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# **HOUTH CLIMATE** ADVISCR5

# HEALTH CRISIS







#### Awareness

don't believe in sugarcoating (the issue), by telling the tourists the issue as is, you have more of a chance of them bringing more light to it...more publicity we're going to get, the more chance we're going to fix it. – Arayah

If its not a touristy place and its just the local population here who feel "this is a problem, and we want to solve it". I feel like if you get more people from other communities to care about it (air quality) then we can solve it together. – Navya

#### Vegetation

know that vegetation can also help out. A lot of plants take in carbon dioxide so you could get some more foliage in there, maybe some more trees. – Adam

#### Testing

If we could find out whats causing the smaller particles, we could see the connections between high particle counts in different places. We can design solutions to lower air particle counts. – Navya

#### Ventilation

Put money into infrastructure to make sure any gases that are secreted from a lot of things that involve combustion. Some sort of air flow, some sort of ventilation. – Adam

# WHAT DO YOUTH CLIMATE ADVISCRS SUGGEST?

#### **Transparency of budgets**

We don't see anything fixed, but there were millions of dollars directed to this. – All the students

#### Funding

Advocate and make system in which money moves to schools. Make it a lot more simple and direct so you dont lose as much. That would be a good start. – Adam

#### Advocacy

What I think we can do is organize clean ups, spread awareness... so we can protect the space for future generation. There is maybe like one day where I get to run in...the estuary, it should smell good right? – Joshua

#### **Cleaning systems**

There is a lot of things we can do to try to prevent this... we can prevent it by possibly trying to create a purifying system for the water that goes into the ocean, and possibly creating like a really big air purifier and placing them around the town. – Erika



## $\mathbf{HE} \mathbf{A} \mathbf{D} \mathbf{V} \mathbf{I} \mathbf{5} \mathbf{E} \mathbf{T} \mathbf{H} \mathbf{E}$ 5CIENTISTS TOINVESTIGATE...

- the beach?
- be every day?

- 7. What has been the physical impact on the residents?
- 8. What is the effect of weather?

## OUR ADVOCACY CONCERNS

- 2. What is the role of capitalism or industry in this?
- 3. What if solidarity instead of blame?
- 4. Need for transparency where is the money going?
- 5. Besides awareness, what are action items we can do?

1. What is causing high levels of very small particles? What is in the air? 2. What is the air quality in different zip codes of San Diego? 3. What are the particle count differences the farther you get away from

4. What is the air quality in a place like school, where students have to

5. Do specific classroom activities (like working in a chem lab with limited ventilation) pose a health risk for those students? 6. What has been the mental health impact on the residents?

1. What are ways that we can get outsiders to care about this issue?



96 unique air readings and more than 55 photographs collected between January 20th and April 16th

The most popular categories were public spaces, school settings, and nature.

February

Least busiest data collection week was January 23rd (San Diego flooding) and during spring break.

Northernmost zipcode where data was collected? 92069

Southernmost zipcode where data was collected? 91932

## ΤΑ COLLCONSUMMARY

Busiest data collection month was



#### air particles in a volleyball practice

inside doors during April(spring)



time of the day from 4:30pm to 5pm





time from a practice 4:30 pm to 6pm



#### **Questions to further investigate...**

- 1. What are the PM counts in different sports locations (football field, soccer field, swimming pool, etc.)?
- 2. When exactly do the PM counts worsen when it comes to seasons?
- 3. Are the extreme levels of PM particles affecting the health of athletes around Mar Vista?
- 4. What high numbers of PM counts are necessary to decide it is a hazard and athletes are too exposed and therefore should cancel sports? Would it ever happen regardless of how unsafe it is?





>= 0.3m = >= 0.5m >= 1.0m >= 2.5m >= 5.0m = >= 10.0m

>= 0.3m >= 0.5m >= 2.5m

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#### Hypotheses from my data collection

- 1. My data shows that there is higher particulate matter affecting athletes when the specific sport is an outdoor sport, as the data depics higher particle counts for sports performed outdoors (track and swim) and lower for the volleyball. Also, according to a student athlete, his outdoor sport (baseball) had higher air particles than his indoors one (volleyball).
- 2. I think that there are more particles in outdoor sports than in indoor sports. Because the particles from the beach reach the school easily superficially but cannot completely go into facilities. Furthermore, I think that the reason many athletes seem to see a rise in particles in the air during summer it's because that's when the sewage worsens, according to the Imperial Beach mayor.

#### Answers from student athletes about air quality:

1) Do the air particles seem to affect you in sports? 2) Do you think the particles you're exposed to increase during certain seasons?

1) I would say I haven't really seen a difference or an impact on the air we breathe with my sport (volleyball); 2) I also do baseball and I will say that sometimes it smells bad and it's not pleasant.

1) When we're swimming we really can't tell since the chlorine in the water overpowers everything else. 2) I also do golf and we do not practice at Mar Vista and I can definitely tell a difference on the air, just the quality is better.

1) The particles in the air definitely affect me, I am long distance so I have to run outside and sometimes the smell is so bad I'll just decide for a different route further from the beach. 2) I also do cross country and I will say it probably gets worse, it is harder to breath and what we breath is heavy and smelly.





















- there's steam involved.
- high potency.

## **Questions to further investigate...**

- particle counters in the air?
- dryer affect the PM Counter?

1. My data shows that there is higher particulate matter (PM) counts when I use my hair dryer and

2. I think that happens because there's a sudden peak in PM when I take a shower and use a hair dryer. This may be due to steam's tiny droplets of water and for the hair dryer it may be due to the dust that may be flying around due to it's

3. When my dehumidifier is turned on, the PM counter decreases which may be due to the extraction of steam's water droplets by it.

1. Are the tiny water droplets produced by steam misleading when measuring the 2. How would using different settings of a hair 3. How would a humidifier differ from steam's water droplets in a particle counter?



- 1. My data shows that there is higher particulate matter (PM) when enclosures contain little to no plants/live vegetation, however, when plants are present, aerosols dramatically drop in quantity
- 2.1 believe that poor air quality happens because of the lack of air filters, natural or not, which do not capture and regulate aerosols that are produced by animals in their enclosures







## **Questions to further investigate...**

Is there anything we can do or implement on our enclosures to ensure our animals have proper, high quality air to breathe?

Do certain plants control air quality better than others?

Do the amount of plants and the micro climate inside these enclosures matter to the surroundings of the enclosure?

## **Plants in captive settings, no matter the surroundings,** ensure a healthier air quality compared to enclosures without them.

A ball python(Python regius) enclosure before and after introducing a plant (Epipremnum aureum)

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1. According to the data I collected, higher levels of PM are shown during stormy or light rain. 2. This most likely occurs because particles within the air condenses into the rain causing the PM levels to rise. 3. This affects the community because people who live around the area have to breathe these small particles which brings potential health risks deterring any tourists.



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- >= 0.3µm <sup>8</sup>
- >= 0.5µm
- >= 1.0µm
- >= 2.5µm
- >= 5.0µm
- >= 10.0µm

### **Questions to further investigate...**

- population?
- tourist destinations?
- visiting IB?
- breath clean air in our community?

1. Will these increased levels of PM affect the

2. How does the increased levels of PM affect

3. Will increased PM levels stop tourists from

4. What are steps we can take to make sure we









- 1. My data shows that there are higher particulate matter (PM) counts when there is the presence of fog or a slight smell is in the air from the sewage crisis that my town struggles with.
- 2. I think that the heightened number of particulate matter (PM) happens because the aerosols that spray up from the polluted ocean and those particles travel in the with and clouds around our city and impact our daily lives in numerous ways.



#### **Questions to further investigate...**

- 1. How does the increase of pollution in our oceans create harmful outcomes for the human population?
- 2. What efforts can the Imperial Beach community take to instill change to our lives?
- 3. When will we see the effects of ocean pollution in our bodies? How can we measure these health effects?











Time (seconds)



## Hypotheses from my data collection

- 1. My data shows that there are higher particulate matter (PM) counts when there is precipitation.
- 2.1 think that there is a higher particulate matter (PM) count when there is precipitation because of pollutants exposure to contaminated runoff that travels to the ocean.

## **Questions to further investigate...**

- matter count?

and



1. How do different seasons and climates change the particulate 2. What changes can be made to infrastructure to handle rain and sewage more efficiently? 3. What types of harmful pollutants are released after a rain event?

# A Study of Air Quality by Zip Codes in North County (San Diego)

Author: Navya Arora, YCA

#### Introduction

This study is a comparison of air quality in different zip codes of North County. The data was collected between January 2024 to April 2024.



#### OBJECTIVE

The data was collected using air quality monitors provided by UCSD. These instruments measure the number of particles of various sizes >=0.3  $\mu$ m – 10  $\mu$ m. The data was collected for about 45 seconds between January 2024 to April 2024. The data was compared to one site (Mission Grove) chosen as a control, for ease of access and the Healthy Places Index of 50.3 Percentile. This means this community has healthier community conditions than 50.3 percent of other California communities).

The purpose of this study was to see if people residing in higher-income areas in North County San Diego (as reflected by the median home price/HPI), had better/worse air quality than areas with a lower median home price/ HPI. (HPI-The Healthy Places Index<sup>®</sup> is a project of the Public Health Alliance of Southern California.)



HP-Hollandia Park, TSq Escondido-Town Square Escondido, WVP-West Valley Parkway, CV-Carmel Valley, DMH-Del Mar Heights, VVV-Vista Village Vista, BR-Bressi Ranch.

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Picture 1- Map of North County by Zip Codes and Air Quality.

#### METHODOLOGY

Peak Park, WP-Woodland Park, HP-Hollandis Park, TSq E-Town Square Escondido, WVP-West Valley Parkway, CV-Carmel Valley, DMH-Del Mar Heights, VVV-Vista Village Vista, BR-Bressi Ranch.



Figure 4 (Left). Percentage Change in Air Particle Count by Zip Codes in North County San Diego on a cloudy day. (4/14/24) .Percentage increase (+) or decrease (-) compared to MG (Mission Grove) indicated by blue/red/yellow fonts for particle sizes  $\geq$ . 0.3, 0.5, 1.0 µm respectively).



Picture 2– Photovoice: My community, my home.

#### RESULTS

- The air quality varies with zip codes. The less affluent zip codes (as indicated by median home price per sq ft and Healthy Place Index) had better air quality than the more affluent ones
- Air Quality varies with the weather. There were fewer smaller particles (< 2.5 µm size) after rain.
- Air Quality data correlates with Purple Air data which measures particle sizes between ≥.1– 2.5µm size. Our study measures particle sizes between  $\geq$ 0.3–10µm.

#### **Further Questions**

(1) What are the factors affecting the findings of this study? Previous studies have indicated that less affluent areas have worse air quality than the more affluent ones.

(2) On days with bad air quality, is there an association with increased hospital visits for the vulnerable population?

Figure 5. (Right) Median Home Price/sqft and HPI (Healthy Places Index) by Zip Code.

Fig 3: ArcGIS Heat Map













- 1. The data that I collected tell us that there tends to be a higher particle count early in the morning and late at night.
- 2.1 believe that the reason the numbers appear this way is because of the presence or absense of the sun or UV radiation

#### **Questions to further investigate...**

- 1. Would these numbers change in a
  - place that gets more/less sunlight?
- 2. How could certain weather events or seasons effect the amount of sunlight/UV radiation that helps to transform the chemicals in the ocean into the particles that we measure?





