



# THE ROAD TO BETTER HEALTH

HOSTED BY CLARK COUNTY'S  
CLEAN CITIES COALITION

FEBRUARY 23, 2023

# OVERVIEW

- Clean Cities Introduction
- Dr. Jacob Altholz
  - NV Clinicians for Climate Action
- Dr. Joanne Leovy
  - NV Clinicians for Climate Action
- Melissa Ramos
  - American Lung Association
- Questions
- Upcoming Programs



- National network through the US Department of Energy
- Goal:
  - Reduce petroleum fuels
    - Approved alternative fuels
    - Idling reduction
- Purpose:
  - Reduce dependence on foreign oil
  - Provide cleaner air
  - Lower greenhouse gas emissions
- 75 Coalitions in the United States
  - ...but no representation in Nevada!
- Clark County is currently working towards a designation



# WHY CLEAN CITIES?

Funding opportunities

National recognition

Collaborative space for the community

Capacity building

Cleaner air and fewer greenhouse gas emissions!





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## WHO IS A STAKEHOLDER?

- Anyone interested in reducing their petroleum fuel use!
- We want to work with:
  - Fleet managers
  - Car dealerships
  - Nonprofits
  - Municipalities
  - Fuel providers
  - Public Organizations
  - Trade unions and mechanics
  - Individuals interested in sustainable transportation

# HOW TO PARTICIPATE?

Quarterly Stakeholder Meetings

Online Programming

In-Person Events

Join a Working Group

Opportunities to support, present & host





## WANT TO LEARN MORE?

Visit our website by scanning this QR code

Email [Nicole.Wargo@ClarkCountyNV.gov](mailto:Nicole.Wargo@ClarkCountyNV.gov)





# Air Pollution and Health: The Las Vegas Valley

Presented by Jacob Altholz, MD and Joanne Leovy, MD

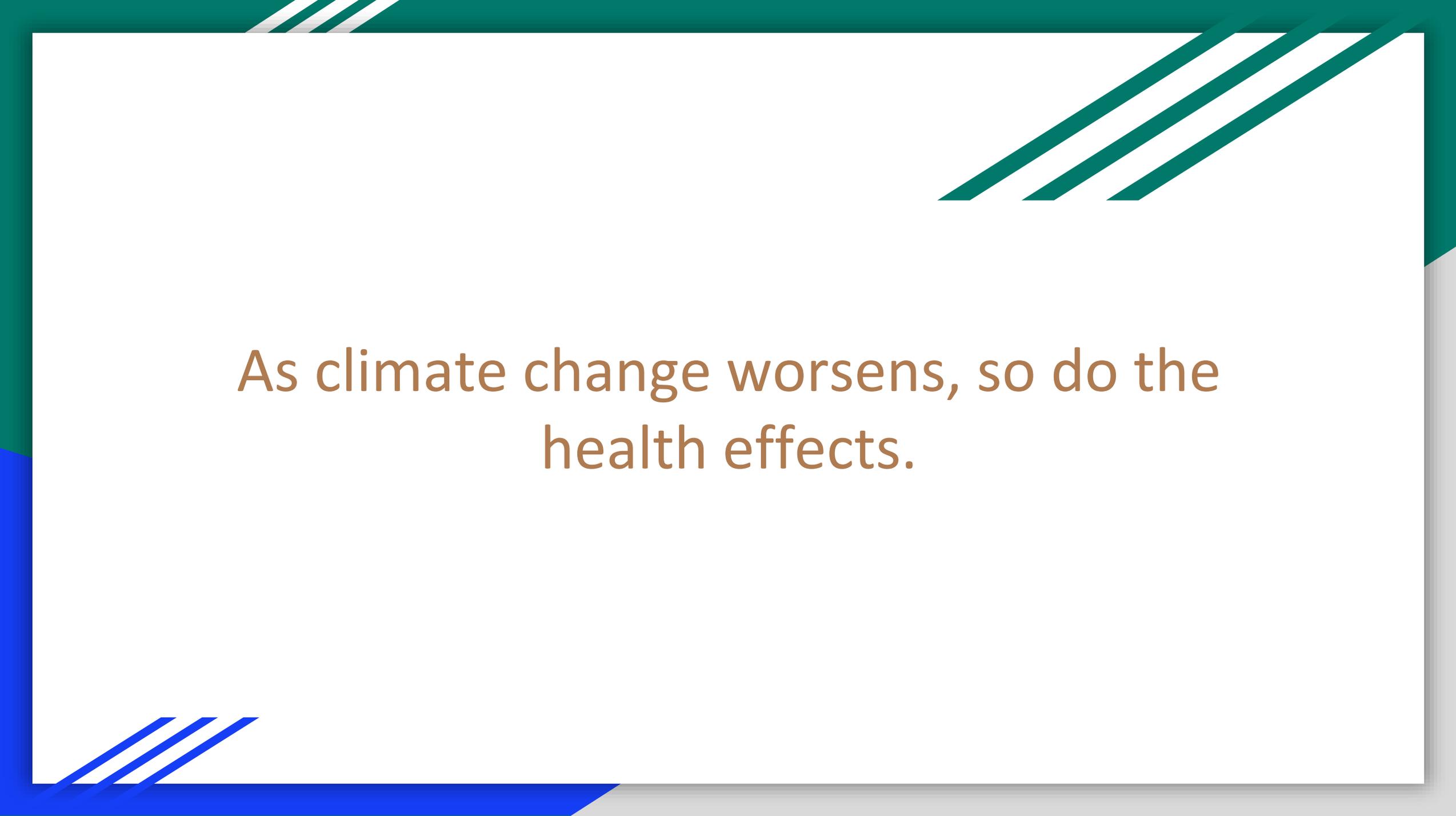


# Take-home thoughts

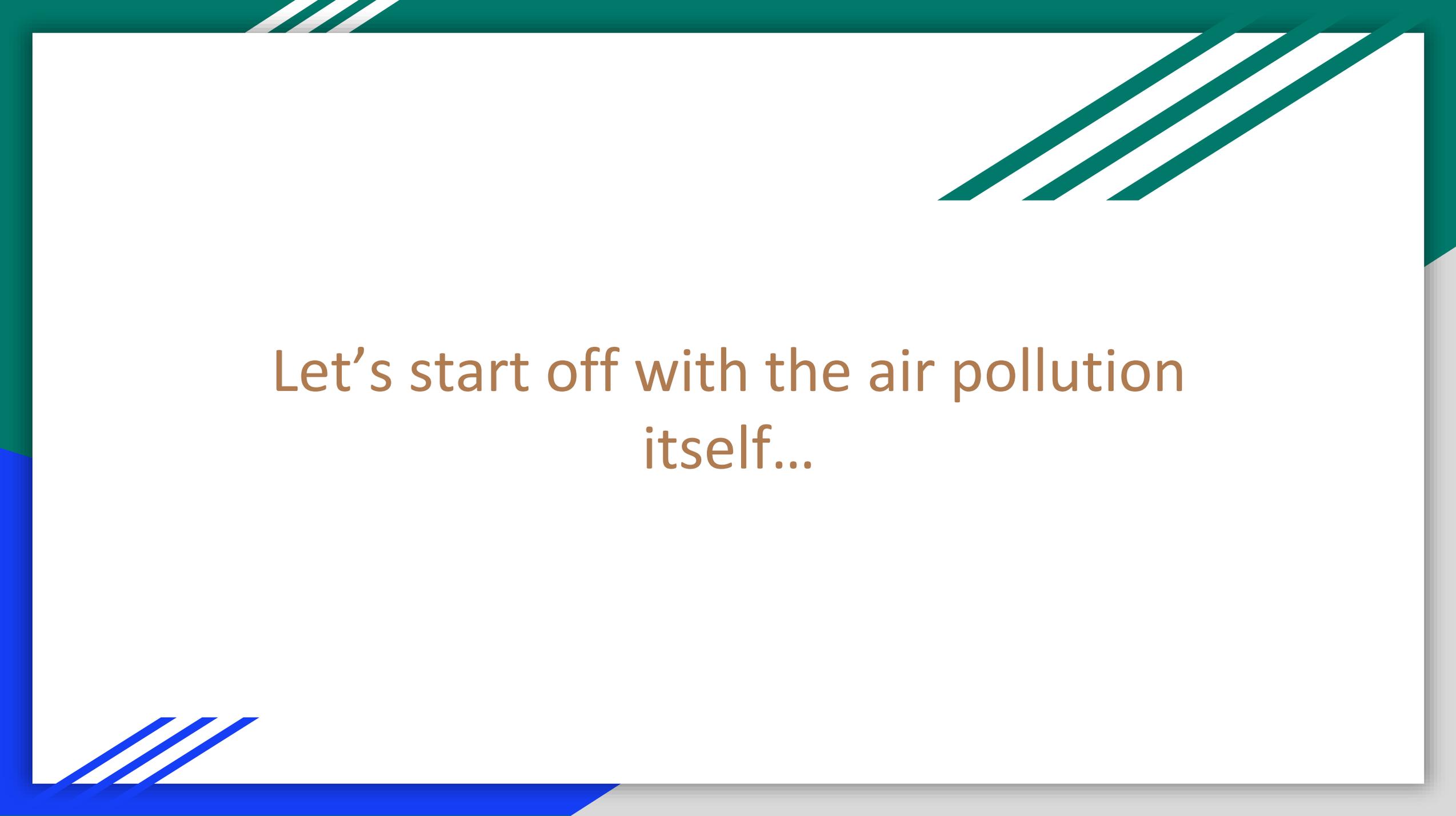
- Fossil fuel combustion threatens health.
- Transportation-related air pollution causes many well-documented health problems.
- Everyone is at risk, but some individuals and groups have particular vulnerability.
- Air pollution exacerbates inequities.
- Policies that reduce transportation emissions rapidly improve health measures.
- Reimagining transportation centered around health “co-benefits” is possible and cost-effective.

# Impact of Climate Change on Human Health





As climate change worsens, so do the health effects.



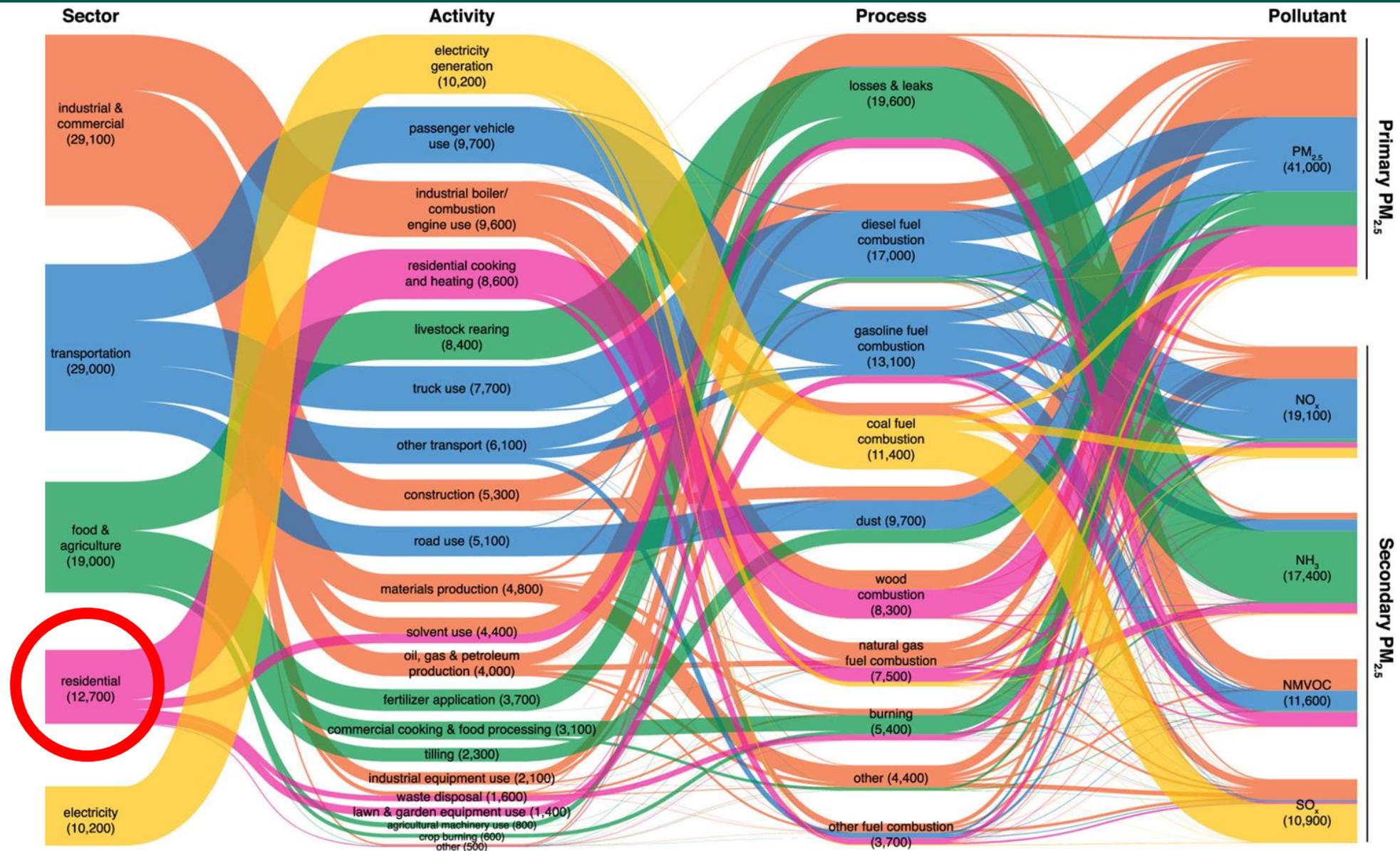
Let's start off with the air pollution  
itself...

Does anyone remember The Ionic  
Breeze?

# Ionic Breeze Suit Drives Sharper Image into Bankruptcy

Company challenged Consumer Reports and lost





**Total deaths per year in the United States from human-caused, domestic emissions: 100,000**

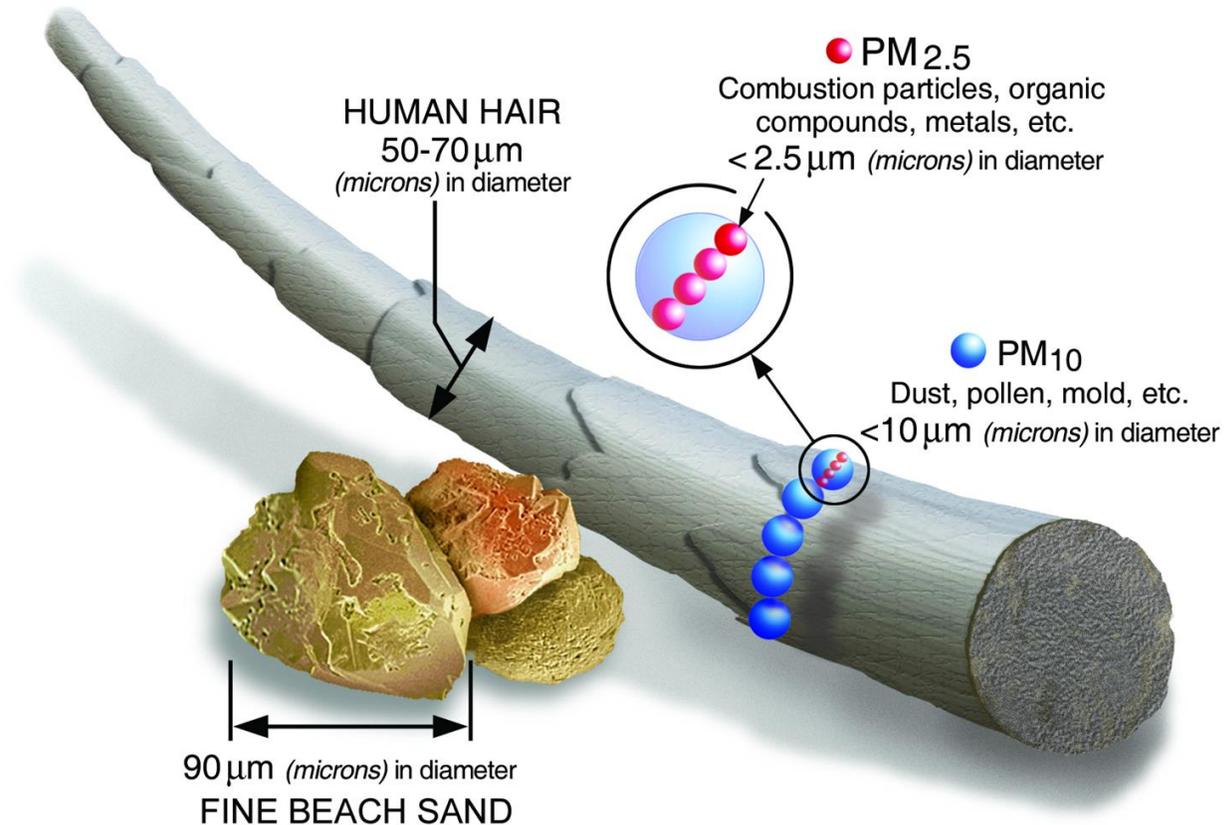
Generally speaking, air pollution effects can be divided into many different segments and the ratios depend on the source.

Broadly speaking, burning will create:

- Particulate Pollutants
- Ozone
- Nitrous Oxides
- Sulphurous Oxides
- Ammonia
- Carbon Monoxide
- Carbon Dioxide



Particulate air pollution is usually discussed in categories of size.



# PM2.5 is particularly dangerous.

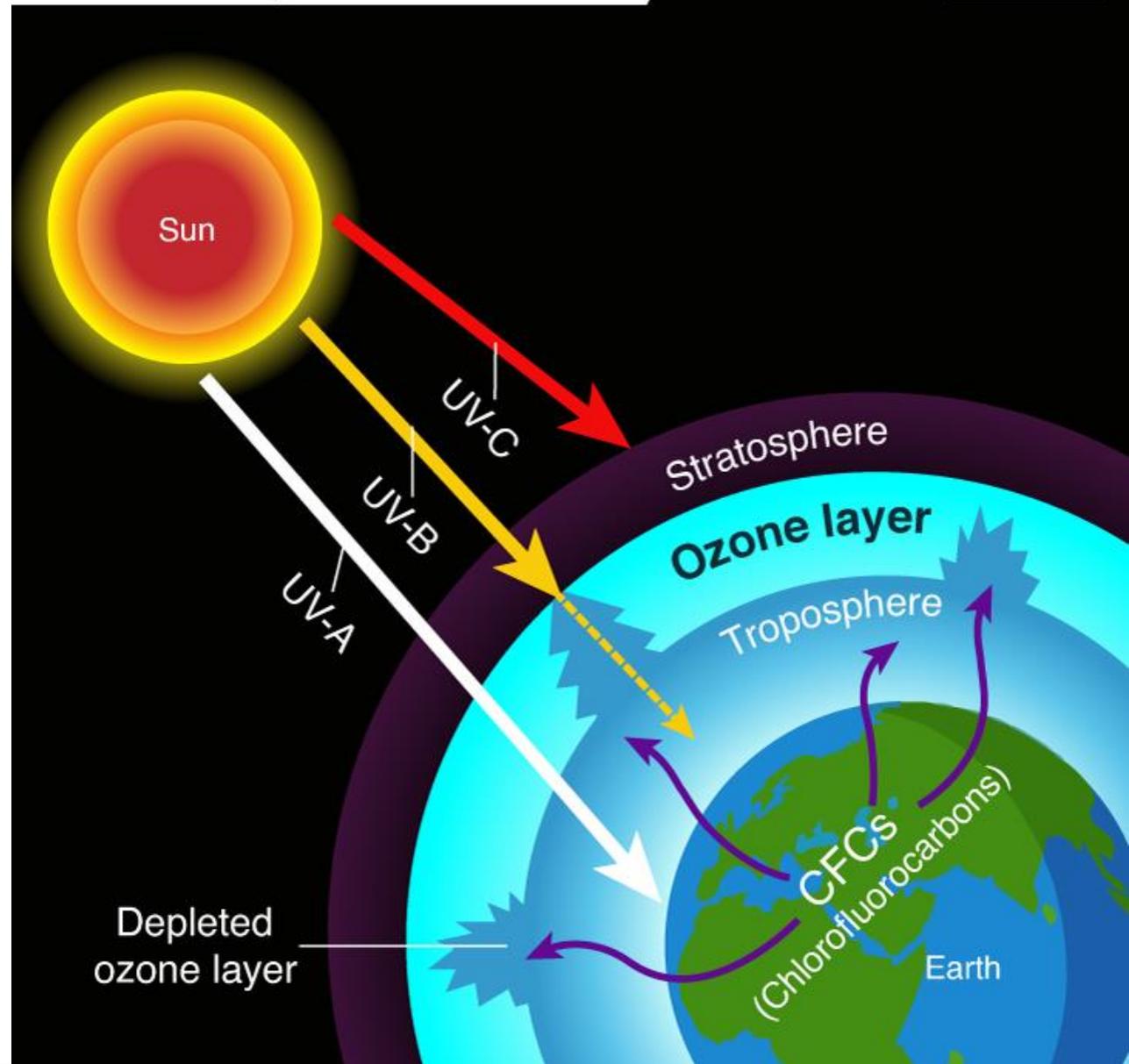
## Short Term:

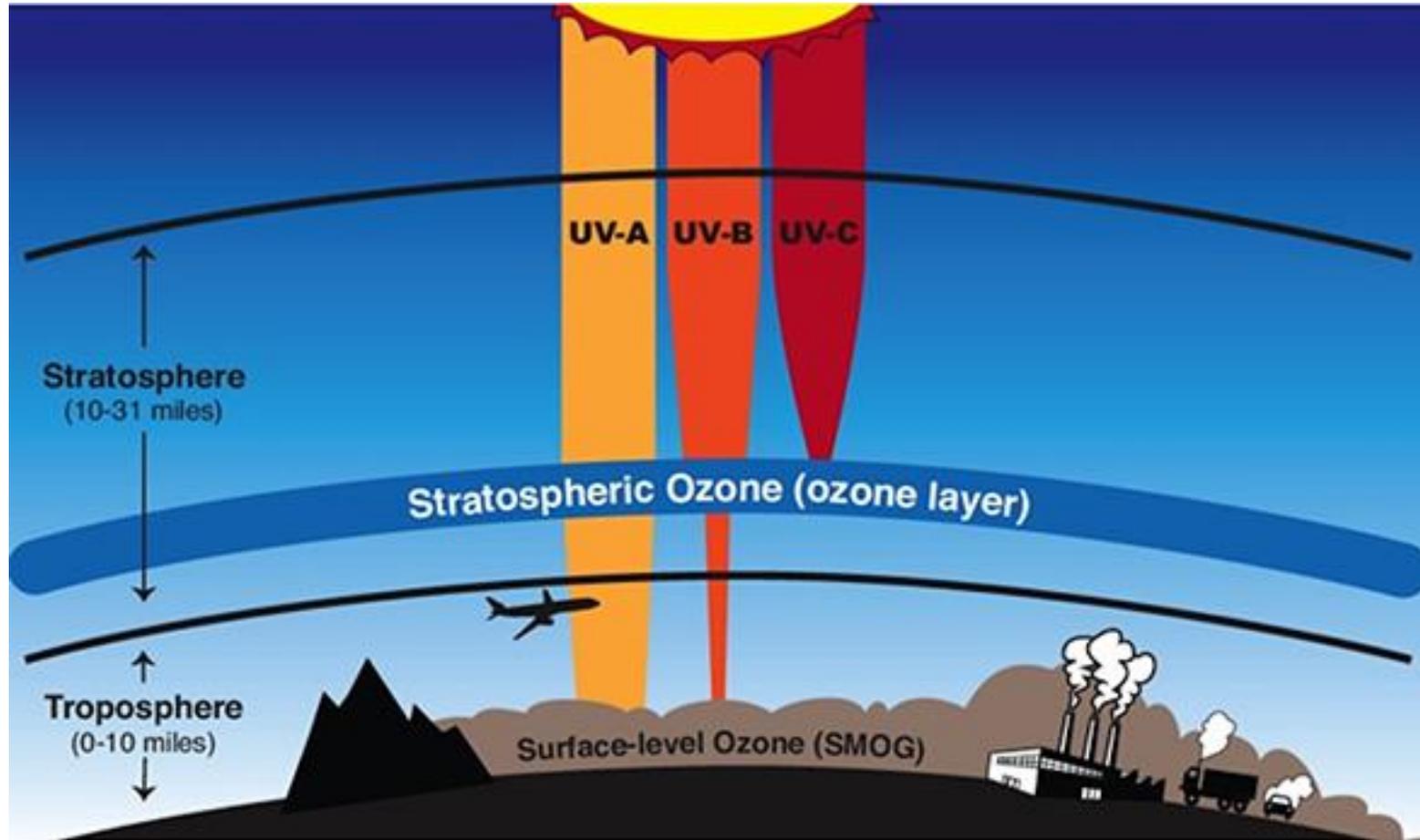
- ED visits for cardiac concerns (MI and CHF)
- Hospital admissions for pneumonia/COVID
- Overall non-accidental mortality

## Long Term:

- Cardiovascular mortality/ischemic heart disease
- Stroke
- Lung cancer
- Decreased lung function
- Neurodevelopmental problems
- Cognitive impairment/dementia
- Impulse control/academic performance
- Overall non-accidental mortality

# Ozone Layer Depletion







# Ozone health effects

(American Lung Association 2022)

Solid evidence for

Decreased lung function

More asthma exacerbations

More ED visits for cardiac and respiratory conditions

Increased risk of cardiovascular death

Increases in preterm birth and low birth weight

# Clark County transportation-related pollutant levels (from lung.org)

## Ozone



## Particle Pollution (annual)

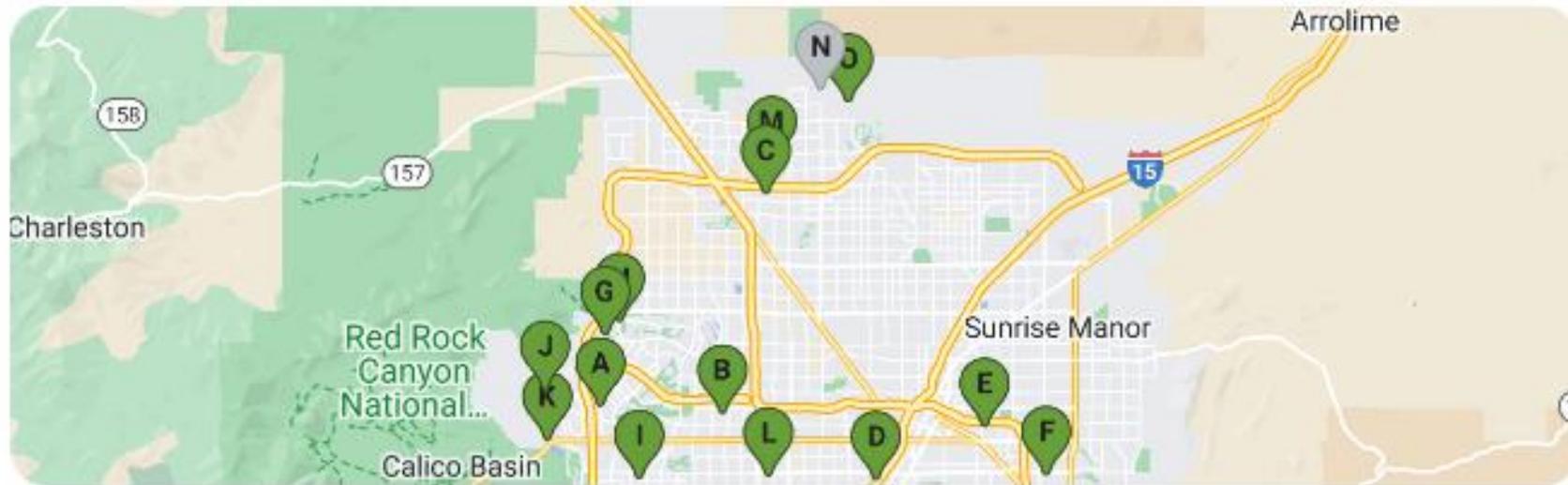


# A lot of days in Las Vegas don't look too bad.

## Air quality

From [airnow.gov](#) and [PurpleAir](#) · near Las Vegas · [Choose area](#)

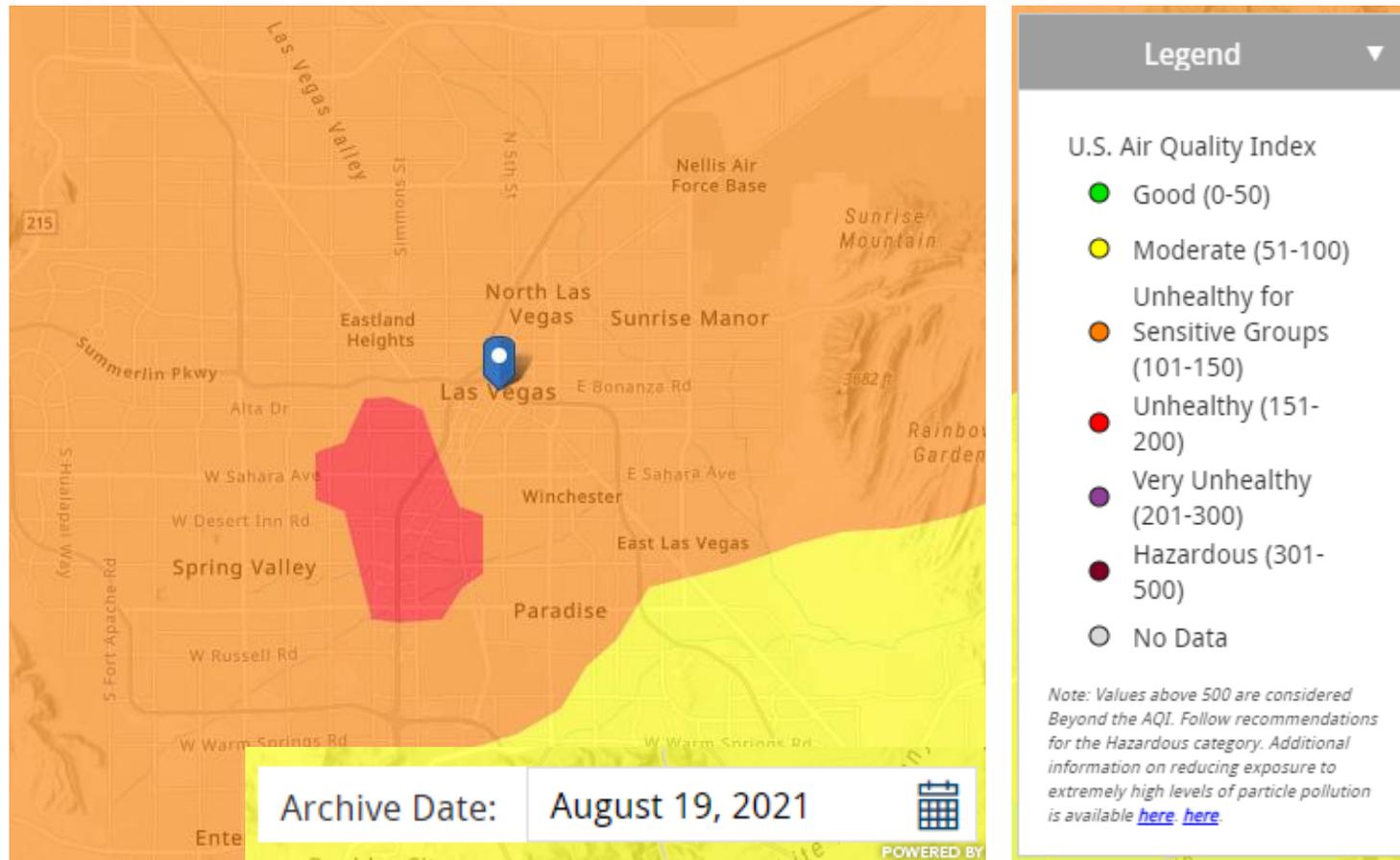
Include air sensors 



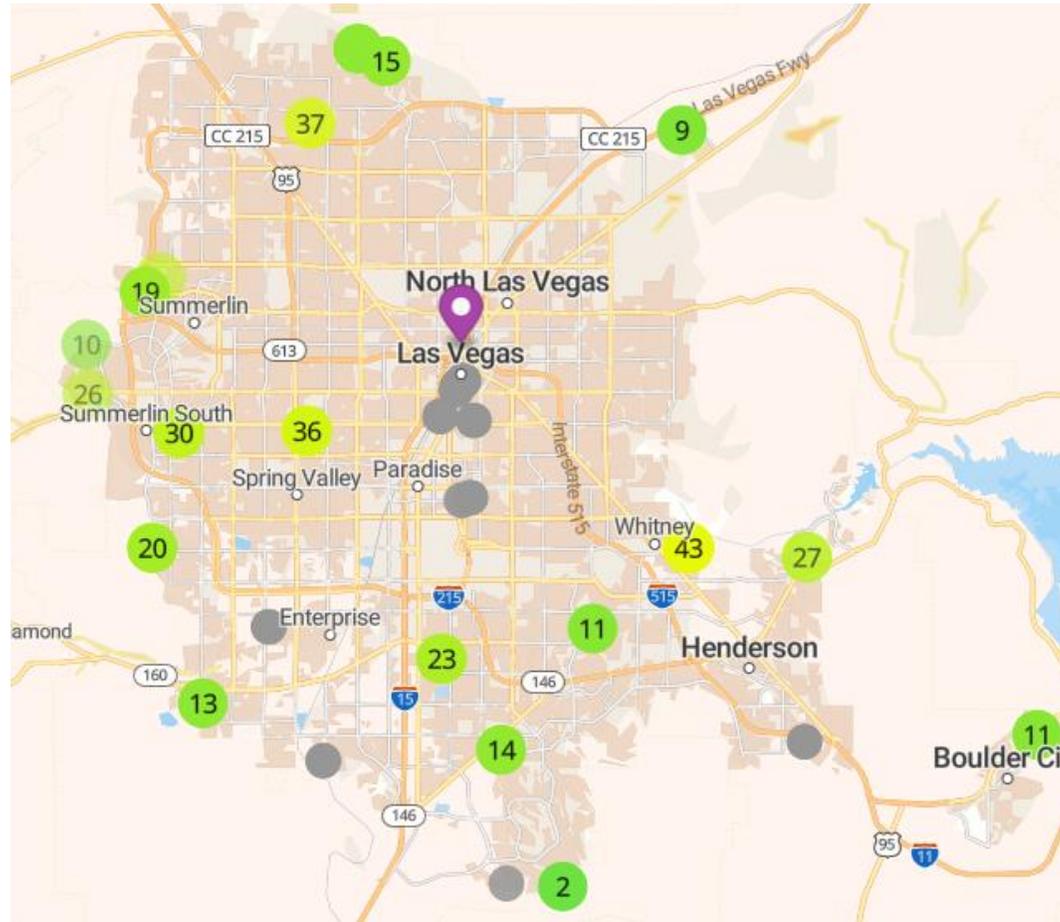
US Air Quality Index (AQI) 



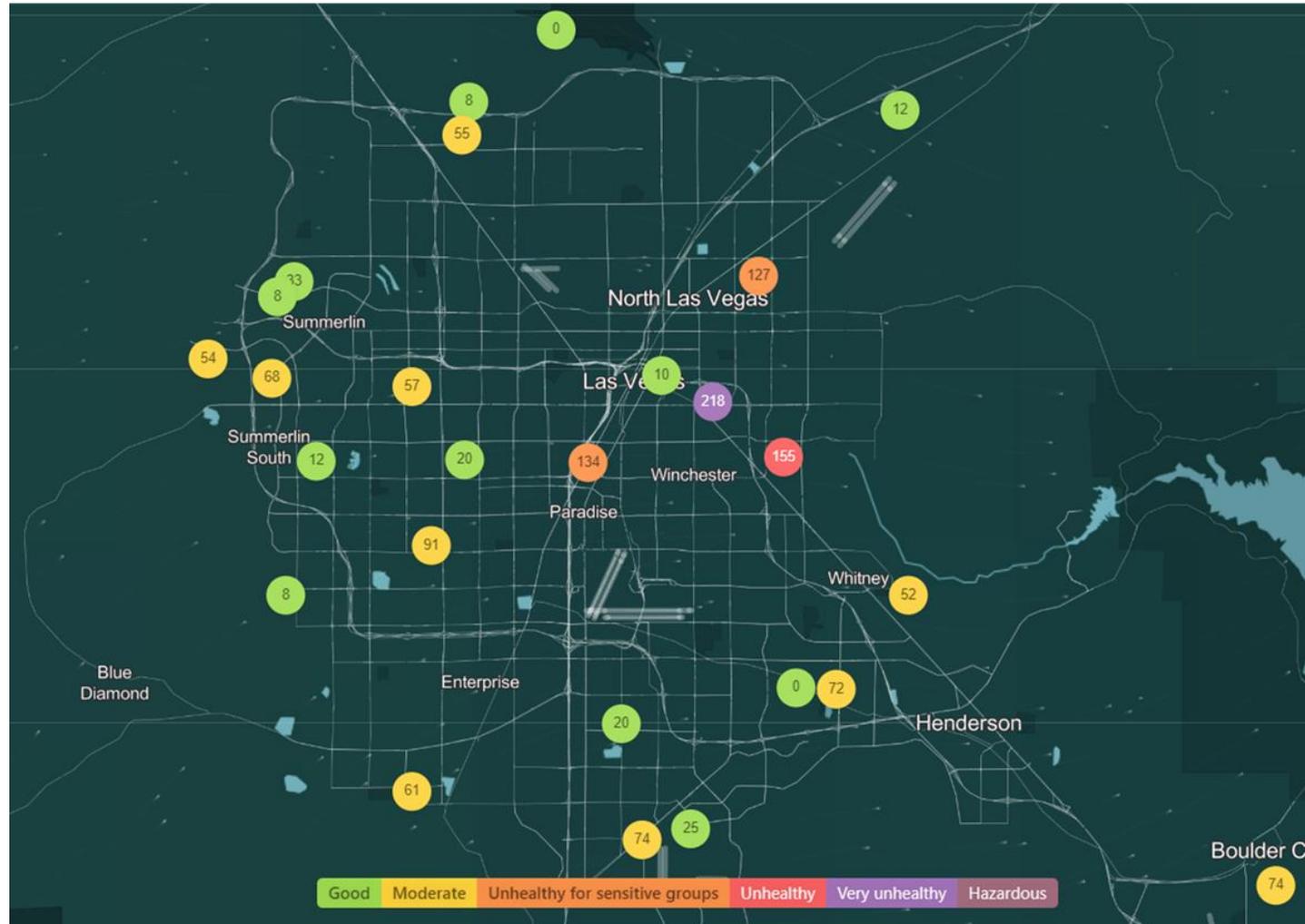
# Wildfires cause temporary peaks in unhealthy air

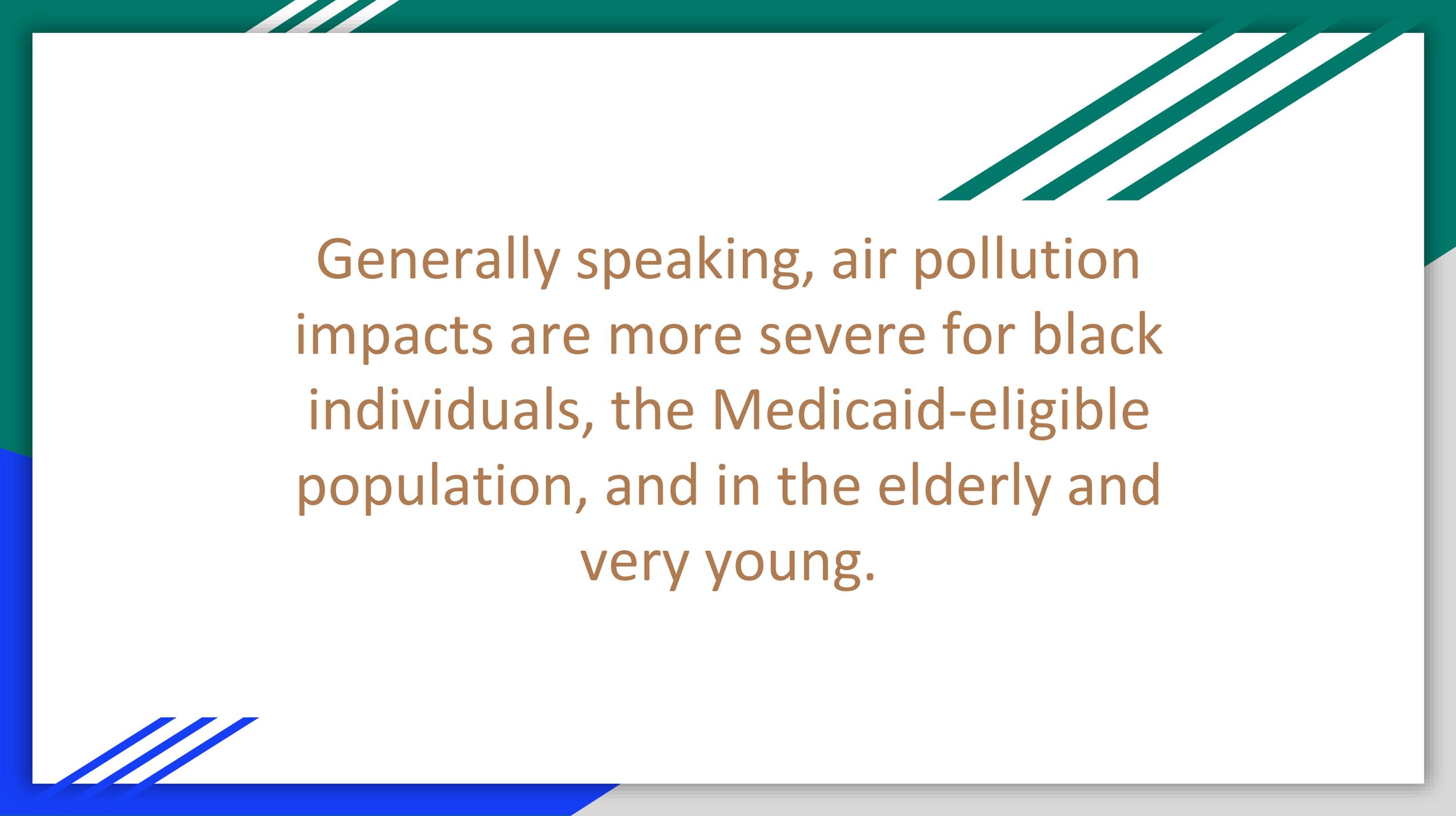


Averaged over a year, we start to see better trends in specific areas.

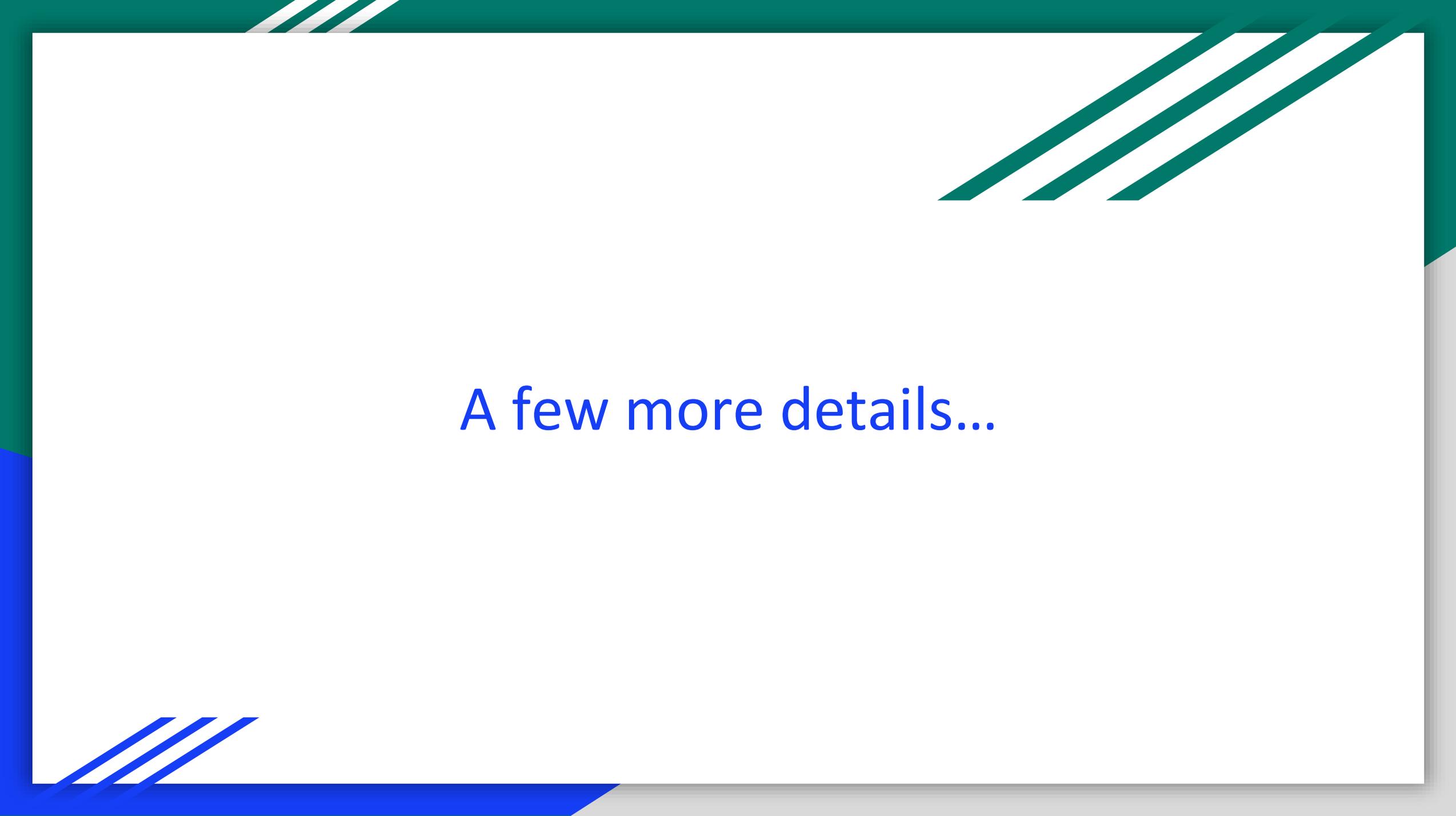


# Worse air quality is often clustered around freeways and airport





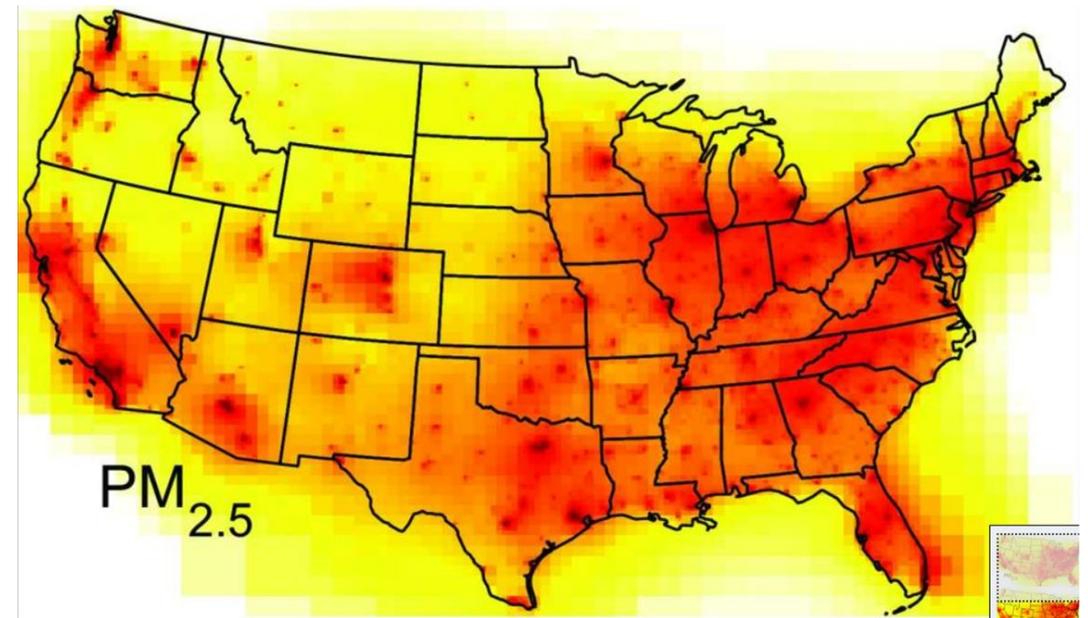
Generally speaking, air pollution impacts are more severe for black individuals, the Medicaid-eligible population, and in the elderly and very young.



A few more details...

Fine particle pollution (PM<sub>2.5</sub>)  
causes >100,000 deaths per year

More than traffic fatalities and  
homicides combined  
(2018 CDC data)



Short-term exposure to PM2.5  
(wildfire smoke, inversion layer)  
Might last a day or a few days

Overall non-accidental mortality increases

Emergency department and hospital admissions for  
heart problems, pneumonia, Covid-19, and lung disease  
increase

Source—EPA, 2022





Long term exposure to PM 2.5  
(transportation, power plant)  
Constant emissions over time

## **ADULTS**

Cardiovascular mortality and illness from stroke, heart attack, angina (likely)  
Lung cancer (likely)  
Increase in other cancers and decreased cancer survival (possible)  
Cognitive impairment and dementia in older adults (likely)

***Increase in overall non-accidental mortality (certain)***



# Cancer

Significantly increased risks of breast cancer seen in women who lived within 500 feet of a major road and were exposed to higher concentrations of transportation emissions.

Childhood leukemia substantially higher in children exposed to high levels of residential traffic in seven studies. (No connection with prenatal exposure).

Sources: Cheng I et al. Association between ambient air pollution and breast cancer risk: the multiethnic cohort study. [Int J Cancer](#) 2020 Feb 1;146(3):699-711.

Booth V et al. Residential traffic exposure and childhood leukemia: a systematic review and meta-analysis. [American Journal of Preventive Medicine](#). 2014. 46(4): 413-422.

# Mental Health

HEALTH

Air Pollution

Add Topic +

## Exposure to air pollution increases risk for anxiety or depression. What can you do?



**Karen Weintraub**  
USA TODAY

Published 6:00 a.m. ET Feb. 6, 2023 | Updated 8:48 a.m. ET Feb. 6, 2023

Air pollution associated with-

Outpatient visits and hospital admissions for depression and anxiety in Chinese cities

Long-term exposure correlated with levels of depression in UK

Decision-making and cognitive performance in US and China

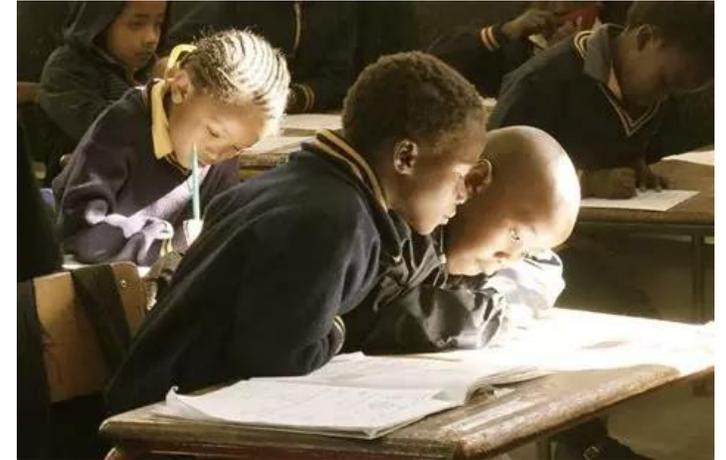
***Air pollution may be a risk-magnifier!***

Source: Yang T et al. *JAMA Psychiatry*. Published online February 1, 2023. doi:10.1001/jamapsychiatry.2022.4812

Long term exposure to PM 2.5  
(transportation, power plant)  
Constant emissions over time

## **CHILDREN**

Asthma incidence and prevalence (likely)  
Learning and developmental problems in children (likely)  
Difficulty with impulse control and academic performance—likely  
Reduced lung function in young, healthy people--likely  
Autism (possible)



# Living near a roadway increases childhood asthma

Table 2

Association of asthma and wheeze with distance to a major road [OR (95% CI)].<sup>a</sup>

Major road distance (m)	No. <sup>b</sup>	Lifetime asthma	Prevalent asthma	Current wheeze
All participants				
> 300	2,058	1.00	1.00	1.00
150–300	1,193	0.92 (0.73–1.15)	1.04 (0.82–1.33)	1.02 (0.82–1.27)
75–150	778	1.06 (0.82–1.36)	1.33 (1.02–1.72)*	1.30 (1.02–1.66)*
< 75	713	1.29 (1.01–1.66)*	1.50 (1.16–1.95)**	1.40 (1.09–1.78)**
Long-term residents				
> 300	813	1.00	1.00	1.00
150–300	483	0.86 (0.59–1.24)	0.83 (0.56–1.21)	0.97 (0.69–1.38)
75–150	294	1.03 (0.68–1.56)	1.09 (0.71–1.66)	1.09 (0.73–1.62)
< 75	266	1.46 (0.98–2.17)	1.64 (1.10–2.44)*	1.67 (1.14–2.43)**

[Open in a separate window](#)

<sup>a</sup>Adjusted for age, sex, language of questionnaire, community, and race.

<sup>b</sup>Total exposed in each category of distance to a major road.

\* $p < 0.05$ ;

\*\* $p < 0.01$ .

Source: McConnell R et al. Traffic, susceptibility and childhood asthma. [Environ Health Perspect.](#) 2006 May; 114(5): 766–772.



Long term exposure to PM 2.5  
(transportation, power plant)  
Constant emissions over time

**PREGNANCY AND NEWBORNS**

Low birth weight (likely)

Preterm birth (likely)

Reduced lung function in newborns (likely)

Increased neonatal mortality, including SIDS (likely)



# Air pollution and the workplace

*Poor air quality is linked to increased absenteeism and lower workplace productivity*

- Chinese call center workers 5-6% more productive on good air days compared to poor air days.
- Increased ozone, even within standard, decreased California farm worker productivity.
- In 2020, the Clean Air Act prevented 17 million lost work days and 5.4 million lost school days (EPA).

# SHORT-TERM EXPOSURE TO AMBIENT AIR POLLUTION AND ONSET OF WORK INCAPACITY RELATED TO MENTAL HEALTH CONDITIONS

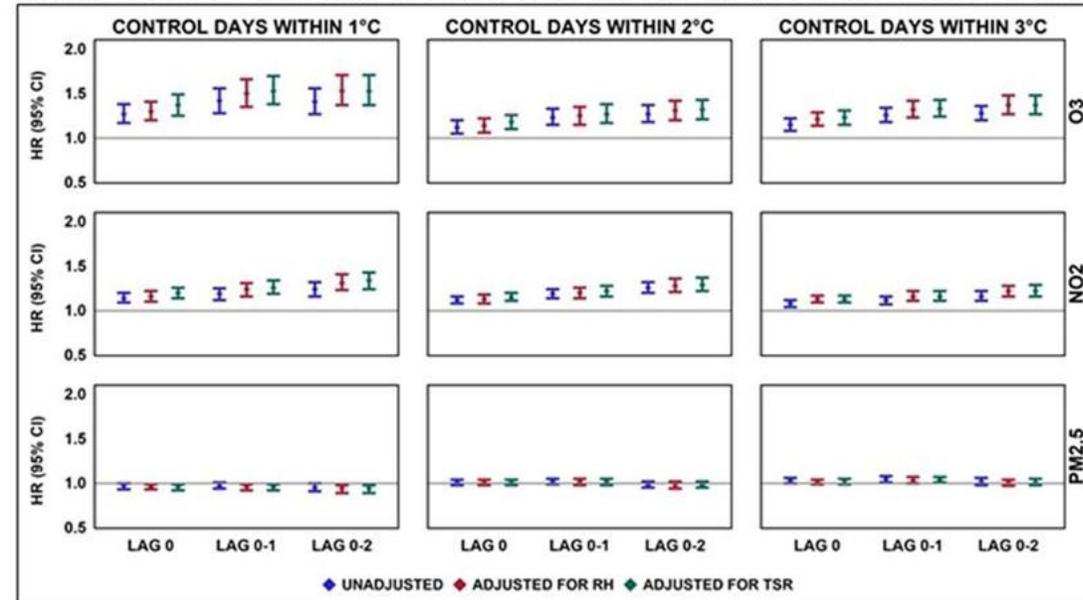
 TO EXAMINE THE ASSOCIATION BETWEEN SHORT-TERM FLUCTUATIONS IN AMBIENT AIR POLLUTION AND ONSET OF WORK INCAPACITY RELATED TO MENTAL HEALTH CONDITIONS

 12 270 EVENTS OF WORK INCAPACITY RELATED TO MENTAL HEALTH CONDITIONS IN 2019 IN BELGIUM

 BLACK CARBON (BC), NITROGEN DIOXIDE (NO<sub>2</sub>), OZONE (O<sub>3</sub>), AND PARTICULATE MATTER 2.5 (PM<sub>2.5</sub>), CONTROLLED FOR TEMPERATURE, RELATIVE HUMIDITY (RH) AND TOTAL SOLAR RADIATION (TSR)

 A BIDIRECTIONAL TIME-STRATIFIED CASE-CROSSOVER STUDY WITH DAILY AIR POLLUTION ESTIMATES BY MUNICIPALITY

FINDINGS FOR 3-POLLUTANT MODELS, UNADJUSTED AND ADJUSTED FOR RH OR TSR



HIGHER LEVELS OF NO<sub>2</sub> AND O<sub>3</sub> ARE SIGNIFICANTLY ASSOCIATED WITH INCREASED ONSET OF WORK INCAPACITY RELATED TO MENTAL HEALTH CONDITIONS, ADJUSTING FOR RH AND TSR UNDER VARIOUS SCENARIOS OF MATCHING CONTROL DAYS AND CASE DAYS FOR TEMPERATURE. ADVERSE ATMOSPHERIC CONDITIONS AGGRAVATE WITHIN 48 HOURS A LIKELY EXISTING PROPENSITY TO ENTER WORK INCAPACITY BECAUSE OF MENTAL HEALTH CONDITIONS.



## Salt Lake City, UT

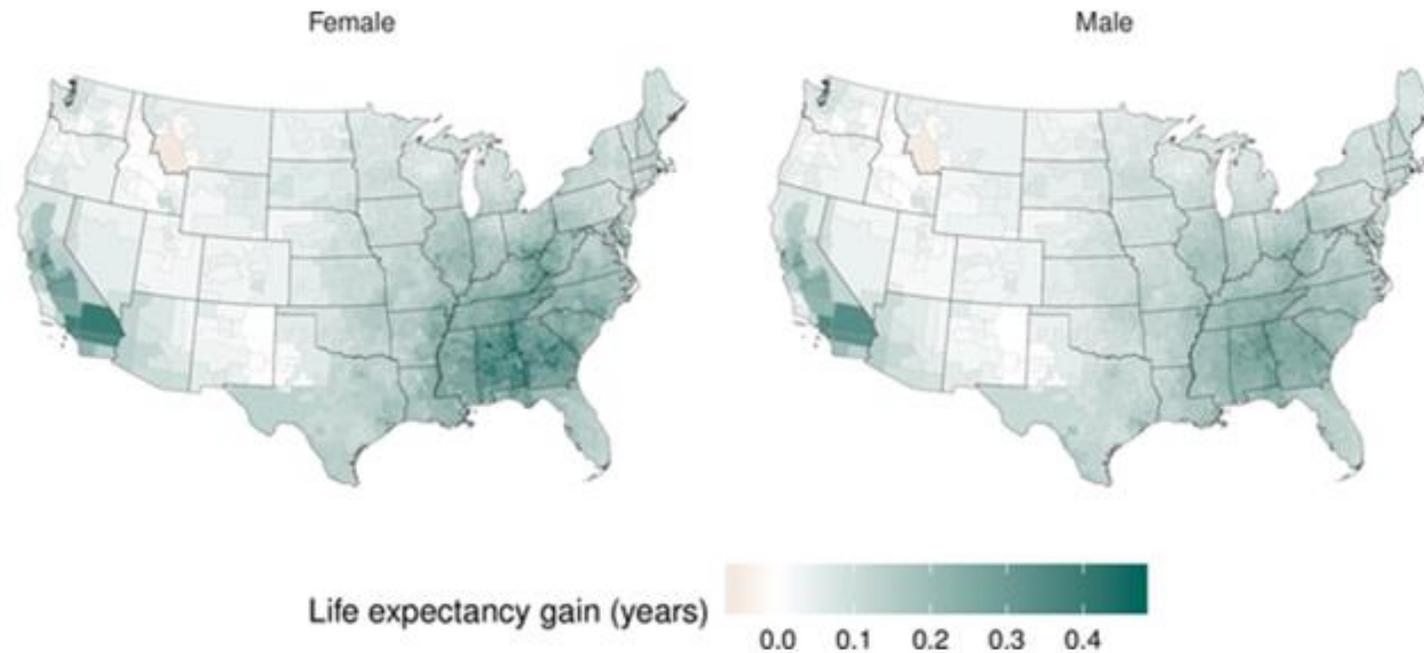
- Local school area pollution correlated with absences in a “dose-response” manner
- Low income students disproportionately affected
- Reducing pollution by 50% would save \$426,000/year in lost wages and economic costs

Source: Daniel L Mendoza et al 2020 Environ. Res. Lett. 15 114052

# Clark County

- Vehicle miles traveled increased by 41% 2005-2022 (source NV DOT).
- About 11% of US public schools lie within 500 feet of a highway, major roadway or major truck route. How many CCSD schools fit that definition?
- Ozone emissions increase with increased heat.
- Extreme heat multiplies risk of air quality-related heart, lung, behavioral and perinatal disease.
- Transportation sector vulnerabilities to climate change include flood and heat risks to roads and rails.

# We're off to a good start...



Contribution of  $PM_{2.5}$  reduction to life expectancy gains from 1999 to 2015, estimated using the Covariate-and-county model.  
 $PM_{2.5}$ , fine particulate matter.  
<https://doi.org/10.1371/journal.pmed.1002856.g005>

## Widespread switch to alternative fuels saves lives

*If by 2035 all new cars use alternative fuels, by 2040 all new trucks use alternative fuels, and grid is powered by renewables, we would realize....*

- 110,000 avoided deaths
- 2.79 million avoided asthma attacks
- 13.4 million avoided lost workdays
- >\$1.2 trillion in health benefits by 2050
- >\$1.7 trillion in additional climate benefits by 2050

Source: American Lung Association "Zeroing in on Healthy Air", March 2022

# But we can do more...

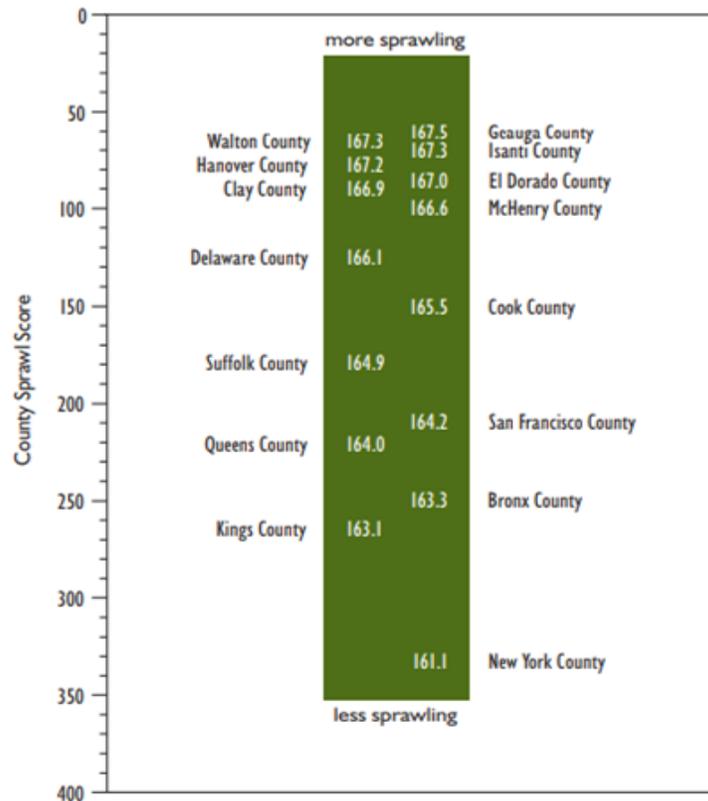
## ***Health “Co-benefits” of reducing transportation emissions***

Cities that emphasize mass transit can cut traffic fatalities by up to 40%.  
Increased active transportation reduces obesity, diabetes, high blood pressure.  
Reducing self-driven car commutes over 10 miles may reduce anxiety and depression.  
Clean skies are prettier and better for outdoor recreation and tourism.

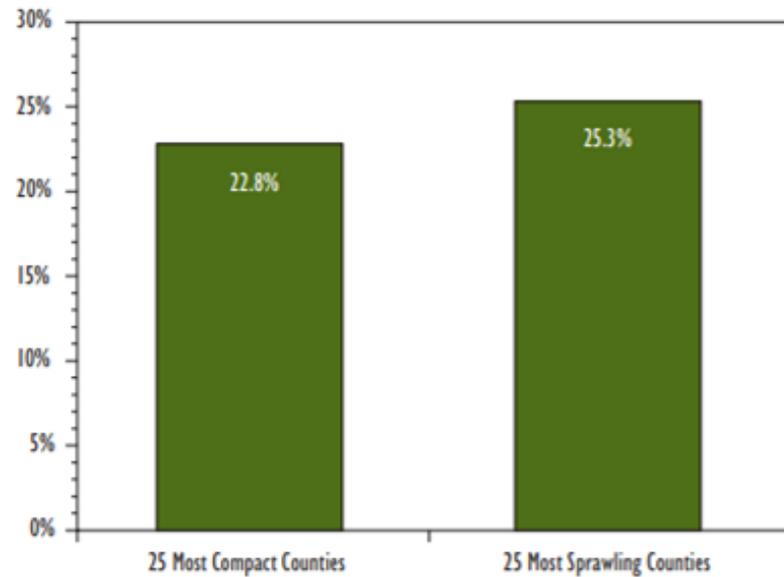


# Urban sprawl is unhealthy

**FIGURE 1. Sprawl and Weight**  
Expected Weight for a 5'7" Adult (lbs.)



**FIGURE 2. Sprawl and Blood Pressure**  
Percent of Adult Population with Hypertension



Source: BRFSS Hypertension rates, weighted by county (1998-2000).

Source: McCann B and R Ewing. Measuring the health effects of sprawl. Smart Growth America Surface Transportation Policy Project. 2003.

# Traffic congestion costs should measure health as well as economics

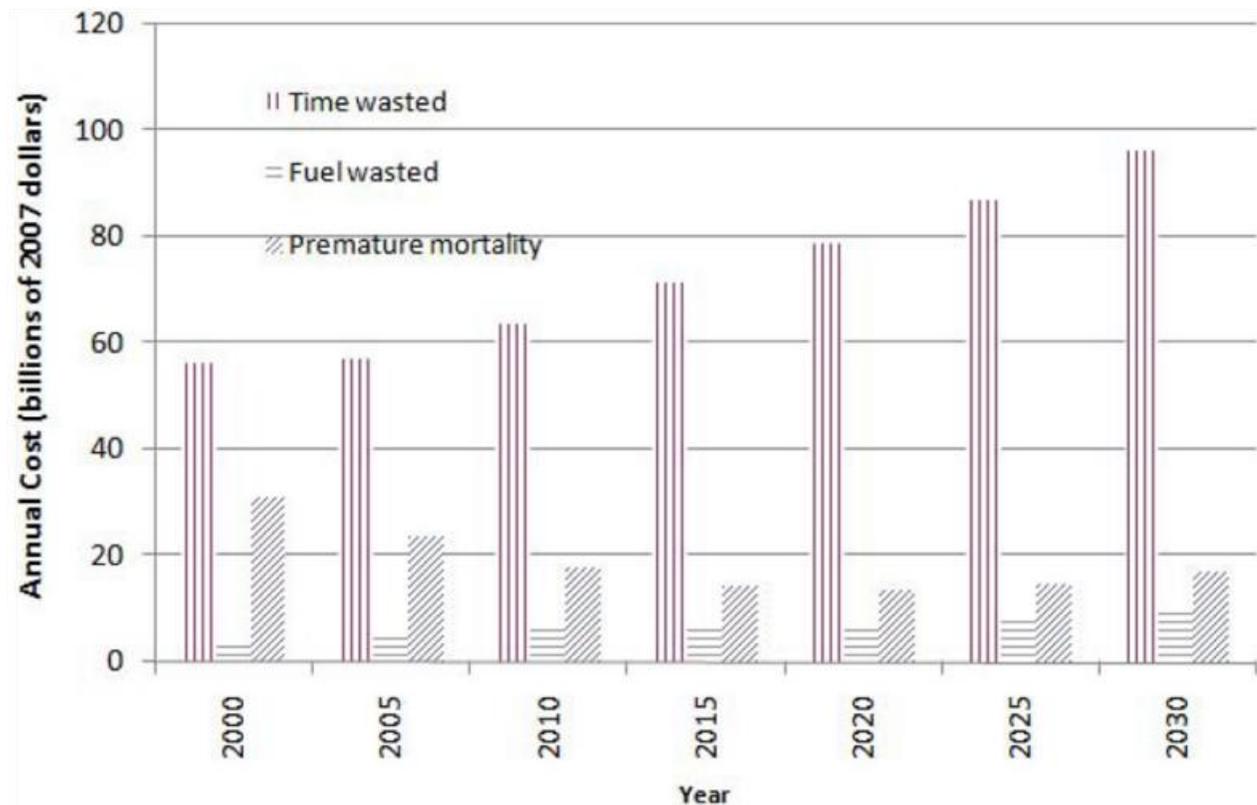
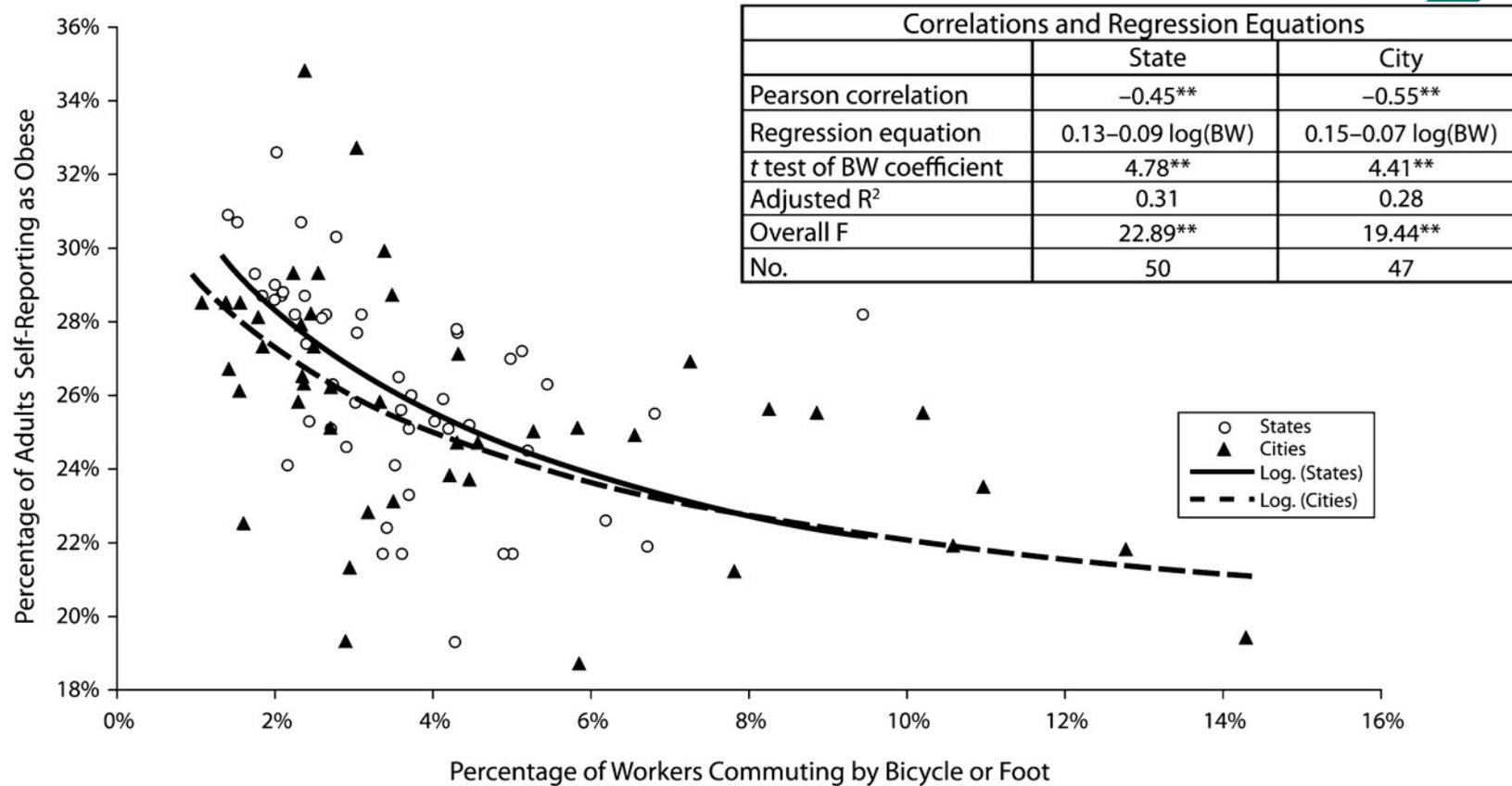


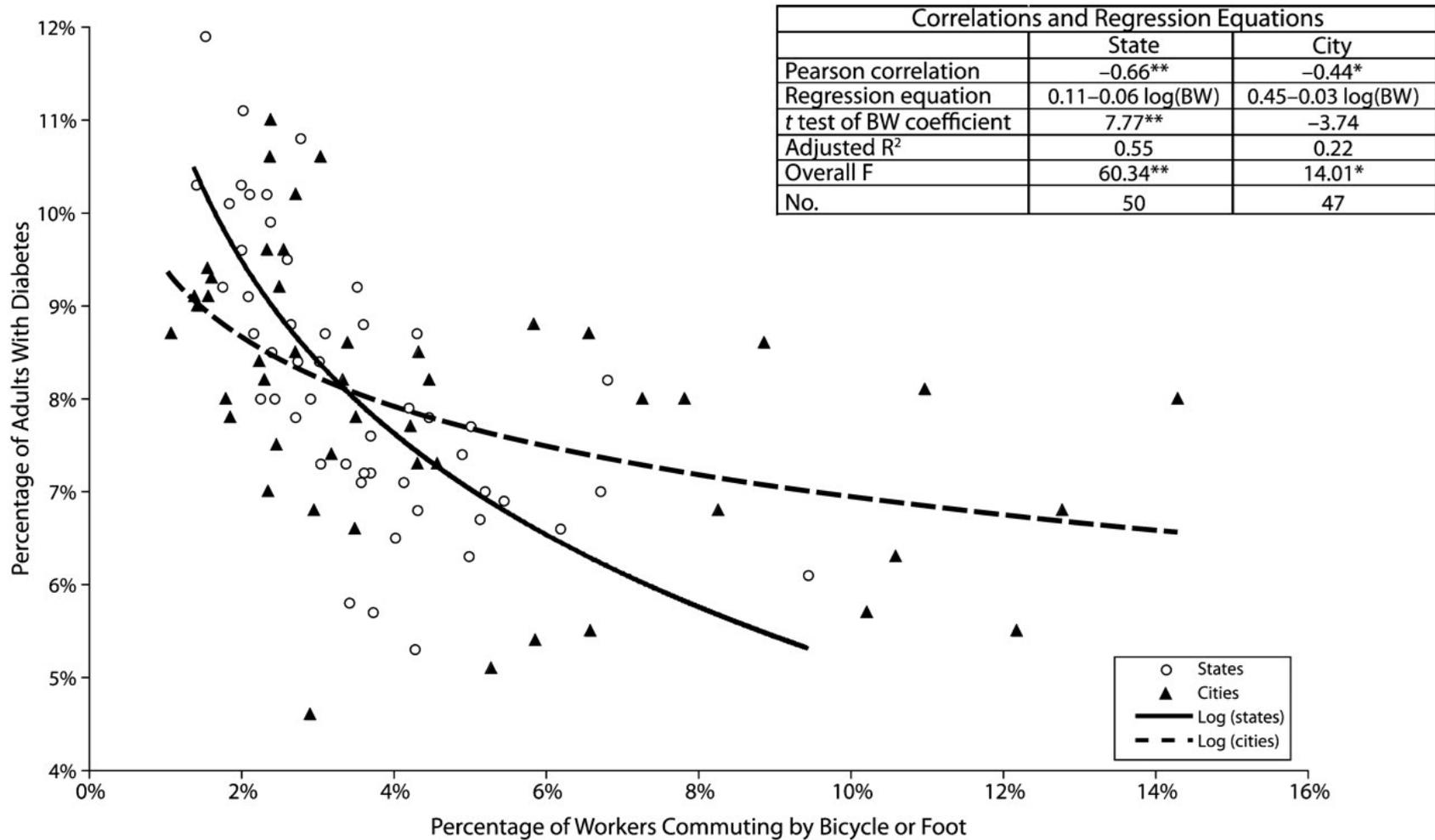
Figure 3 Comparison of the economic costs of congestion with the monetized estimates of PM<sub>2.5</sub>-related mortality risks (in billions of 2007 dollars)

Source: Levy J et al. Evaluation of the public health impacts of traffic congestion: a health risk assessment. Environmental Health 2010, 9:65

# Active transportation benefits chronic disease



**FIGURE 3** Relationship between share of workers commuting by bicycle or foot and self-reported obesity levels: 50 US States and 47 of the 50 largest US cities, 2007.



**FIGURE 4** Relationship between share of workers commuting by bicycle or foot and share of population with diabetes: 50 US States and 47 of the 50 largest US cities, 2007.

# Modeling study in San Francisco

Increasing mean daily walking/cycling from 4-22 minutes daily would

Reduce diabetes and cardiovascular morbidity by 14%

Reduce traffic-related injury by 39%

Reduce GHG emissions by 14%

Increase annual bicycle fatalities by 5 total

Changing to low carbon fuels without change in driving patterns would

Reduce cardiovascular mortality by 1%

Reduce GHG emissions by 33%

Source: Maizlish N et al. Health co-benefits and transportation-related reductions in greenhouse gas emissions in the San Francisco Bay area. Am J Public Health. 2013;103:703–709.



# Emissions intensity is “decoupled” from economic growth in Nevada

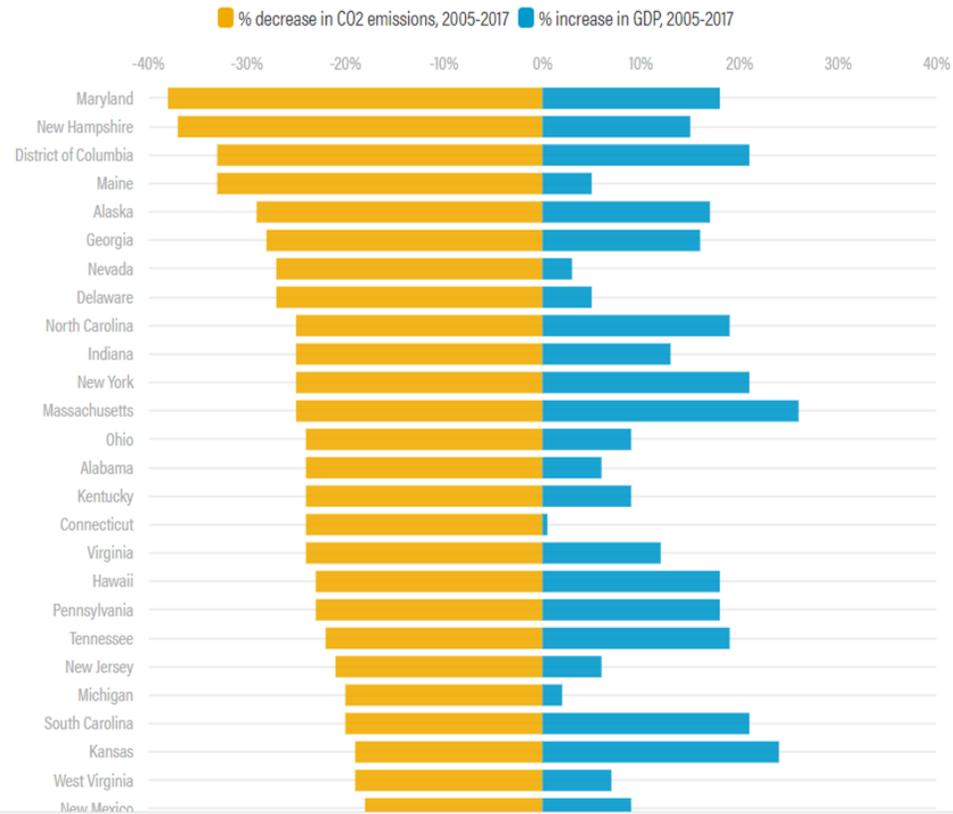


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## 41 U.S. States and Washington, D.C. Are Reducing Emissions While Growing GDP



# Reducing emissions saves money

## Clean Air Act

Saved 230,000 lives in 2020

Nearly \$2 trillion in cost savings 1990-2020

Financial benefits exceed costs of implementation by 30:1

## Paris Agreement

Reducing emissions to align US with Paris goals would save \$700 billion/year

And save 1.4 million US lives over 20 years

***Health benefits from cleaner air occur immediately, so cost savings are immediate.***

Sources: [epa.gov](http://epa.gov)

Drew Shindell, testimony to Congress Aug 2020



# NEVADA CLINICIANS FOR CLIMATE ACTION

We are health professionals around the state organizing to educate Nevadans about the harmful effects of climate change, advocate for reduced emissions of greenhouse gases, prepare for and mitigate the expected adverse health consequences.

[nvcliniciansforclimate.org](http://nvcliniciansforclimate.org)





# Health Benefits of Electric Vehicles

*Clark County Clean Cities*

**Melissa Ramos**

**Senior Manager**

**Clean Air Advocacy**

**[Melissa.ramos@lung.org](mailto:Melissa.ramos@lung.org)**

**February 23, 2023**



**3.6X**

People of color are 3 times more likely than white people to live in a county with 3 failing grades.



More than 4 in 10 Americans live in places with unhealthy levels of air pollution.

**For more info visit: [Lung.org/sota](https://Lung.org/sota)**

# Climate Change is a Health Emergency

- Longer, hotter heat waves
- More unhealthy ozone days
- More unhealthy particle pollution
- Extreme wildfires, drought, storms, flooding
- Longer, stronger allergy seasons
- Spread of infectious diseases



# How Air Quality Impacts Our Health

## Nevada Cities Rank Among the Top 25 Most Polluted Cities Lists

### LAS VEGAS

**11<sup>th</sup>**   
in most unhealthy  
ozone days.

**31<sup>st</sup>**   
in unhealthy particle  
pollution days.

### RENO

**21<sup>st</sup>**   
in most unhealthy  
ozone days.

**12<sup>th</sup>**   
in unhealthy particle  
pollution days.

## Air pollution can harm children and adults in many ways

### Respiratory

Wheezing and coughing  
Shortness of breath  
Asthma attacks  
Worsening COPD  
Lung cancer



### Other

Premature death  
Susceptibility to infections  
Heart attacks and strokes  
Impaired cognitive functioning  
Metabolic disorders  
Preterm births and low birth weight



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***NEW DETAILED REVIEW FINDS STRONGER LINKS BETWEEN  
ADVERSE HEALTH EFFECTS AND TRAFFIC POLLUTION***

*Expert Panel Reviewed More Than 350 Traffic Studies Spanning Forty Years.*

**BOSTON, MASSACHUSETTS, JUNE 22, 2022** – A comprehensive new scientific review released today by the Health Effects Institute (HEI) found growing confidence in the links between several adverse health effects and traffic related air pollution (TRAP). The review, the largest of its type to date, was conducted by a panel of thirteen renowned experts who evaluated 353 published scientific reports on traffic pollution and related health effects between 1980 and 2019.

Following HEI's widely cited 2010 TRAP report, HEI appointed a new panel in 2018 to evaluate evidence of long-term exposure to TRAP and selected adverse health outcomes. The panel found a high level of confidence that strong connections exist between TRAP and early death due to cardiovascular diseases. A strong link was also found between TRAP and lung cancer mortality, asthma onset in children and adults, and acute lower respiratory infections in children. Of the studies reviewed, 118 examined respiratory effects in children and included populations residing in a wide range of countries, with a majority based in Europe and North America.

"Traffic pollution clearly remains an important public health concern across the globe," said Hanna Boogaard, HEI Consulting Principal Scientist and member of the review panel. "This report provides the evidence to inform policymaker actions to mitigate the consequences of traffic pollution."

# HEI: Traffic Pollution Causes Early Death

The HEI panel found a high level of confidence that strong connections exist between traffic-related air pollution and **early death due to cardiovascular diseases**

A strong link was also found with **lung cancer mortality, asthma onset in children and adults, and acute lower respiratory infections in children.**

# • “Zeroing in on Healthy Air”

- **Key Assumptions**

- Transition to Zero-Emission Vehicles & Electricity Generation

- **Full Zero-Emission Vehicle Sales in the United States**

- 2035, 100% Passenger Vehicle Sales
- 2040, 100% Medium- and Heavy-Duty Vehicle Sales

- **National Power Grid**

- 2035, 100% Non-Combustion Electricity Generation

**For Nevada this transition could mean significant public health benefits, including:**

**\$7.5 Billion in public health benefits**

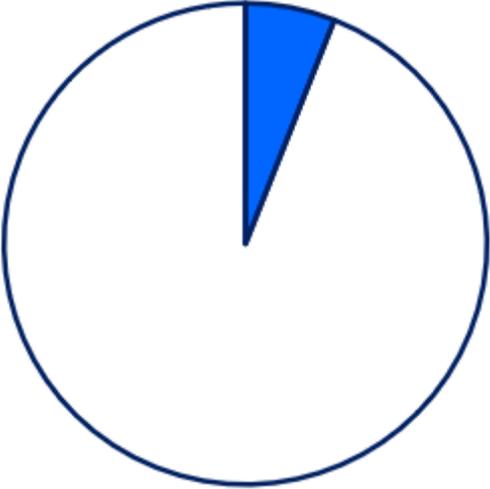
**676 avoided deaths**

**14,800 avoided asthma attacks**

**78,900 avoided lost work days**

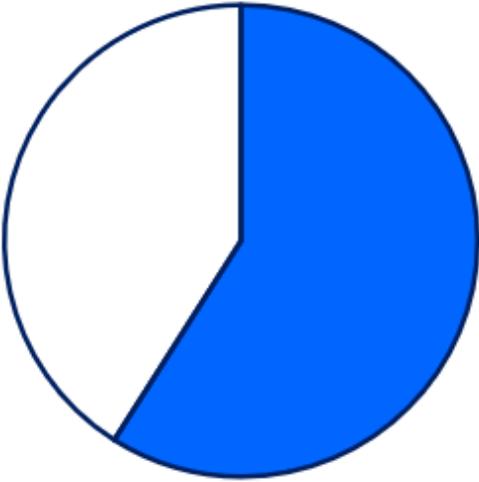
**Heavy-duty vehicles represent the dominant source of on-road emissions, but only a tiny fraction of the on-road population.**

**On-Road Vehicle Population**



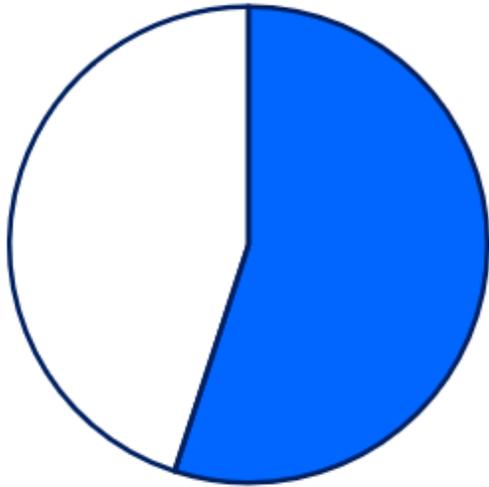
■ Trucks □ Other Vehicles

**On-Road NOx Emissions**



■ Trucks □ Other Vehicles

**On-Road Particle Emissions**



■ Trucks □ Other Vehicles

Source: [American Lung Association Zeroing in On Healthy Air](#) 2022

# US EPA: 72 Million live near truck freight routes

Communities near high-traffic roadways experience higher rates of numerous adverse health effects

72 million people live near truck freight routes in America

Residents of these communities are more likely to be people of color and have lower incomes

**Regulatory Announcement**

## Transportation and Environmental Justice

President Biden has directed the entire federal government and the Environmental Protection Agency (EPA) to prioritize protecting and investing in overburdened and underserved communities across America. EPA plays a leading role in delivering environmental and public benefits for communities with environmental justice (EJ) concerns through our policies, programs, and activities.

Pollution from the transportation sector has been a long-standing obstacle to advancing environmental justice, as many communities of color and low-income families live near areas where pollution from vehicles and engines is abundant, and therefore experience disproportionate exposures to this pollution.

EPA has a number of efforts underway to address pollution from the transportation sector.

### EPA's Comprehensive Approach to New Criteria and Greenhouse Gas Standards for Medium- and Heavy-Duty Trucks

As identified in President Biden's Executive Order 14037, *Strengthening American Leadership in Clean Cars and Trucks*, over the next three years EPA plans to issue a series of regulations to reduce pollution from trucks and buses and to harness improvements in vehicle technologies. EPA's "Clean Trucks Plan" would result in significant emissions reductions from new medium- and heavy-duty vehicles and will be a major step towards improving air quality and addressing the climate crisis.

The regulatory actions that make up the Clean Trucks Plan are as follows:

 United States Environmental Protection Agency

Office of Transportation and Air Quality  
EPA-420-F-22-008  
March 2022

# “Delivering Clean Air”

- **Full Zero-Emission Truck Sales in the United States**
  - 2040, 100% Medium- and Heavy-Duty Vehicle Sales
- **National Power Grid**
  - 2035, 100% Non-Combustion Electricity Generation
- **US Counties with Major Truck Routes**
  - Minimum 8,500 truck trips per day

## Nevada Public Health Benefits of MHD Electrification

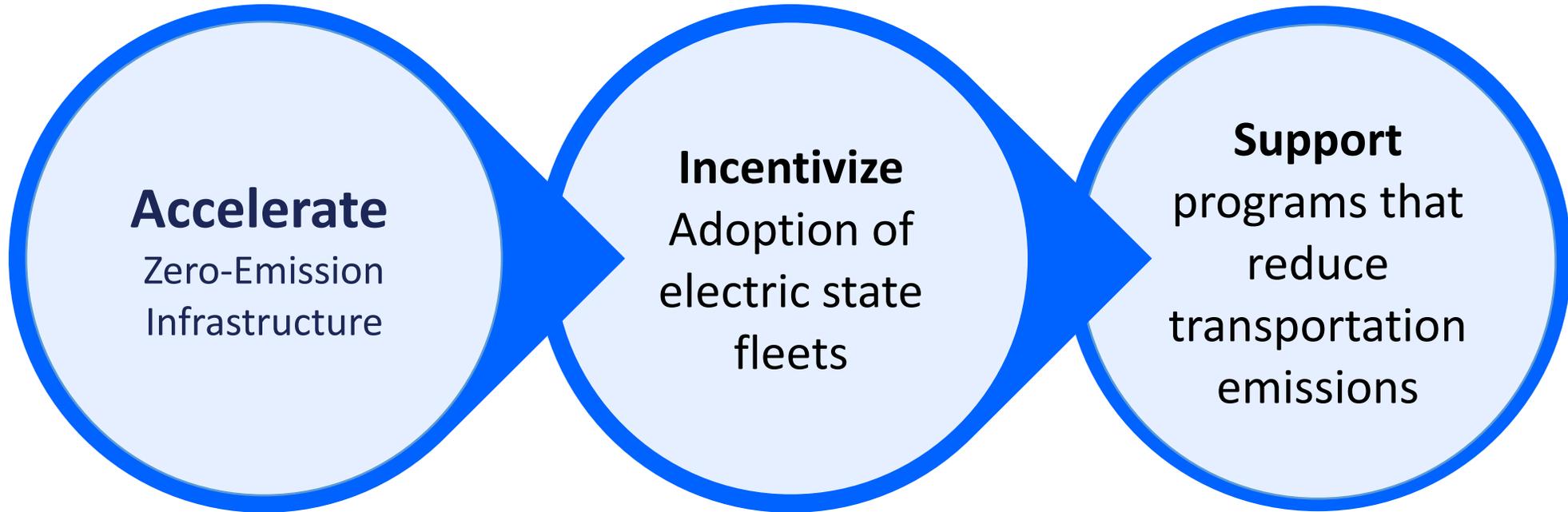
**\$5.2 billion  
in public  
health  
benefits**

**56,722 lost work  
days avoided**

**10,569  
asthma  
attacks  
avoided**

**474  
premature  
deaths  
avoided**

# Key Nevada Policies for Clean Air



For more info visit: [Lung.org/ev](https://Lung.org/ev)



# QUESTIONS?



## UPCOMING

- March 23: Idling Webinar
  - Justin Mahana, Southwest Gas
  - Norma Havens, USA Fleet Solutions
  - Ron Zima, Go Idle Free
- April 20: In-Person Meeting
  - Meeting and networking event
  - “Electric Avenue” Expo
  - Be sure to RSVP!





# THANK YOU!

NICOLE WARGO, CLARK COUNTY SUSTAINABILITY FELLOW

CLEAN CITIES COALITION

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Clean Cities Webpage



April 20 Event