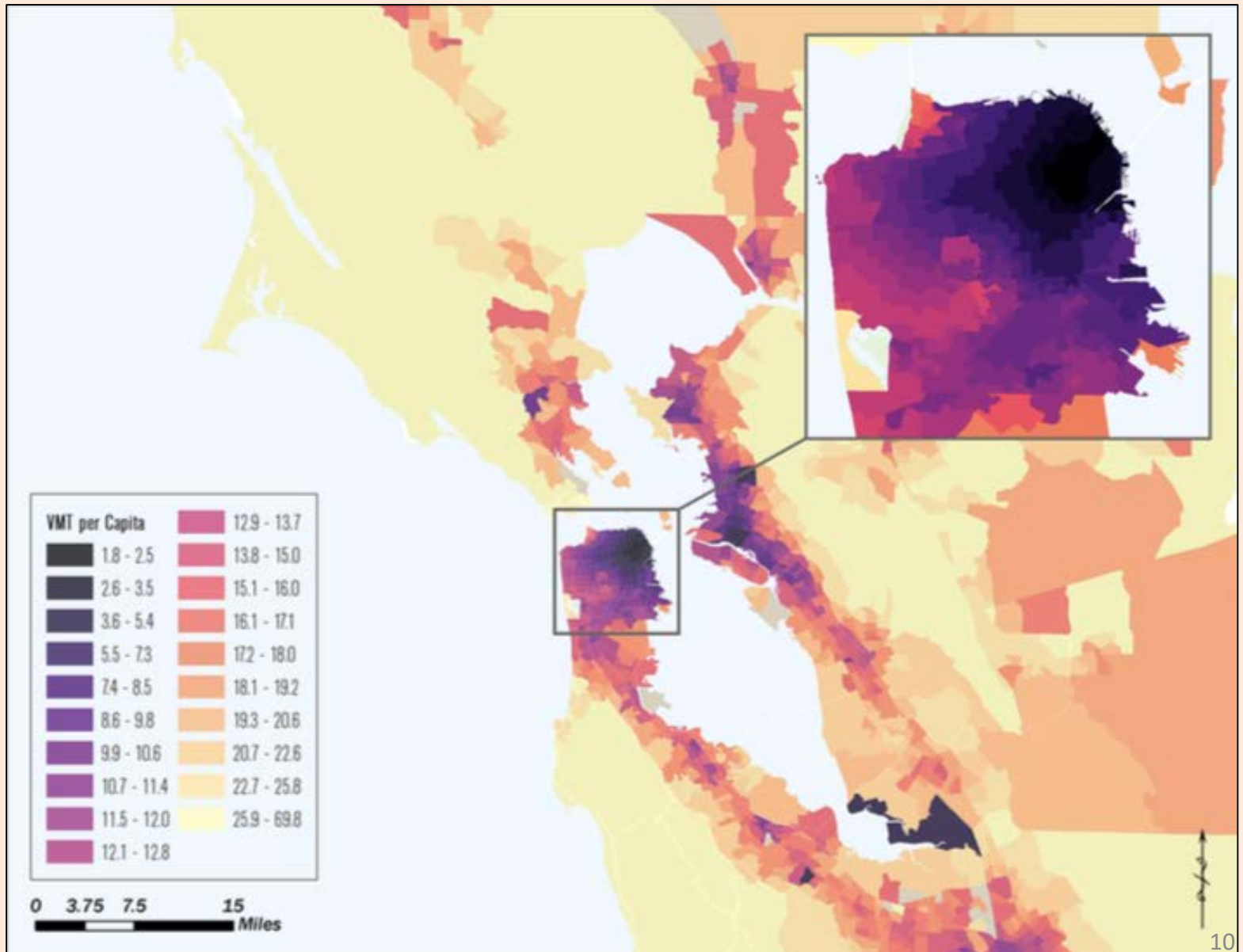
SFDPH-BAAQMD-Lawrence Berkeley National Laboratory Air Quality Research evaluating interventions to reduce air pollutants in homes near busy roadways. *Posted on:* [www.sfgov.org/asthma](http://www.sfgov.org/asthma)



# Permitted Stationary Sources



# Mobile Sources: Roadways from SF-CHAMP





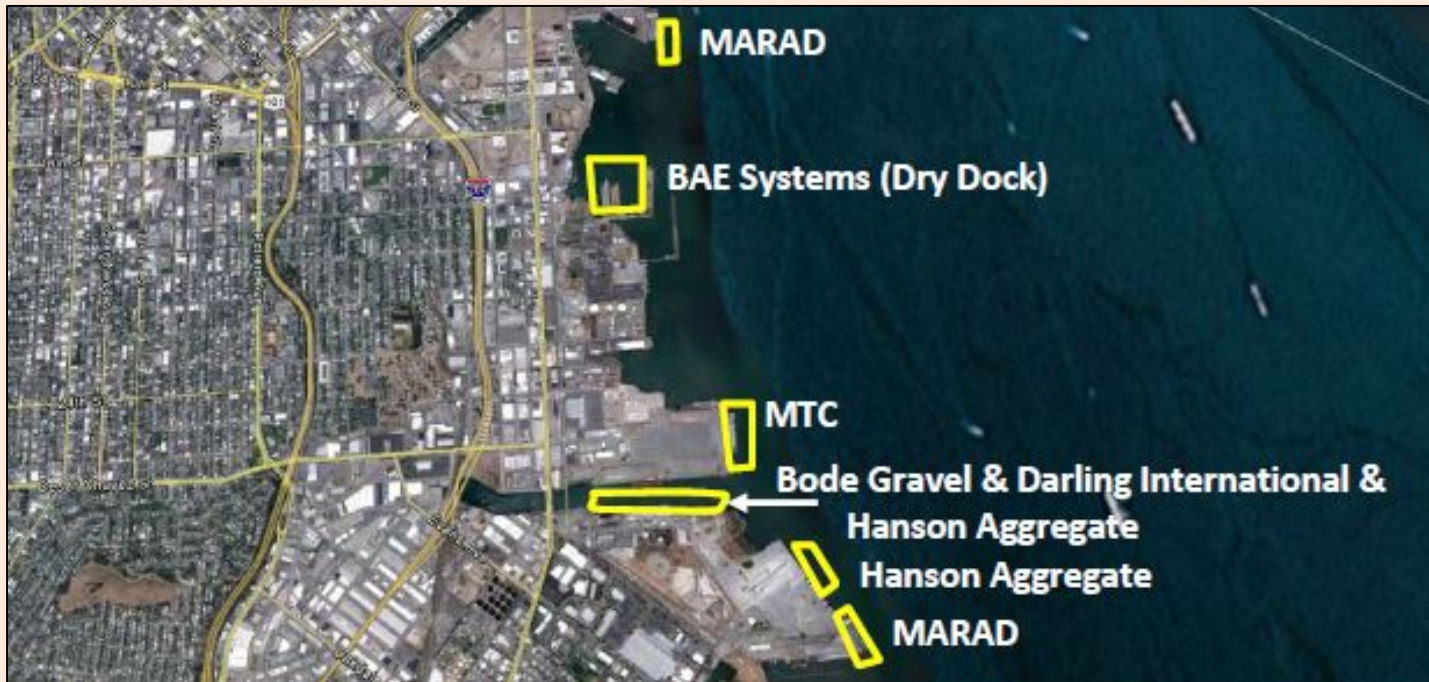


**Emissions modeled  
from light and heavy  
vehicles as well as  
diesel fuel CalTrain**

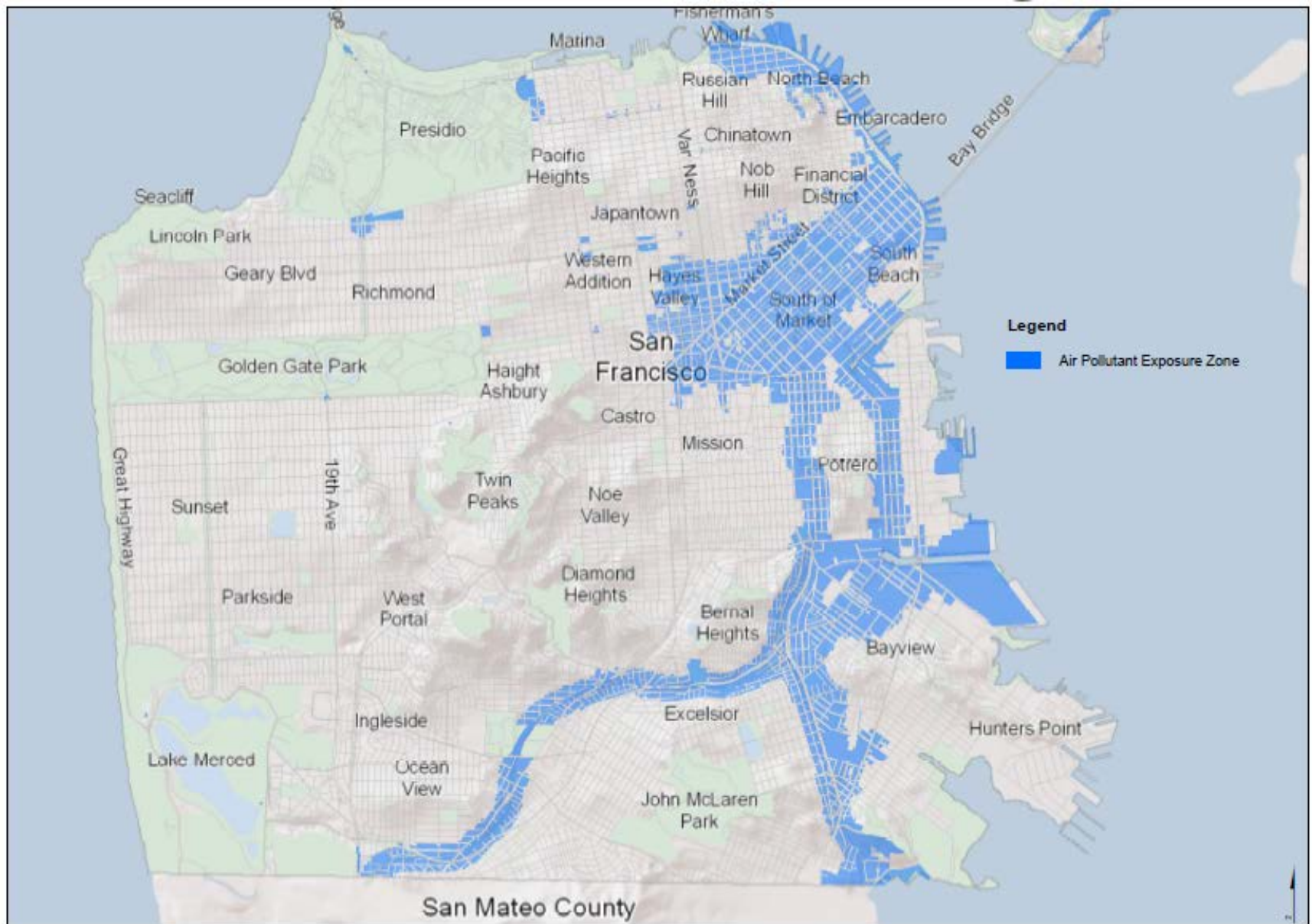




# Emissions modeled from diesel fuel cruise ships, ferries and other port-based emission sources



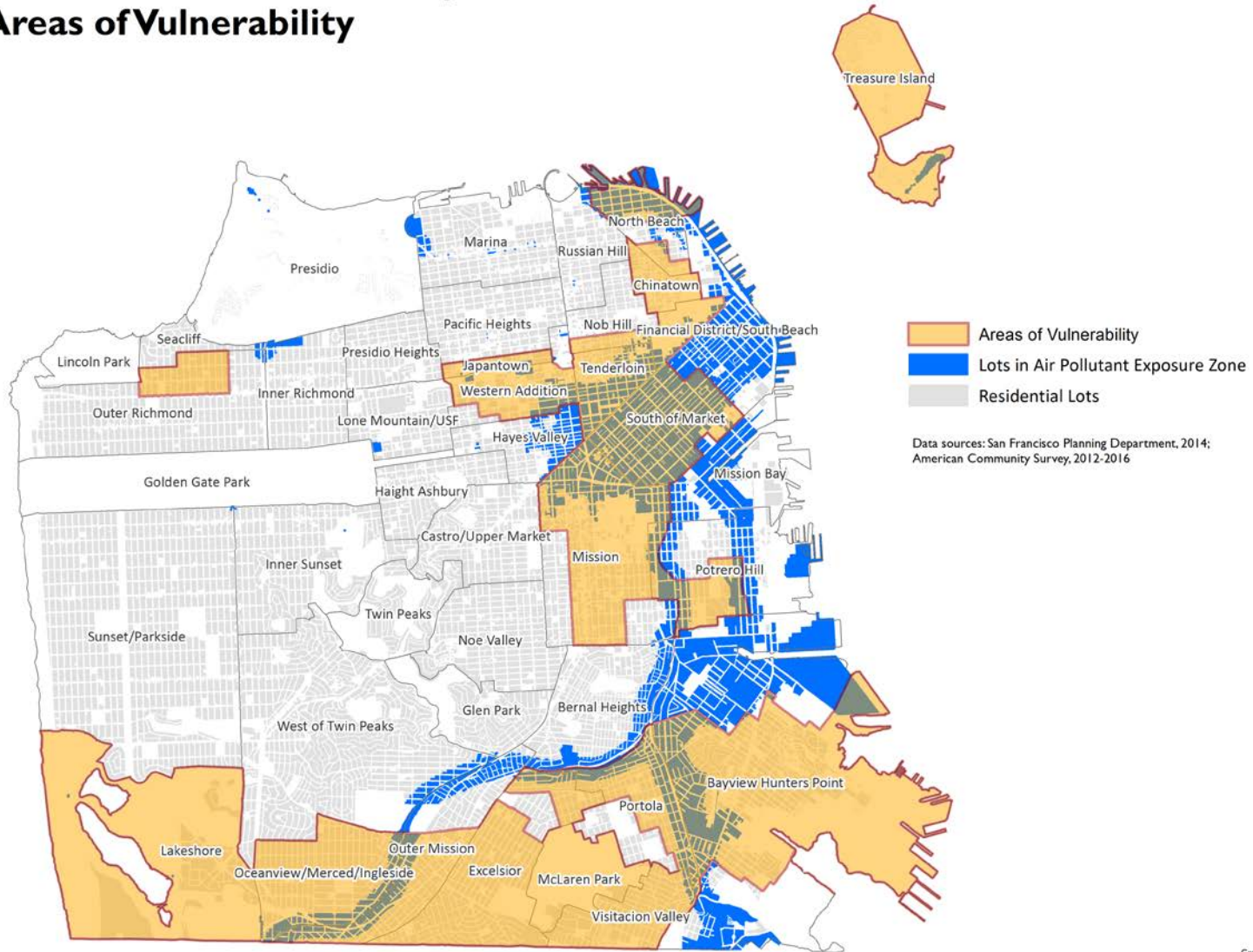
# Air Pollutant Exposure Zone (APEZ)





# Article 38 Air Pollutant Exposure Zone & Areas of Vulnerability

City and County of San Francisco Department of Public Health: Environmental Health Branch

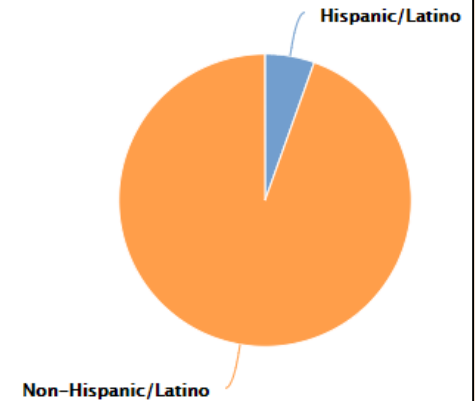


Created Date: 6/13/2018



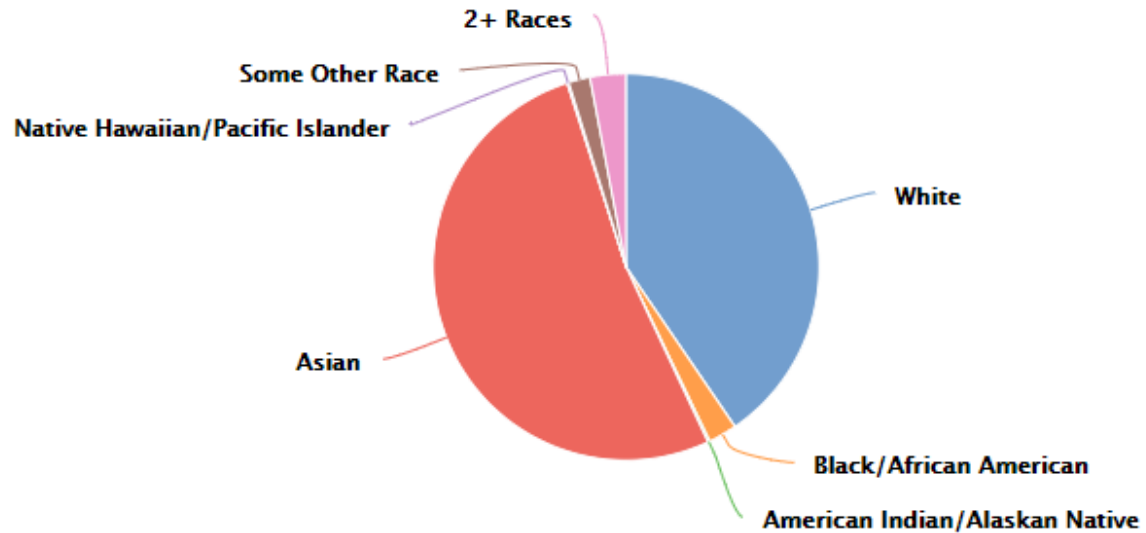
## Population by Ethnicity

Neighborhood: North Beach, Telegraph Hill, Chinatown (94133)



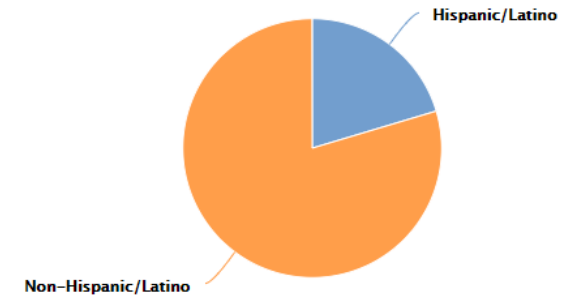
## Population by Race

Neighborhood: North Beach, Telegraph Hill, Chinatown (94133)



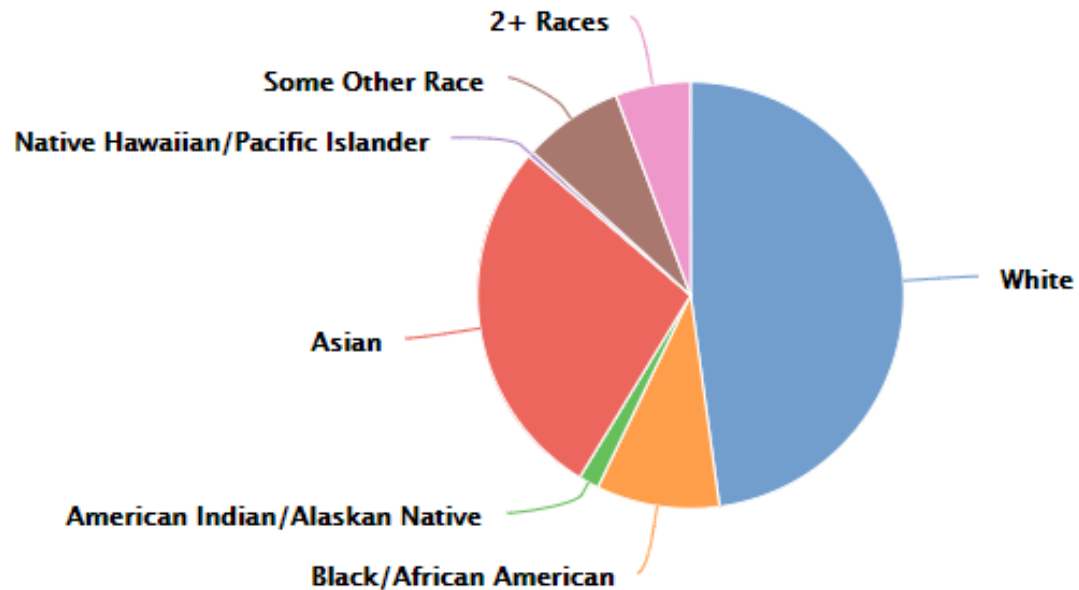
## Population by Ethnicity

Neighborhood: South of Market (94103, 94104)



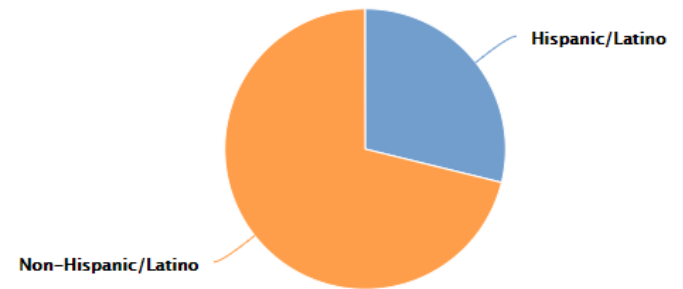
## Population by Race

Neighborhood: South of Market (94103, 94104)



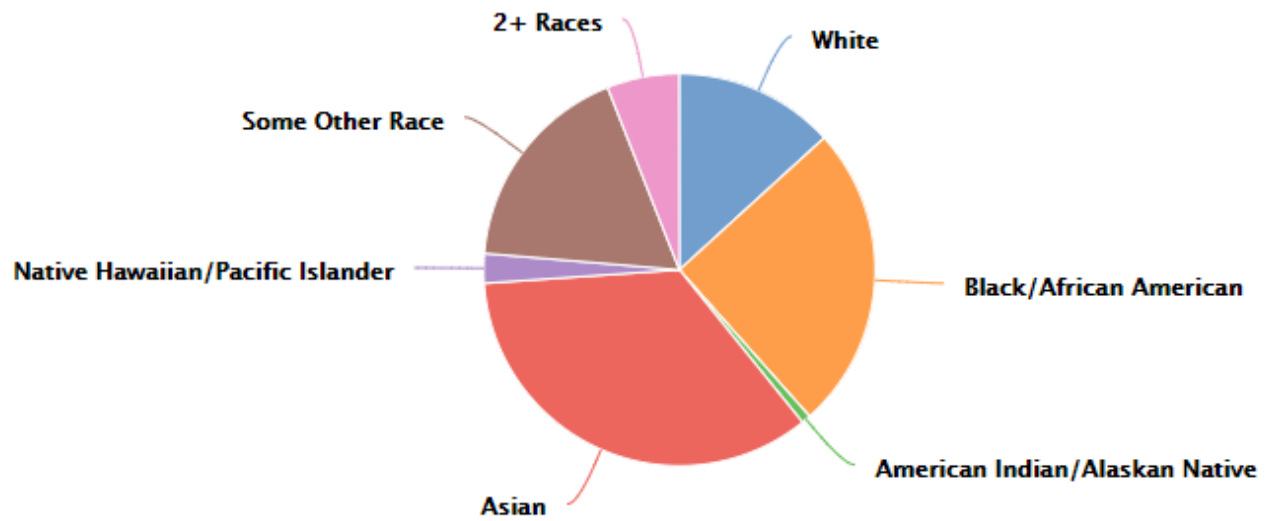
## Population by Ethnicity

Neighborhood: Bayview-Hunters Point (94124)



## Population by Race

Neighborhood: Bayview-Hunters Point (94124)

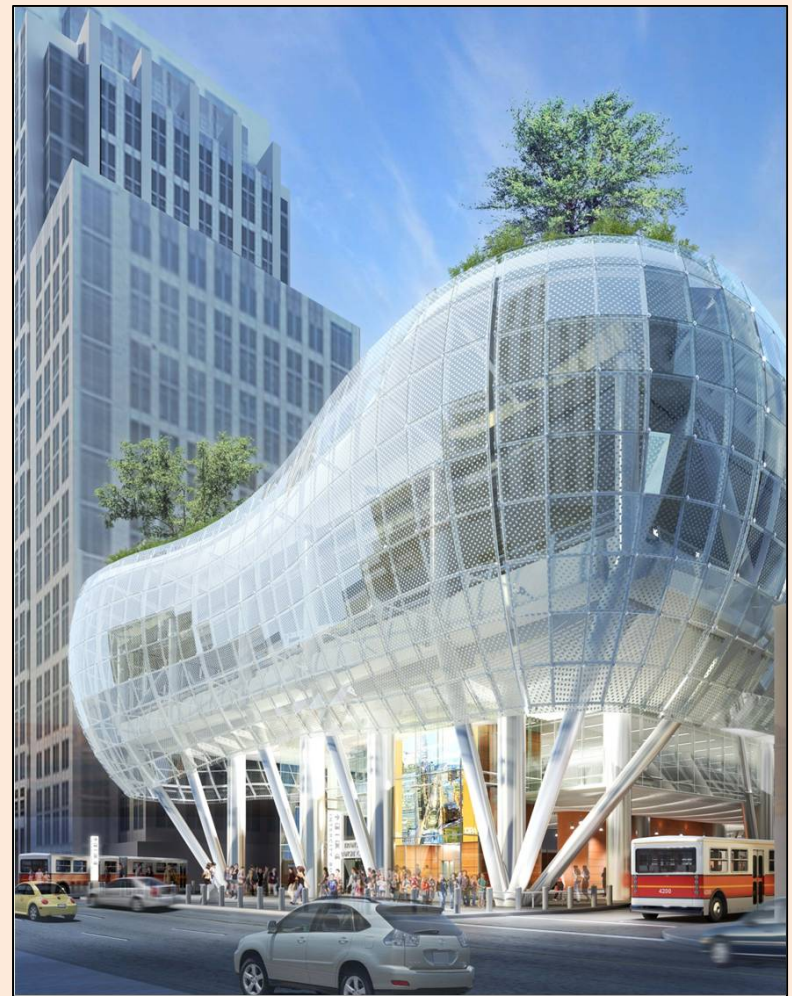




## Emerging sources of concern:

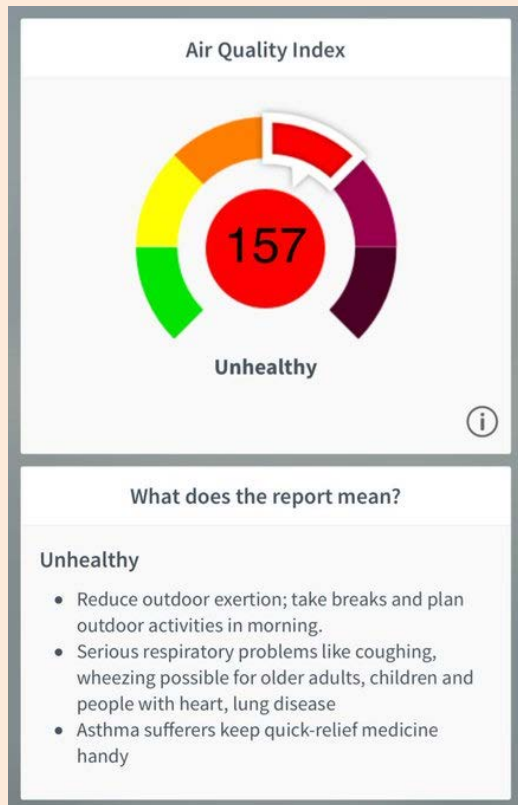
### (1) Major Development

- SF Health Code Article 22B Requires DPH-approved Dust Control Plans.
- Modeling of the next SF Health Code Article 38 APEZ due end 2019.
- Goal is to include emissions from major development: construction equipment emissions & number of vehicle trips.



## (2) Climate Health

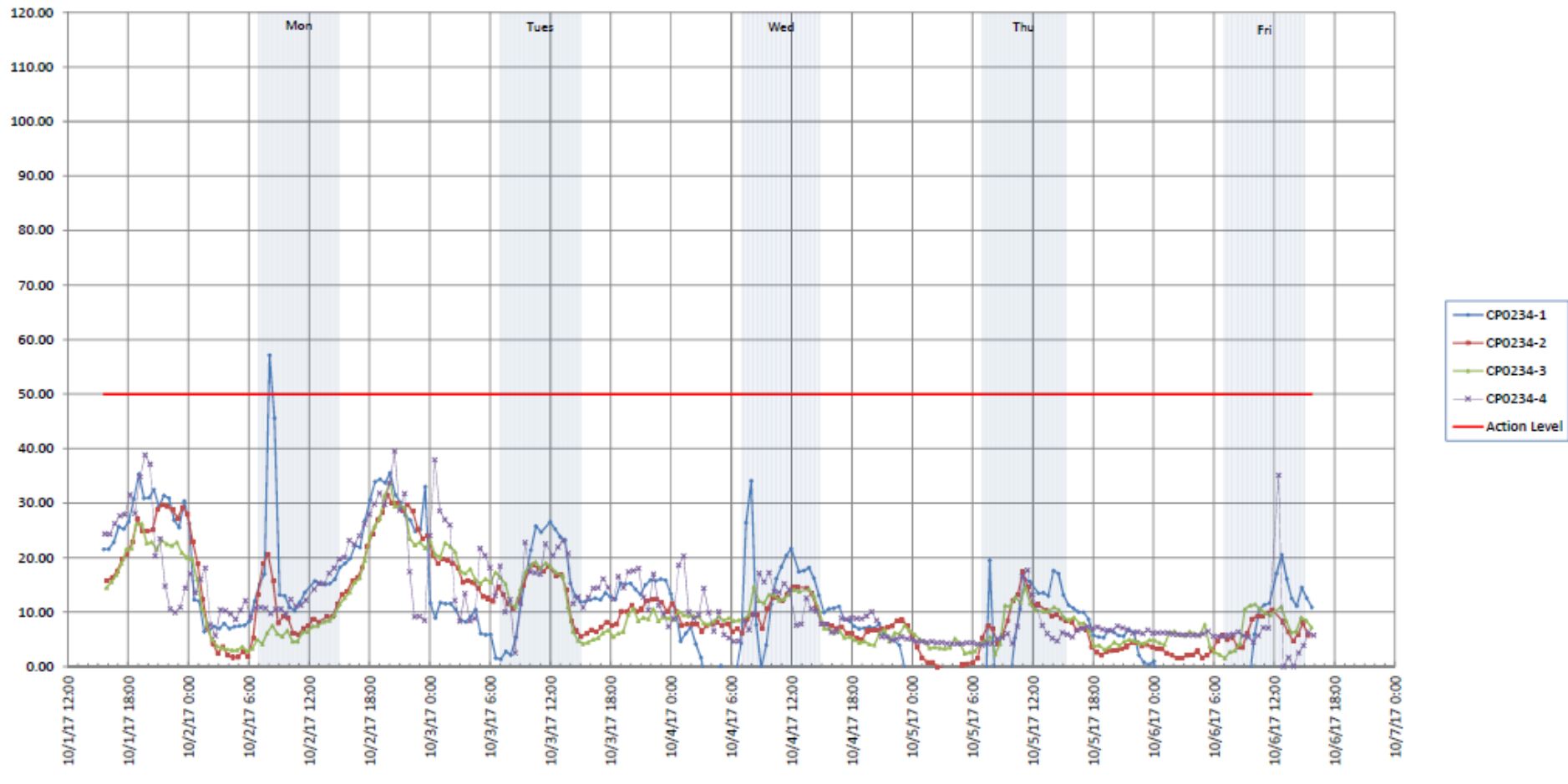
<https://sfclimatehealth.org/>



**SF sky during  
Sonoma fires**

# Candlestick PM<sub>10</sub> monitoring data: Week before Sonoma fires

CP0234 PM-10 Monitoring: Week Ending 10/06/17





# Candlestick PM<sub>10</sub> monitoring data: Week of Sonoma fires

CP0234 PM-10 Monitoring: Week Ending 10/14/17

