

A large commercial airplane is positioned on a runway, viewed from a low angle looking down the length of the runway. The sky is filled with scattered white clouds against a blue background. The runway has white dashed lines in the center and solid lines on the sides, leading towards the horizon. The overall scene is dimly lit, suggesting either dawn or dusk.

# Community Health and Airport Operations-Related Noise and Air Pollution

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# Understanding the community health effects of pollution related to Seattle-Tacoma International Airport (SeaTac) operations

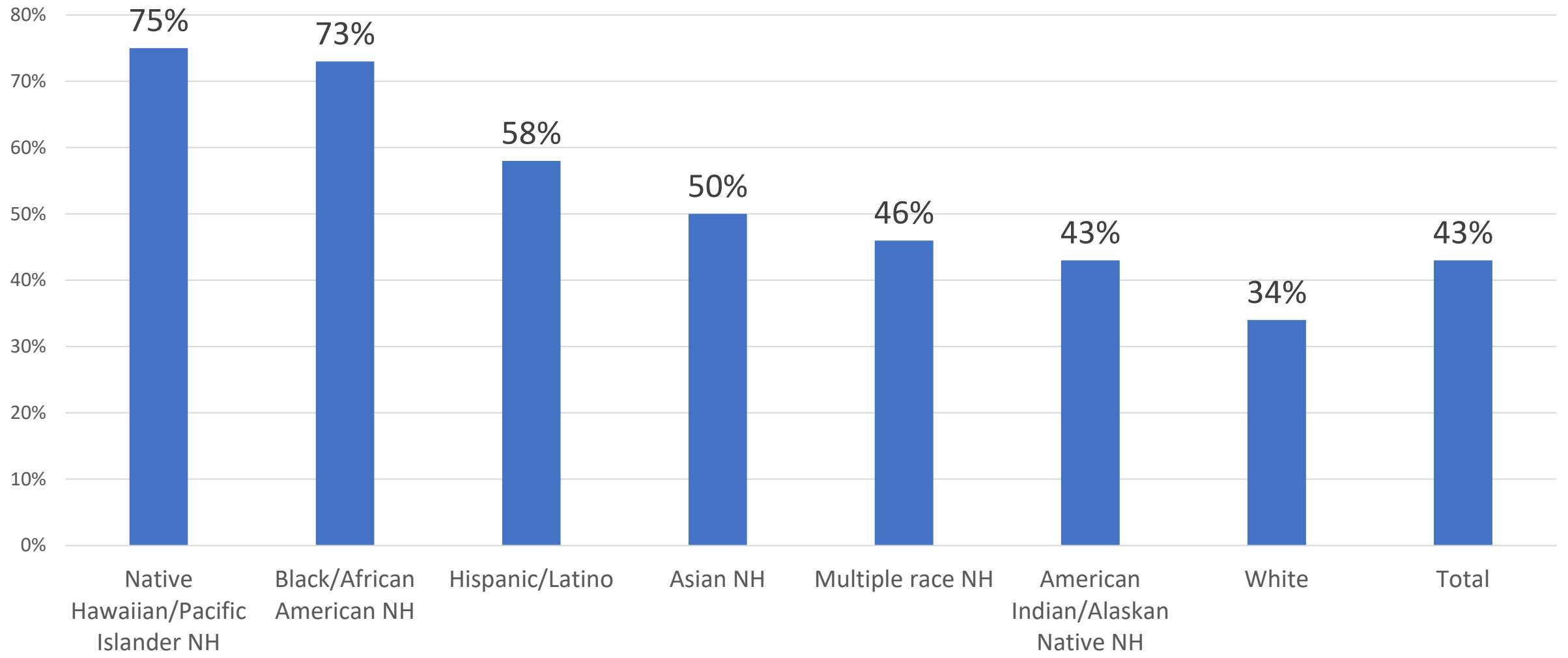
- Airport community health profiles
- Strength of evidence to date
- UW School of Public Health Study on UFP
- Recommendations to address health issues





# The airport communities are home to a majority of King County's people of color

Percent of King County Population by Race/Ethnicity, 2014-2018 Average



A photograph of an airplane flying over a town with mountains in the background. The sky is blue with some clouds, and the mountains are covered in snow. The town below has some buildings and trees.

# WHAT IS THE HEALTH OF AIRPORT COMMUNITIES COMPARED TO THE REST OF KING COUNTY?

Compared to the rest of the county, people in airport communities face disparities in

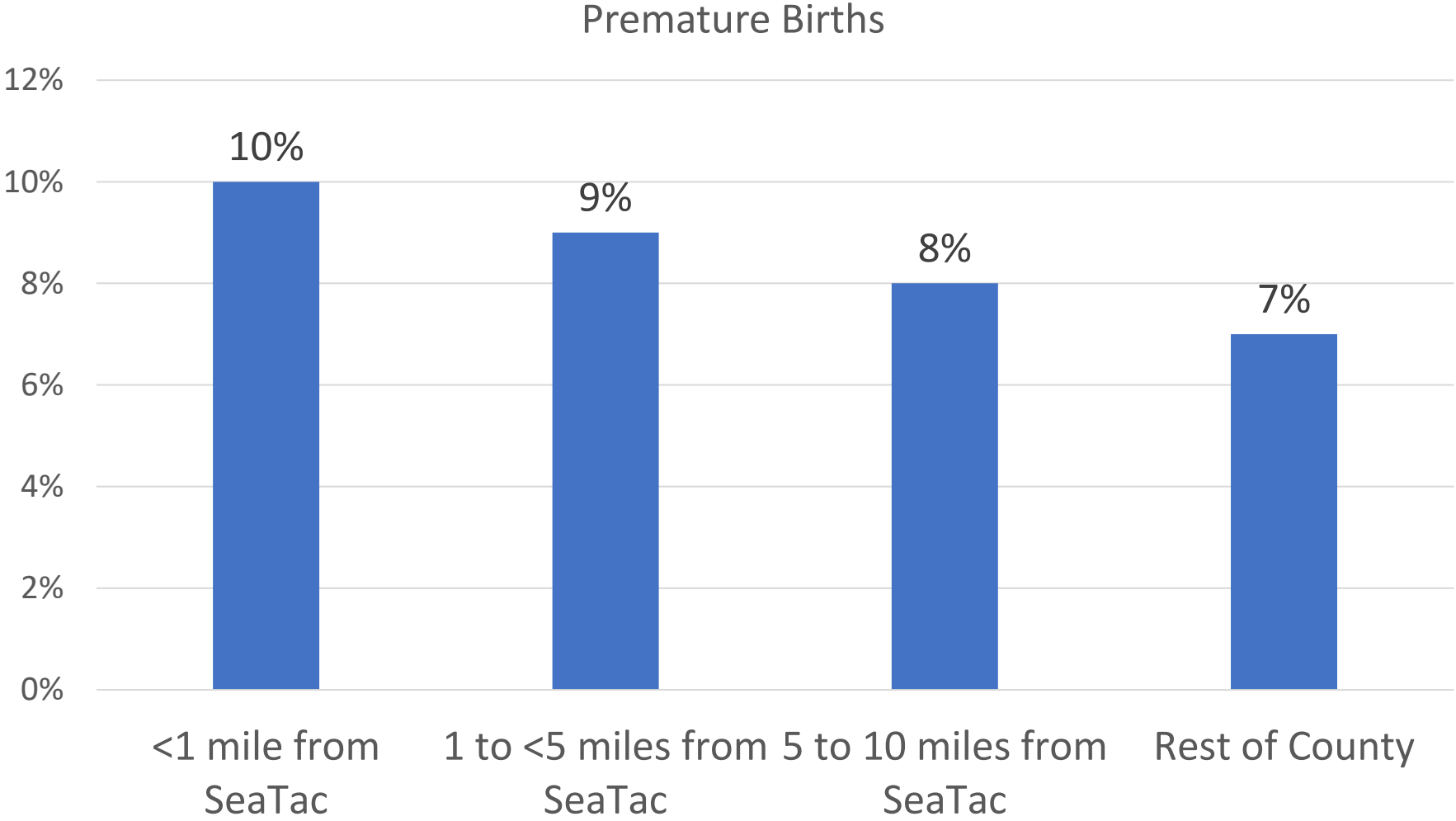
- Health
- Health risk factors
- Resources

For some measures, health outcomes worsened with proximity to airport

- Hospitalization rates for heart disease
- Rate of death from all causes
- Rate of death from heart disease
- Life expectancy (2-5 years lower for airport communities)

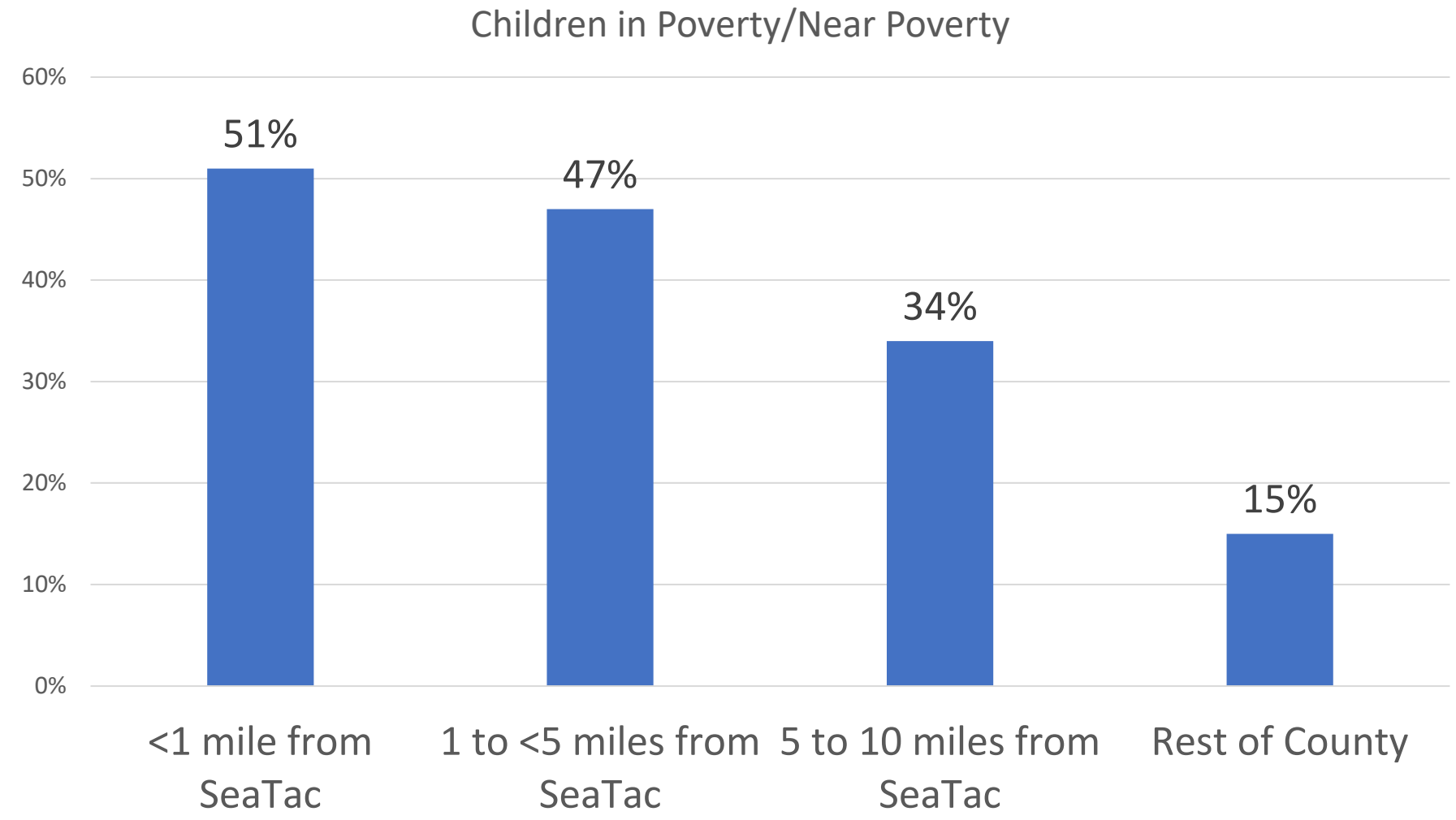


# Mothers in airport communities were 43% more likely to have a premature birth than the rest of King County



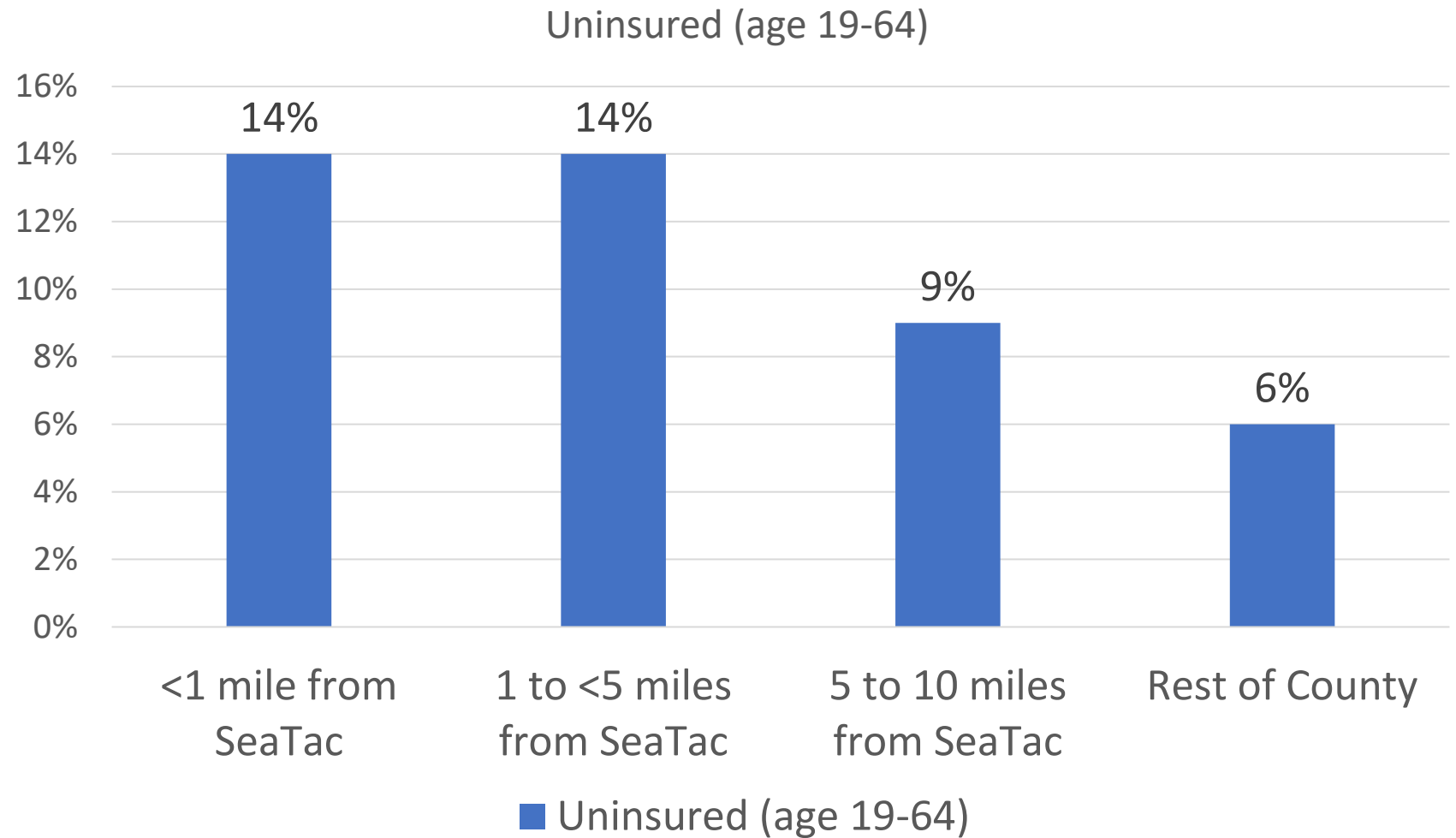


# Airport communities had twice as many children living in poverty or near poverty than the rest of King County



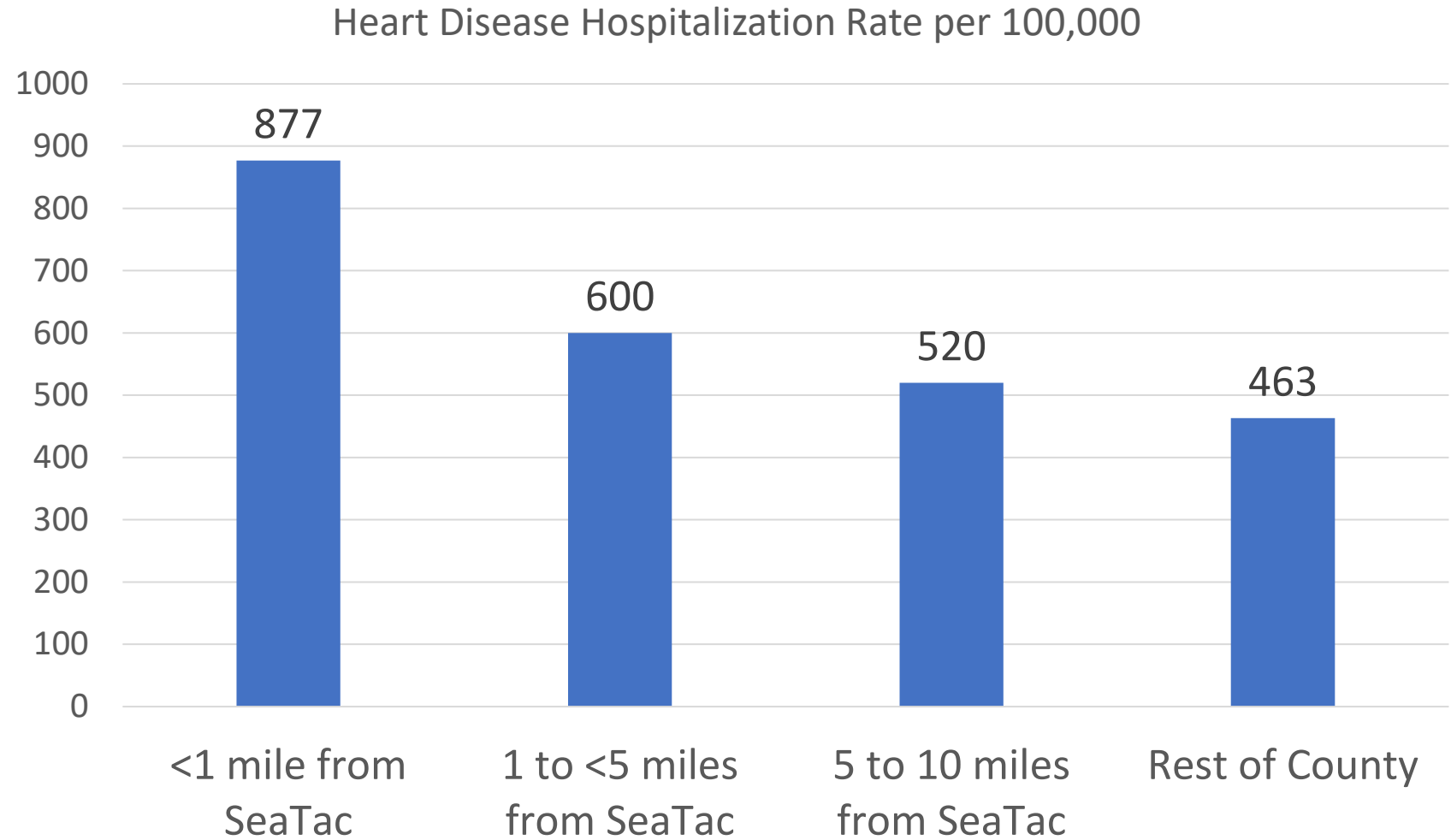
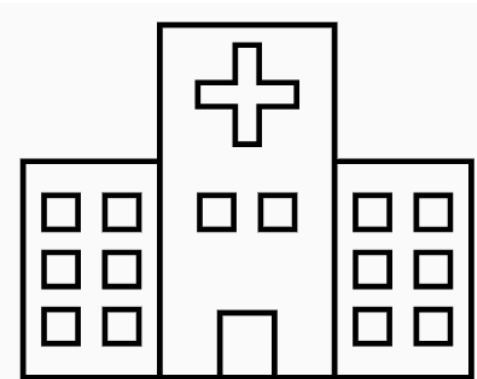
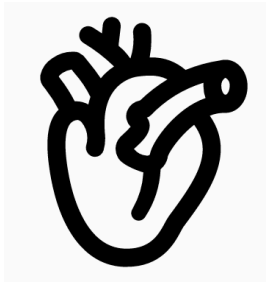


# Adults were more likely to be uninsured in airport communities than in the rest of King County





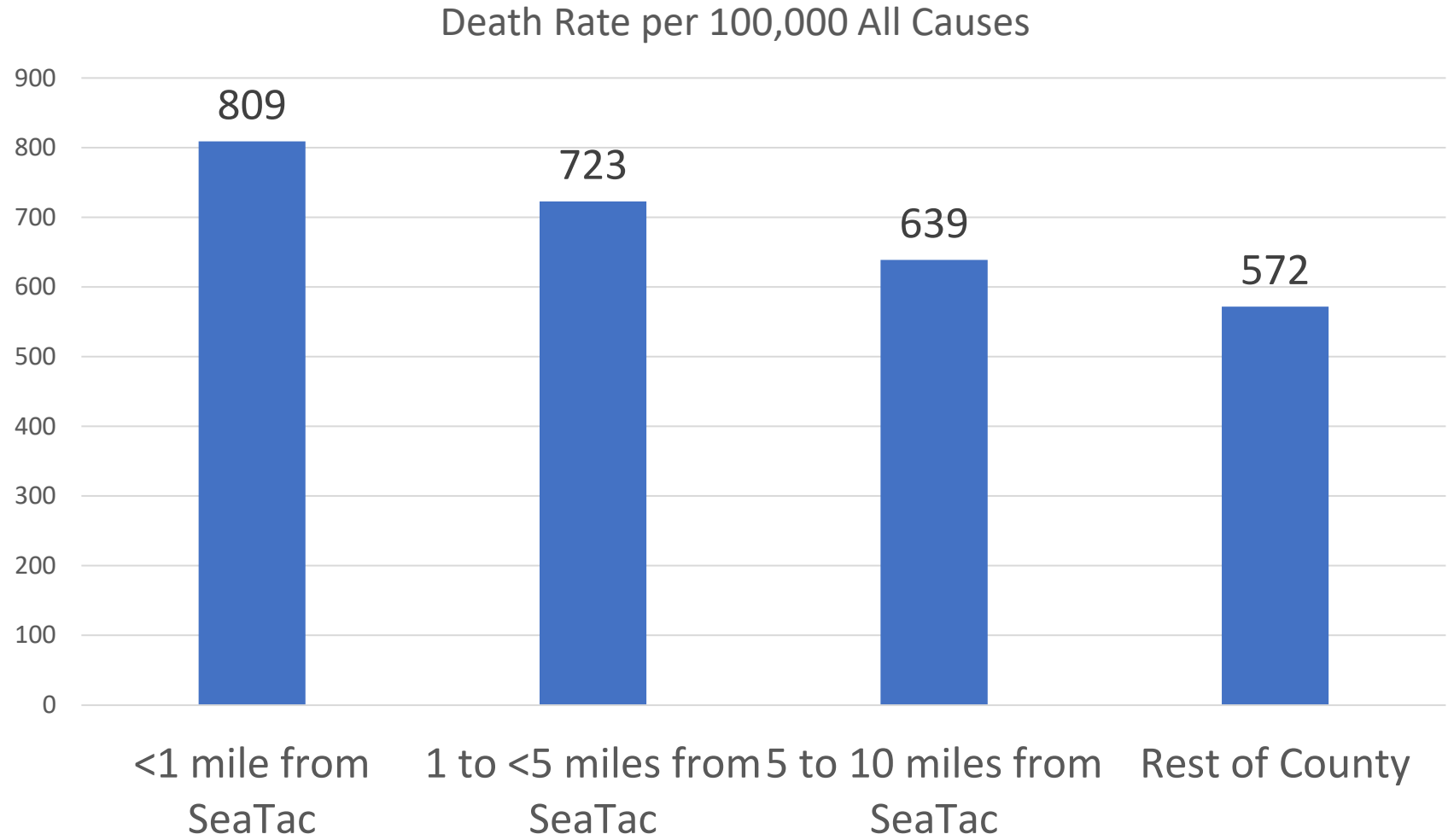
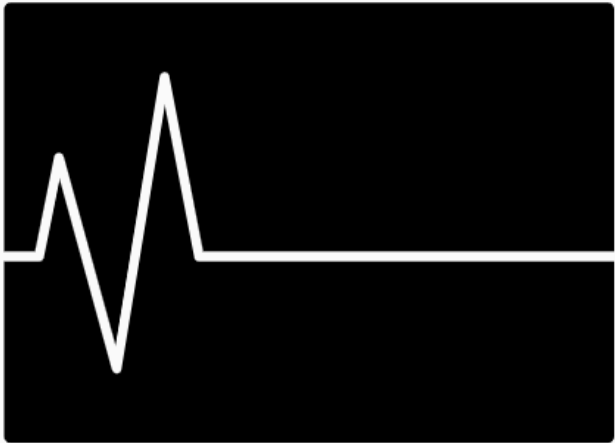
# Airport communities had a higher rate of hospitalization from heart disease than the rest of King County







# Airport communities had a higher rate of death than the rest of King County



# WHAT POLLUTANTS RESULT FROM AIRPORT OPERATIONS AND WHAT ARE THE LIKELY HEALTH IMPACTS?

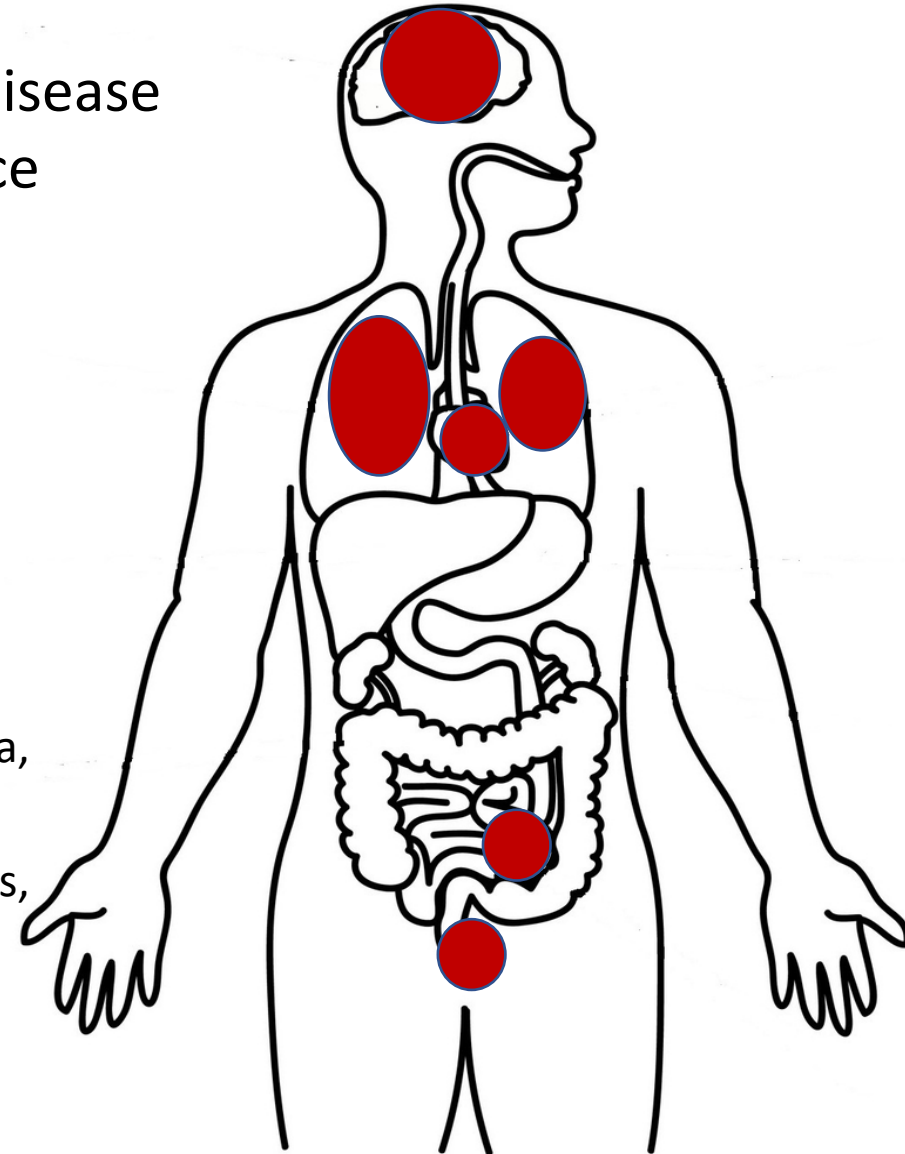
## Airport-related Pollutants and Their Likely Health Effects

### Noise pollution

- Hypertension & Heart disease
- Poor school performance among children

### Air pollution

- Respiratory problems (asthma, respiratory diseases)
- Cardiovascular issues (Hypertension, heart disease/attack, stroke)
- Nervous system (dementia, oxidative stress)
- Metabolic issues (Diabetes, metabolic syndrome)
- Reproductive health concerns



# ARE COMMUNITIES NEAR AIRPORTS EXPOSED TO NOISE AND AIR POLLUTION FROM AIRPORT OPERATIONS?

## We need to know more about exposure

- Several studies in urban areas identified noise and air pollution related to airports and adverse health effects
- 2018 Beacon Hill study showed that >50% of 24-hour day-night avg noise levels over 65 [dB](#) (WHO recommends 45 dB).
- 2019 Puget Sound Clean Air Agency report shows particulate matter levels over EPA-recommended levels 22 days in winter

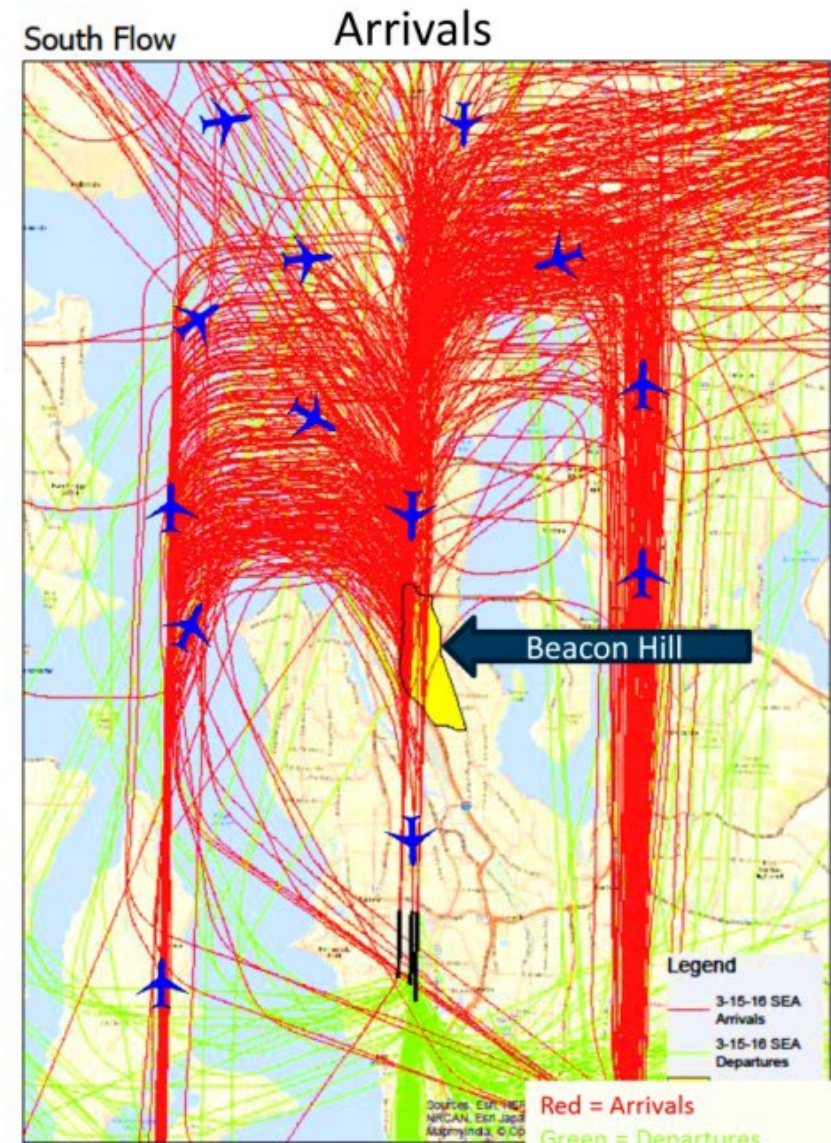
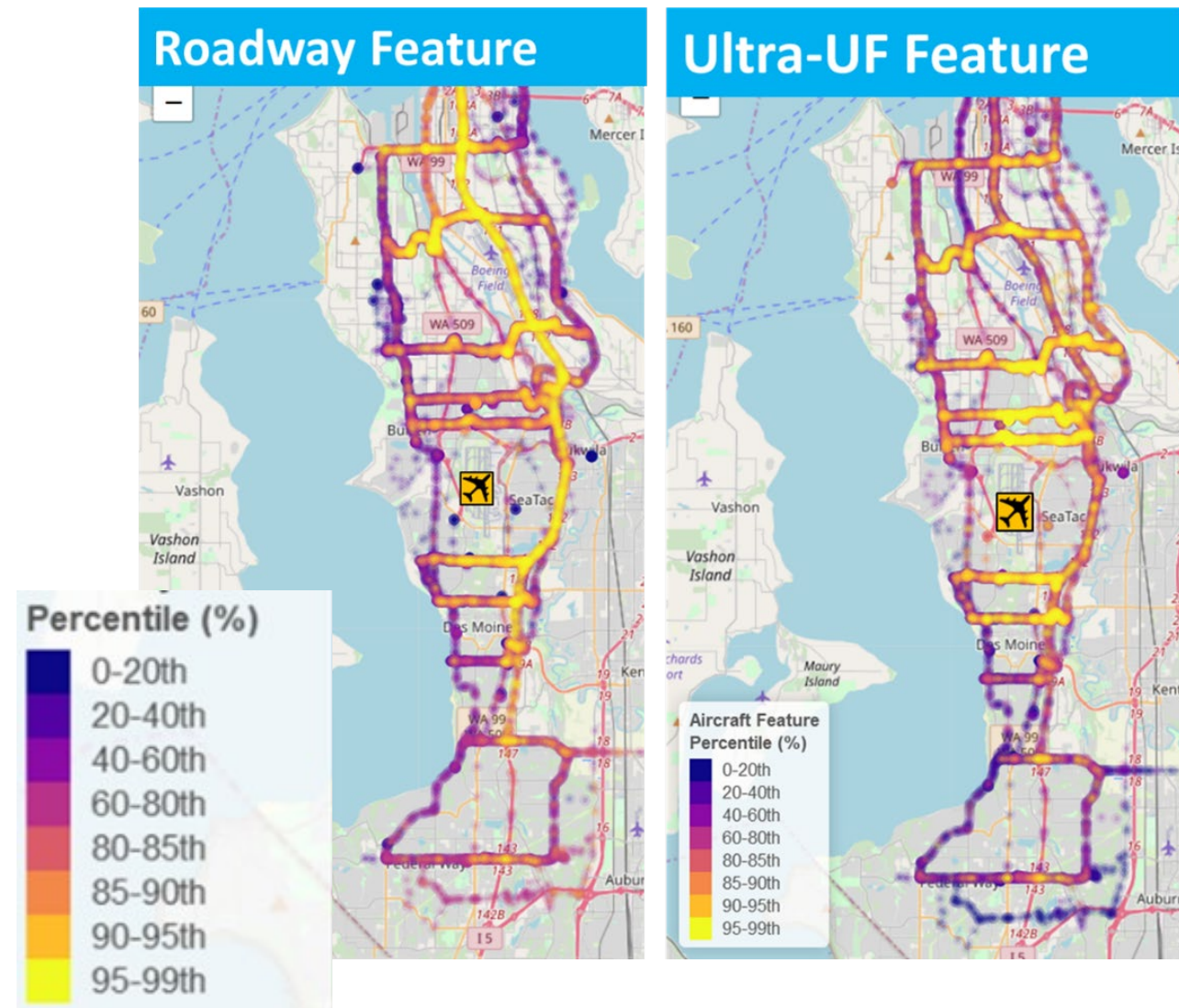


Figure 3. Arrival flight paths for Seattle-Tacoma International Airport. Beacon Hill neighborhood in yellow. Airport runways shown as two black lines center-bottom of image.

# University of Washington air pollution study near SeaTac: Ultrafine particles (UFP) are emitted from both traffic and aircraft sources

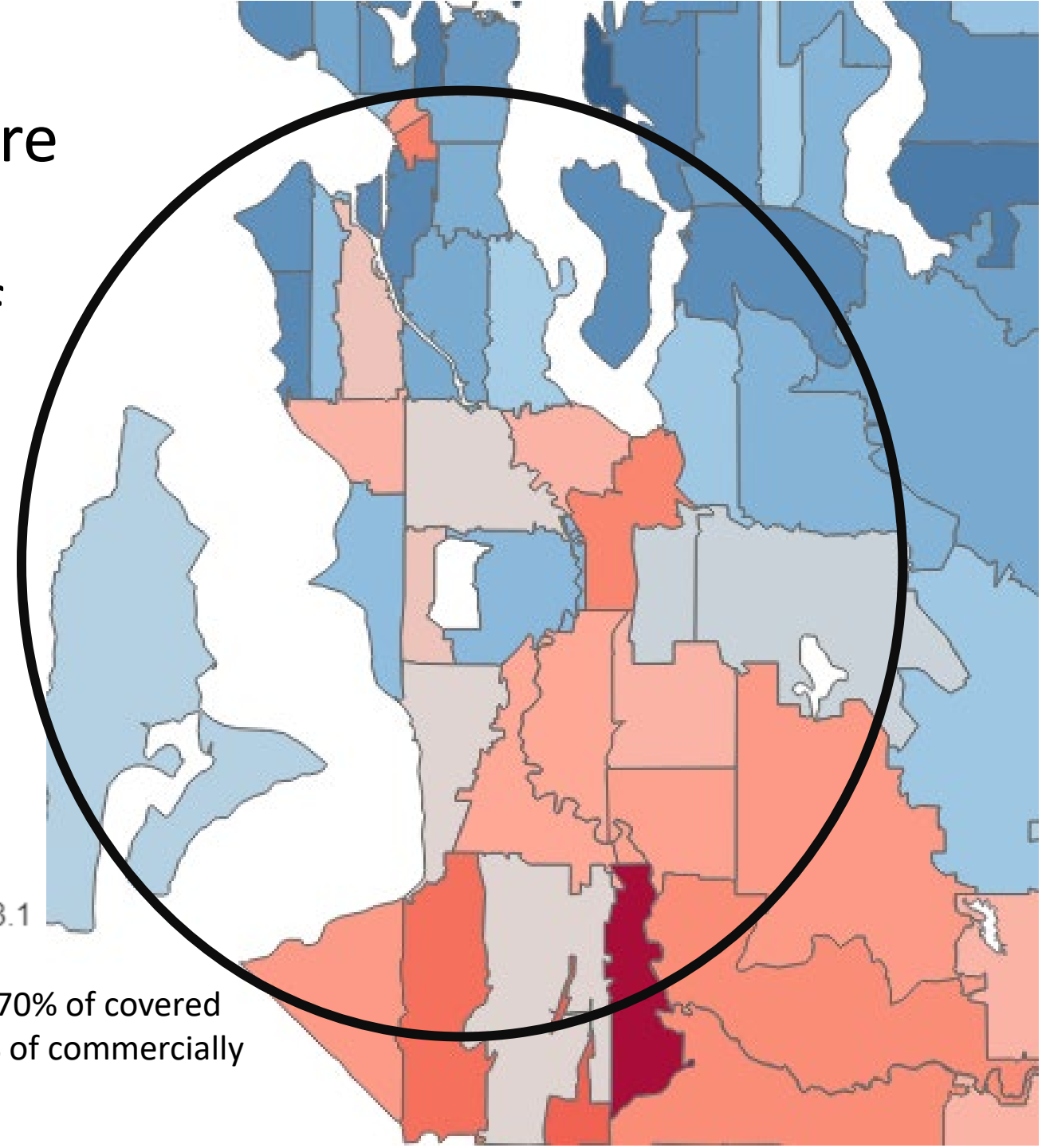
- Ultrafine particles (UFP) emitted from traffic and aircraft sources
- Particle size distribution and black carbon concentration distinguish source
- Subsequent studies showed:
  - air pollution concentrations inside of schools near SeaTac mirrored outside concentrations
  - Portable HEPA air purifier units reduced air pollution concentrations in classrooms



# Airport community residents are more likely to have health conditions that increase risk of pollutants' adverse effects

- Map shows percentage of residents with asthma by zipcode, all ages
- Similar pattern for residents with asthma and above average use of acute care

Color legend

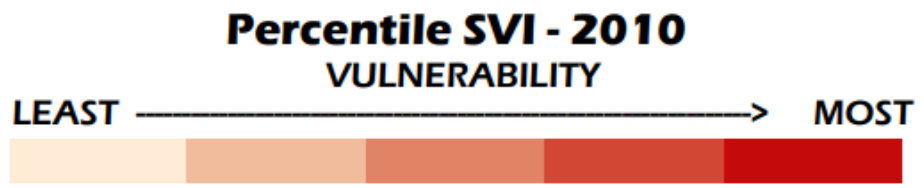


Data source: WA all payer claims data, 2017; covers roughly 70% of covered residents, 100% of Medicaid and Medicare markets and 50% of commercially insured market.

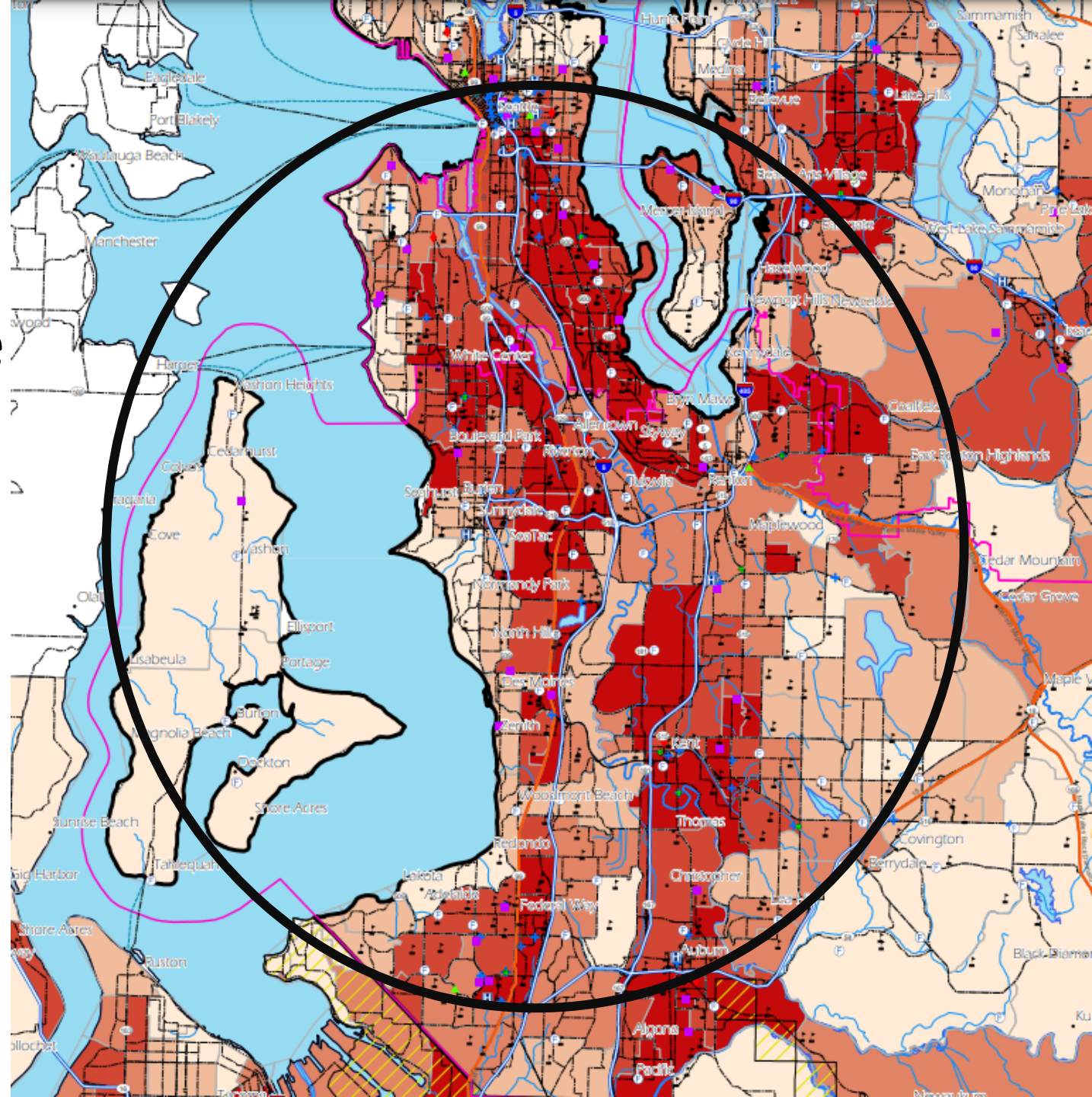
# Airport community residents are more likely to face multiple social vulnerabilities and resource disparities

Social vulnerability index based on:

- Socioeconomic Status,
- Household Composition/Disability,
- Minority Status/Language, Housing/Transportation information.



Data sources: 2010 U.S. Census count; American Community Survey 2006-2010 (5 year).

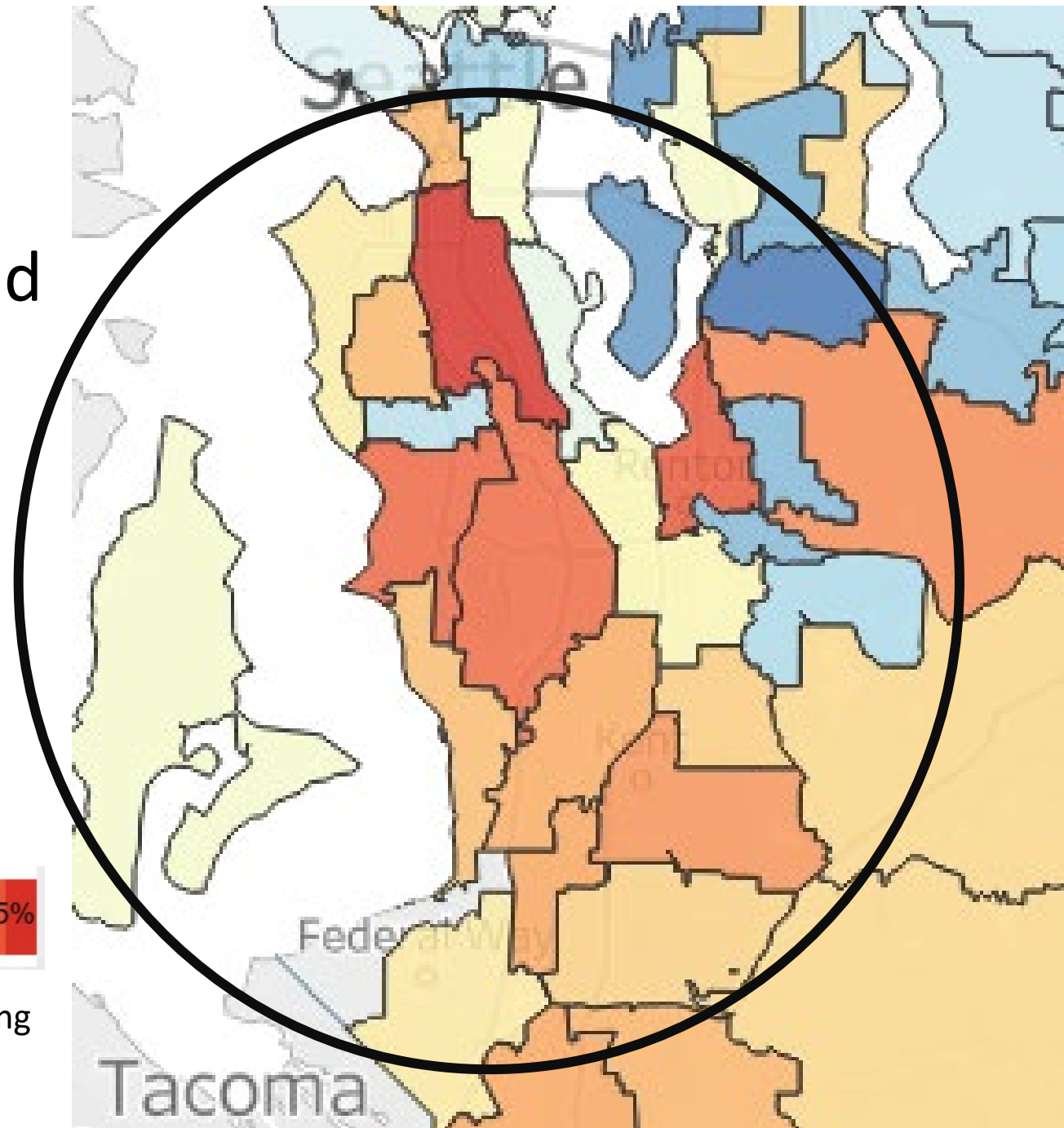


# Adults living in south King County are more likely to experience food insecurity and other resource disparities

- Map shows percentage of adults reporting not enough food to last and didn't have money to get more in last year
- Similar pattern for low food access (food store between 1-10 miles away, among other measures) based on USDA analysis



Data source: WA Behavioral Risk Surveillance System; King County 2018, 2019, 2020 averages.





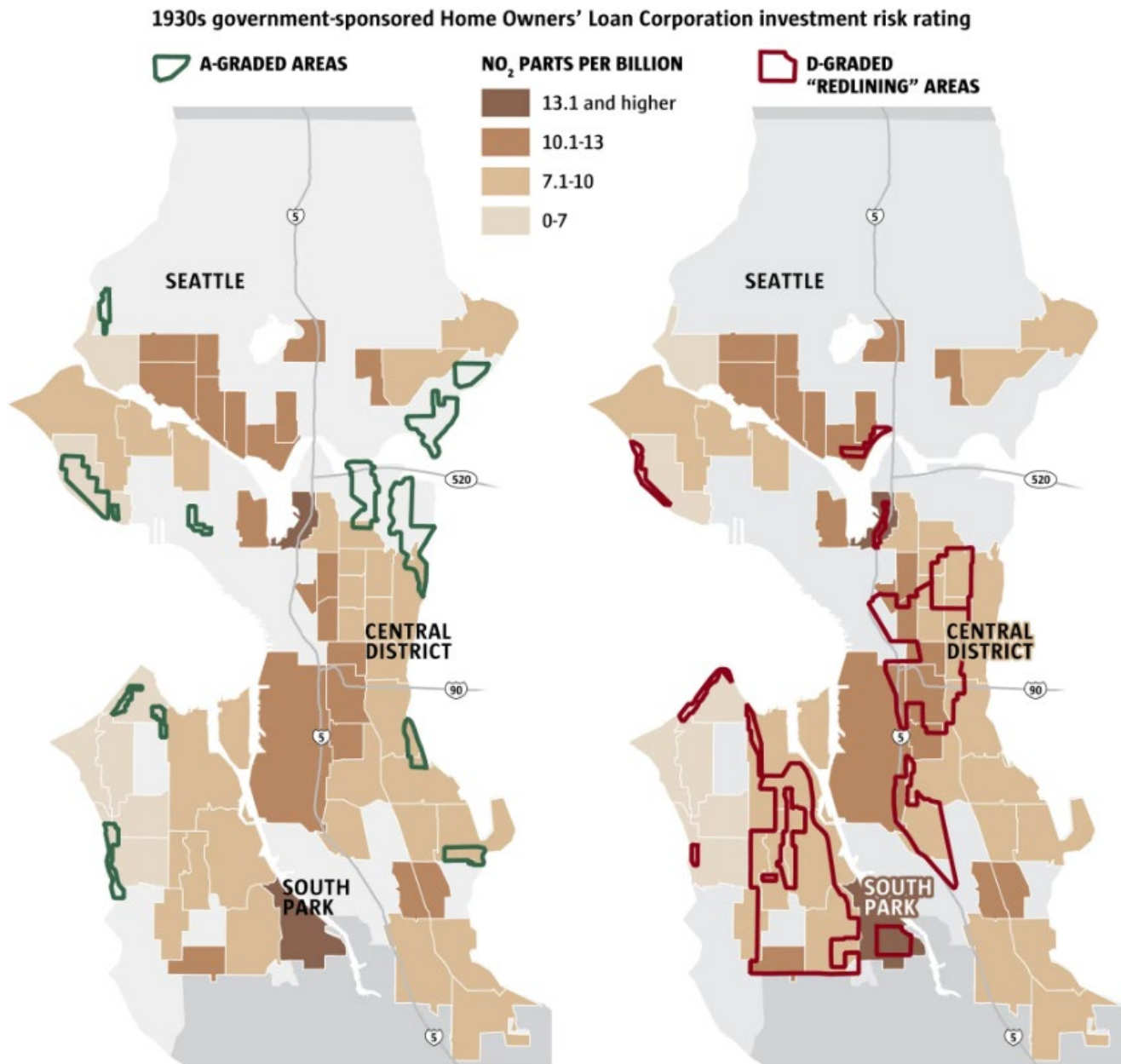
# These cumulative effects have systemic roots

Historical practices (housing redlining for example) and systemic racism underlie the disparities.

Historic and current trauma often result in chronic stress which can lead to adverse health effects like hypertension, other heart conditions, and mental health concerns.

## New study links historic redlining and air pollution in American cities

New research has revealed how the discriminatory and often racist practice of redlining that started nearly a century ago influenced who suffers the worst from air pollution in U.S. cities today.



Source: Lane, Haley M., et al., "Historical Redlining Is Associated with Present-Day Air Pollution Disparities in U.S. Cities," *Environmental Science and Technology Letters*.

EMILY M. ENG / THE SEATTLE TIMES



# THE HEALTH OF AIRPORT COMMUNITIES

A photograph of an airplane flying over a town with mountains in the background. The airplane is white with a red tail and is flying towards the left. The town is visible in the foreground, and the mountains are in the background under a cloudy sky.

## SUMMARY

People in airport communities are:

- More likely to be exposed to air pollution.
- More likely to have health conditions that increase risk of pollutants' adverse effects.
- More likely to face health and resource disparities.

These vulnerabilities increase our responsibility to prevent and mitigate harm from pollution exposures.



# THE HEALTH OF AIRPORT COMMUNITIES

## RECOMMENDATIONS

- Address the health disparities of airport communities
- Mitigate the health impacts of airport operations
- Continue development and implementation of strategies to mitigate airport-related air and noise pollution
- Implement new technologies to improve measurement of exposures indoors and outdoors
- Expand the systematic monitoring of pollutants (both outdoor and indoor exposures) in residences, schools, childcare settings, and long-term care facilities
- Support research to address gaps in knowledge