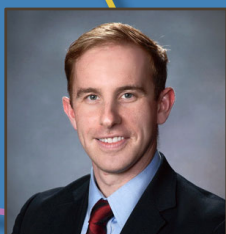




DEANNA GORGEI, MD
PGY-1, ChristianaCare Family Medicine Resident

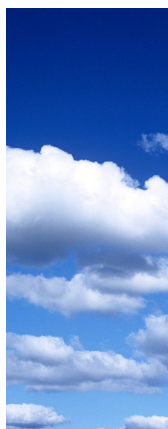


DELAWARE ACADEMY OF
FAMILY PHYSICIANS



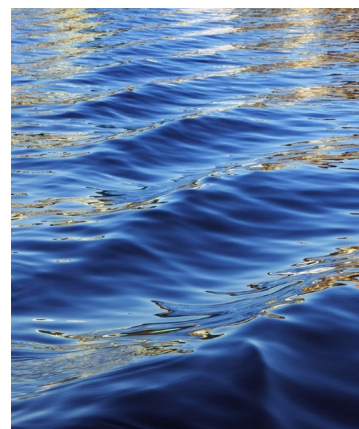
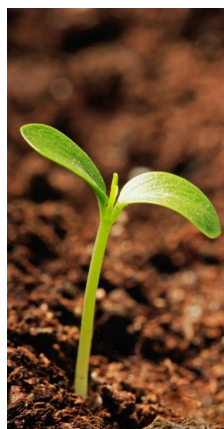
ROBERT RIES, MD
PGY-1, ChristianaCare Family Medicine Resident

A Review of Air Pollutant Effects on Asthma: How Can Health Systems Intervene?



A Review of Air Pollutant Effects on Asthma: How Can Health Systems Intervene?

Deanna Gorgei DO, Robert Ries MD
DAFP Conference 2023



DISCLOSURE

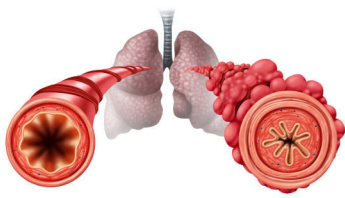
- Dr. Deanna Gorgei and Dr. Robert Ries have no financial relationships in conflict with this activity.

A Review of Air Pollutant Effects on Asthma: How Can Health Systems Intervene?

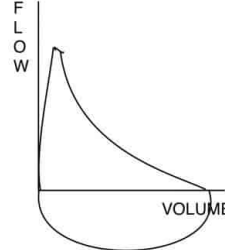
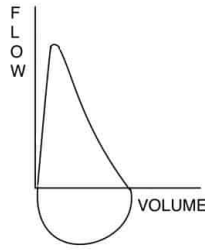
- Review asthma epidemiology, pathophysiology, and clinical features
- Define different types of environmental pollutants
- Explore relationship between environmental pollutants and asthma
- Understand mechanism of environmental pollutants on asthma
- Discuss possible interventions by health systems to improve asthma outcomes



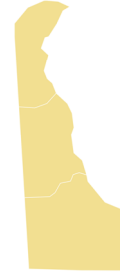
Asthma: Introduction



Environmental factors causing chronic airway inflammation: episodic cough, wheezing, dyspnea, chest tightness

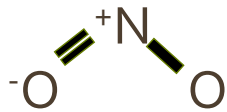


Intermittent expiratory airflow limitation; reversible with bronchodilator therapy

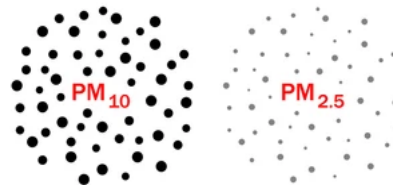


Disproportionately high morbidity and mortality in lower socioeconomic status and minorities

Environmental Pollutants



Nitrogen Dioxide (NO₂)



Particulate Matter (PM)

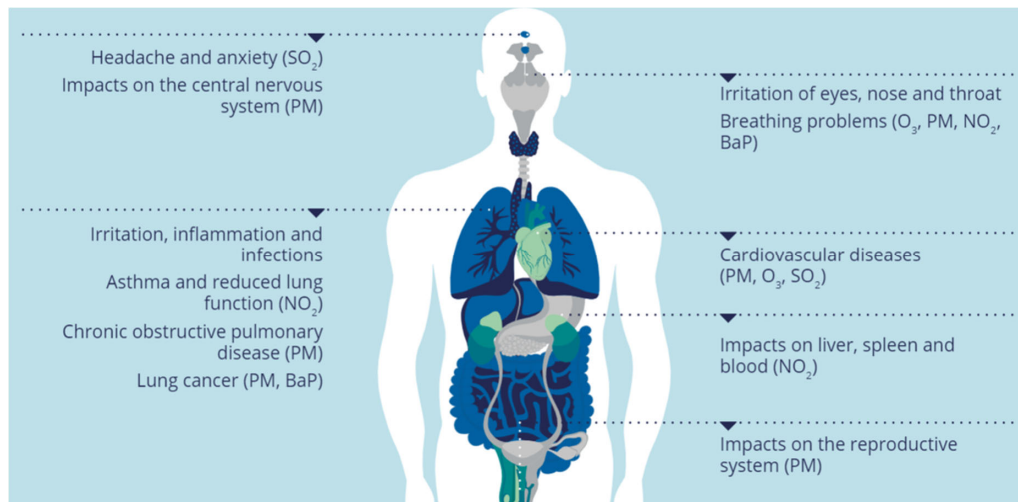


Volatile Organic Compounds (VOCs)



Ozone (O₃)

Impact of Air Pollution on Health



Relationship Between Air Pollution and Asthma

Long-term exposure to traffic-related air pollution and selected health outcomes: A systematic review and meta-analysis. *Environment International*. 2022

- Exposure to TRAP associated with asthma onset in children and adults

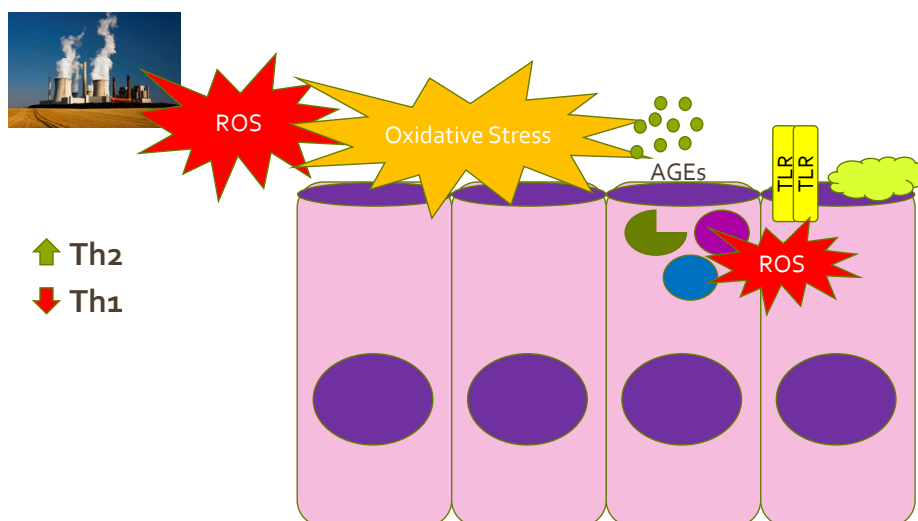
Outdoor Air Pollution and New-Onset Airway Disease. *Annals of the American Thoracic Society*. 2020

- Review of the evidence consistent with a causal link between long term air pollution exposure and new childhood asthma

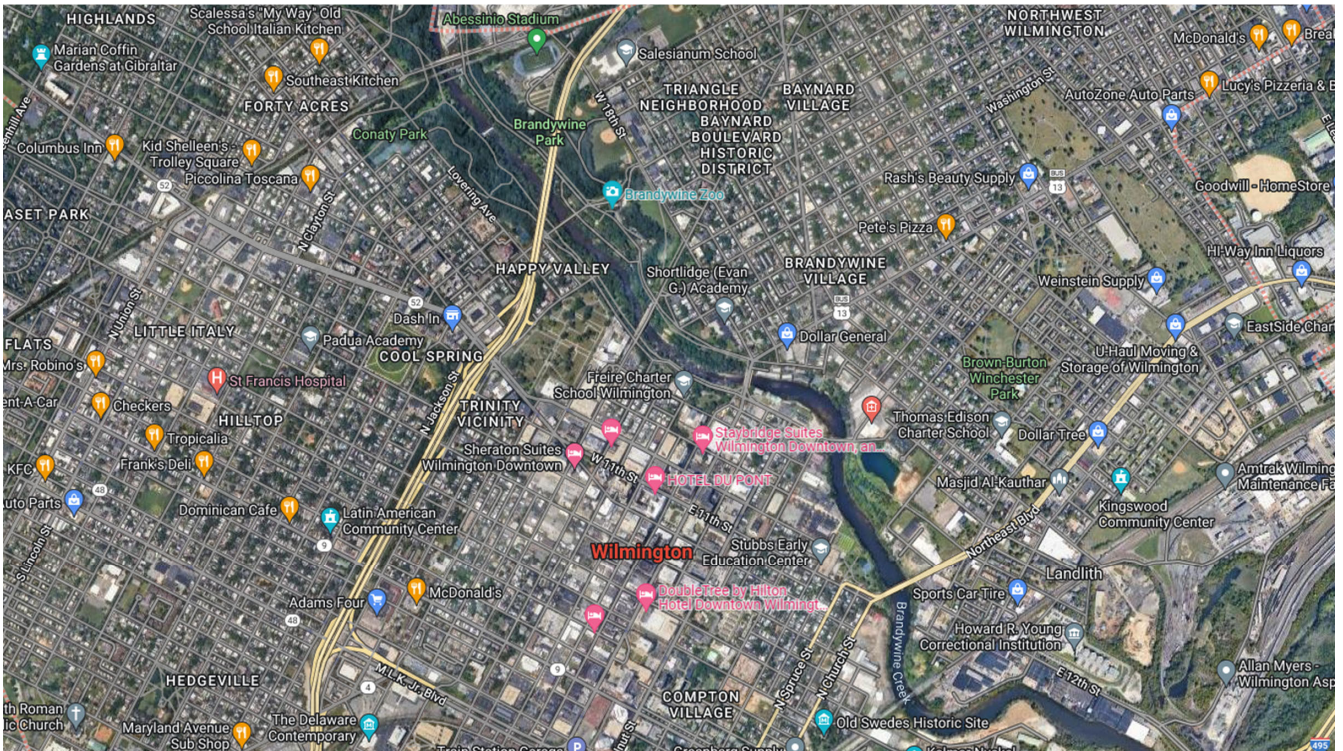
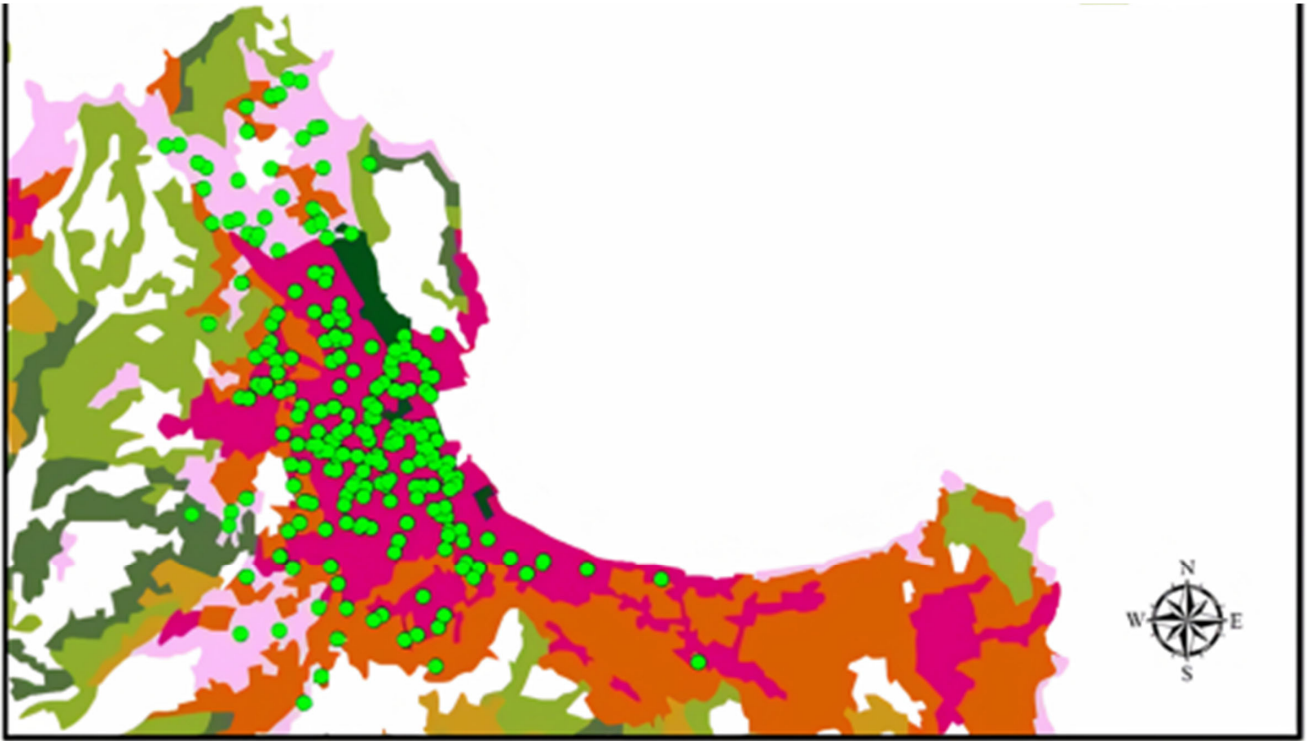
Acute effect of Air Pollution on Asthma Mortality. *American Journal of Respiratory Critical Care Medicine*. 2019

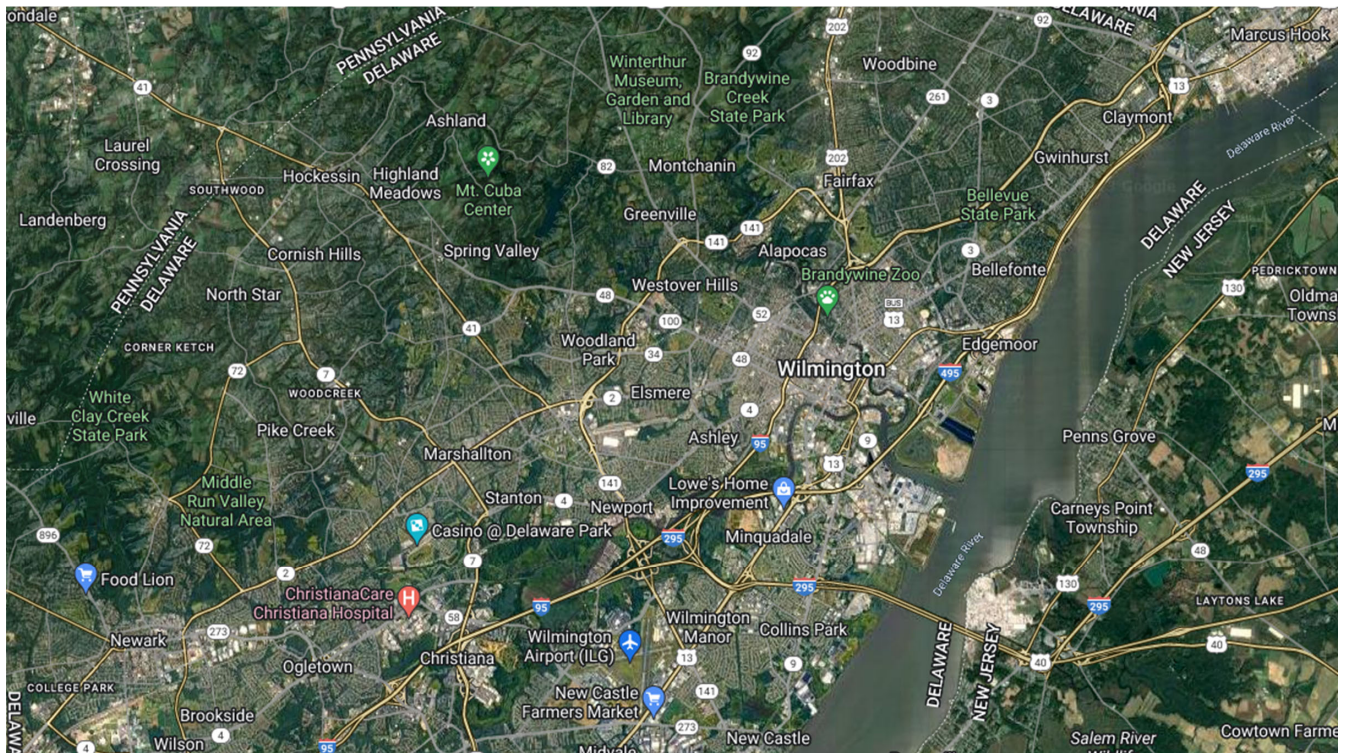
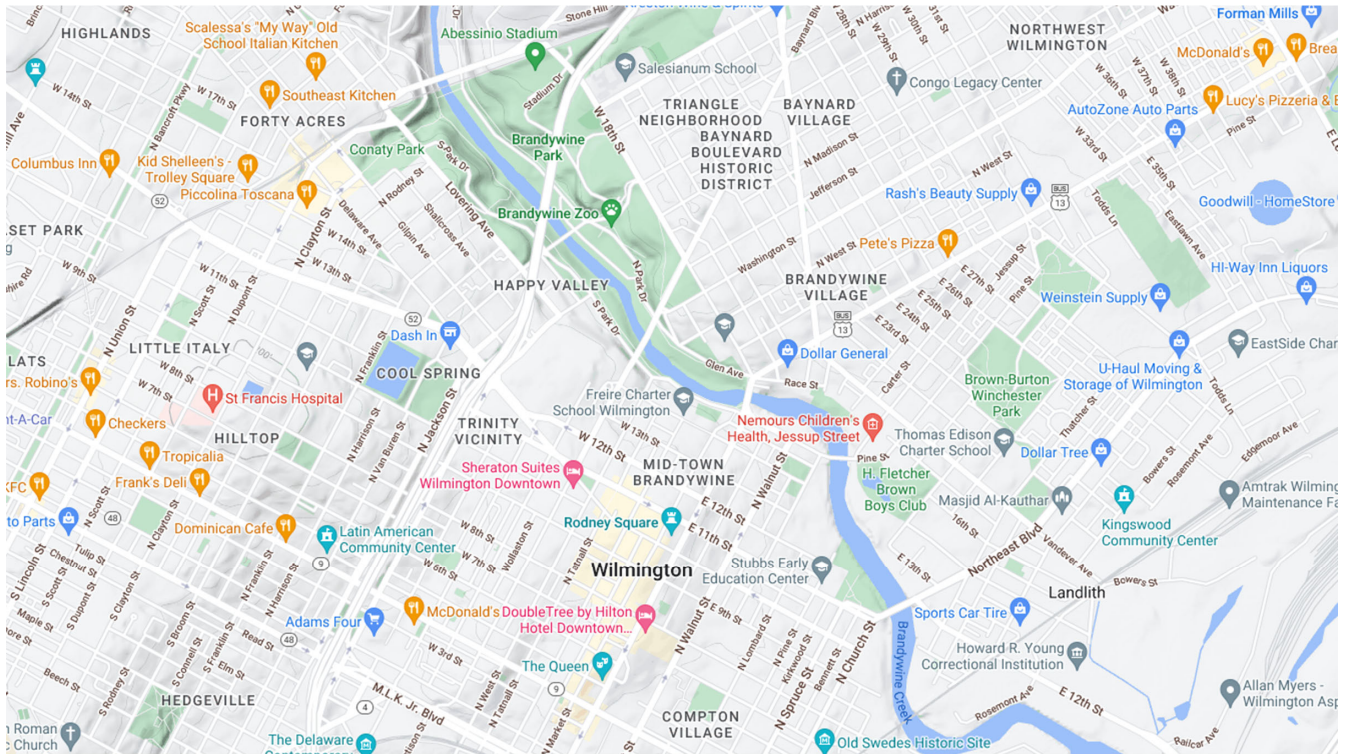
- Short term exposure to $\text{PM}_{2.5}$, NO_2 , O_3 may increase asthma mortality risk

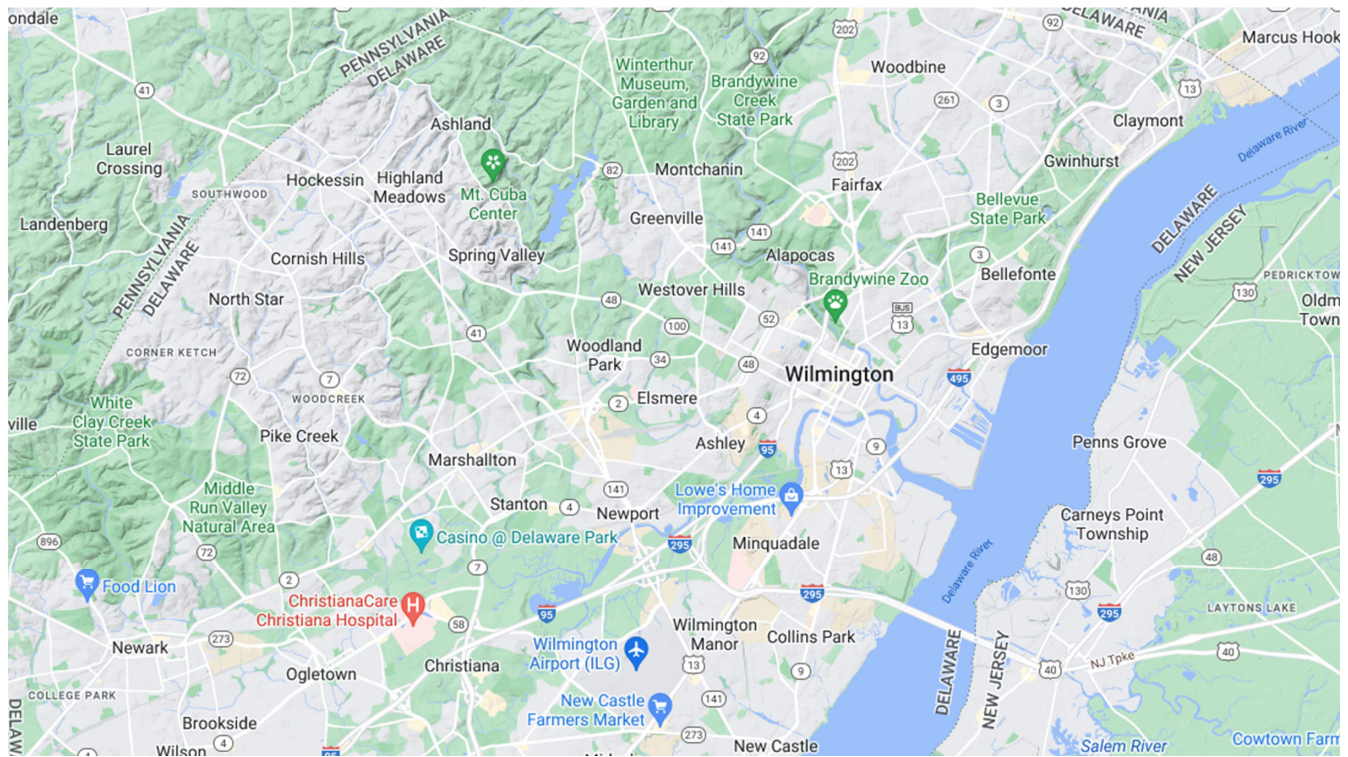
Mechanism of Environmental Pollutants on Asthma



- Longitudinal prospective cohort study (Palermo Italy) 2015-2018
 - 179 children ages 5-16 were recruited
 - Assessed asthma control and environmental exposures
 - Land use regression model based on residential address, using geographic information systems (GIS) to predict NO₂ exposure
 - Controlled asthma (C) vs uncontrolled asthma (UA) based on symptom persistence, ICS dose, and spirometry
 - Low Normalized Difference Vegetation Index (NDVI) was a risk factor for uncontrolled index (OR 3.715, 95% CI 1.108-12.454)

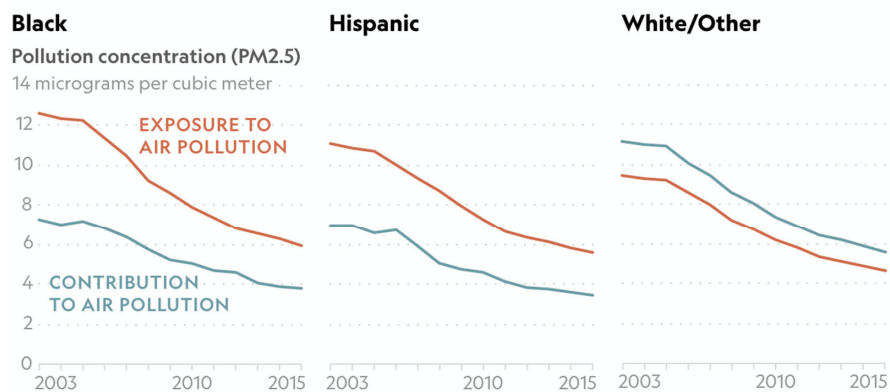






Inequities in Exposure and Health Outcomes

Average per person contribution and exposure to air pollution by race/ethnicity*



*Group population-adjusted

Taylor Maggiacomo, NGM Staff

Sources: Jason Hill, University of Minnesota; Chris Tessum, University of Illinois

How can Healthcare Systems Intervene?



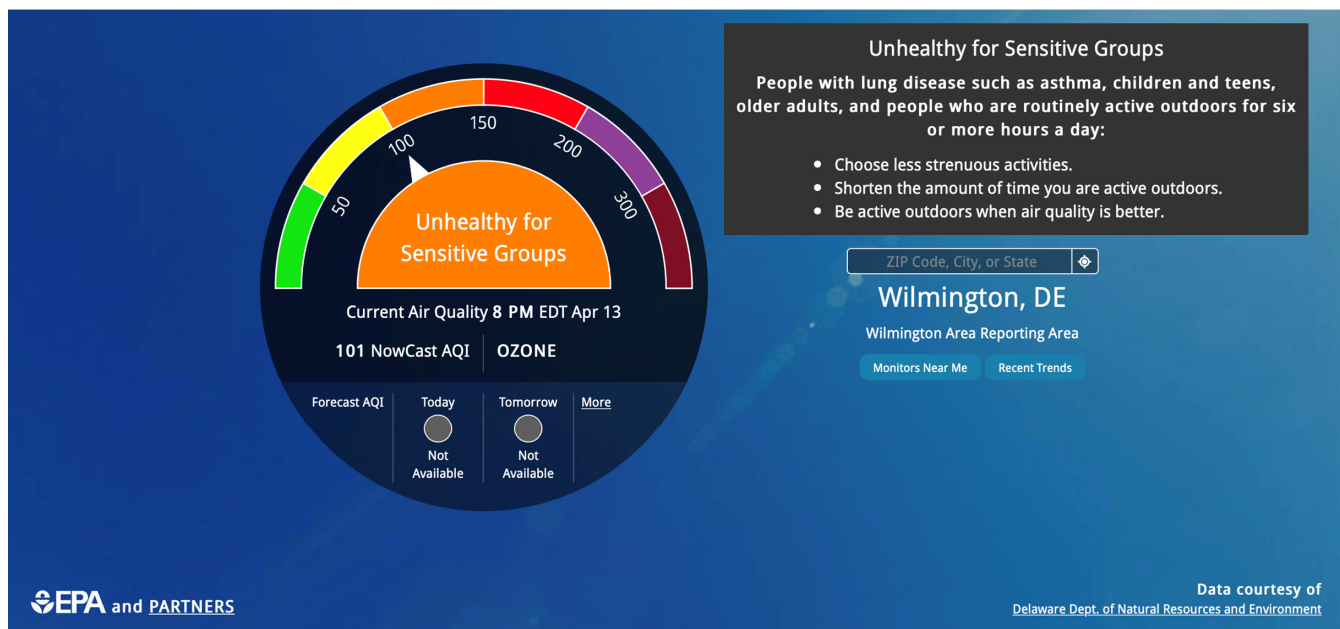
Individual level

- Education
 - Make patients aware of their underlying vulnerabilities
 - Use AQI to understand risk
- Closer follow up during periods of poor air quality
- Preventative medicine
- Role of HEPA filters?

Systemic level

- Advocacy
 - Mid-Atlantic Alliance for Climate and Health
 - Advocate at the local and state level
- Make changes at your home institution
 - Form a "Green Team"
 - Implement "PaRx" program

Air Quality Index (airnow.gov)



DNREC is Accepting Public Comment for April 26 Hearing on Potential Adoption of Clean Car Regulations

Department of Natural Resources and Environmental Control | Division of Air Quality | Featured Posts | News | Date Posted: Monday, April 3, 2023



Reducing Healthcare Carbon Emissions

Decarbonizing the U.S. Health Sector - A Call to Action. *NEJM*. 2021

- Healthcare industry is the most carbon-intensive service sector in the industrialized world
- U.S. health sector is responsible for an estimated 8.5% of national carbon emissions.

"The U.S. health sector accounts for 25% of global health sector emissions — the highest proportion attributable to any individual country's health sector."

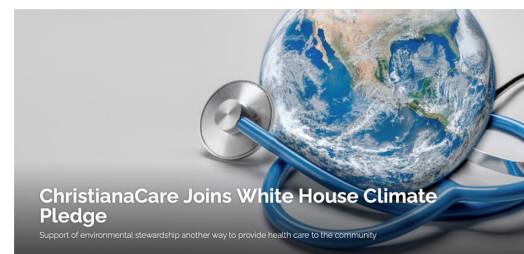
Reducing Healthcare Carbon Emissions

- Reducing Cath Lab's Carbon Footprint: Is It Time, and Can It Be Done?. *Journal of the Society for Cardiovascular Angiography & Interventions*. 2022
- Prescriptions for Mitigating Climate Change–Related Externalities in Cancer Care: A Surgeon's Perspective. *Journal of Clinical Oncology*. 2022
- Impact on the reduction of CO₂ emissions due to the use of telemedicine. *Scientific Reports*. 2022
- Small Devices, Big Problems: Addressing the Global Warming Potential of Metered-Dose Inhalers. *Annals of the American Thoracic Society*. 2022



Christiana Environmental, Social, and Governance Structure and Strategy

- Environmental Sustainability Caregiver Committee
 - A multi-disciplinary committee with the purpose of promoting environmental sustainability through caregiver participation to reduce the environmental impact of care delivery while promoting the health of our community through inquiry, education, and communication
- ChristianaCare signed on to the White House Climate Pledge
 - Procure 100% renewable energy by 2025
 - Cut Greenhouse gas emissions by 50% by 2030
 - Achieve net zero emissions by 2050





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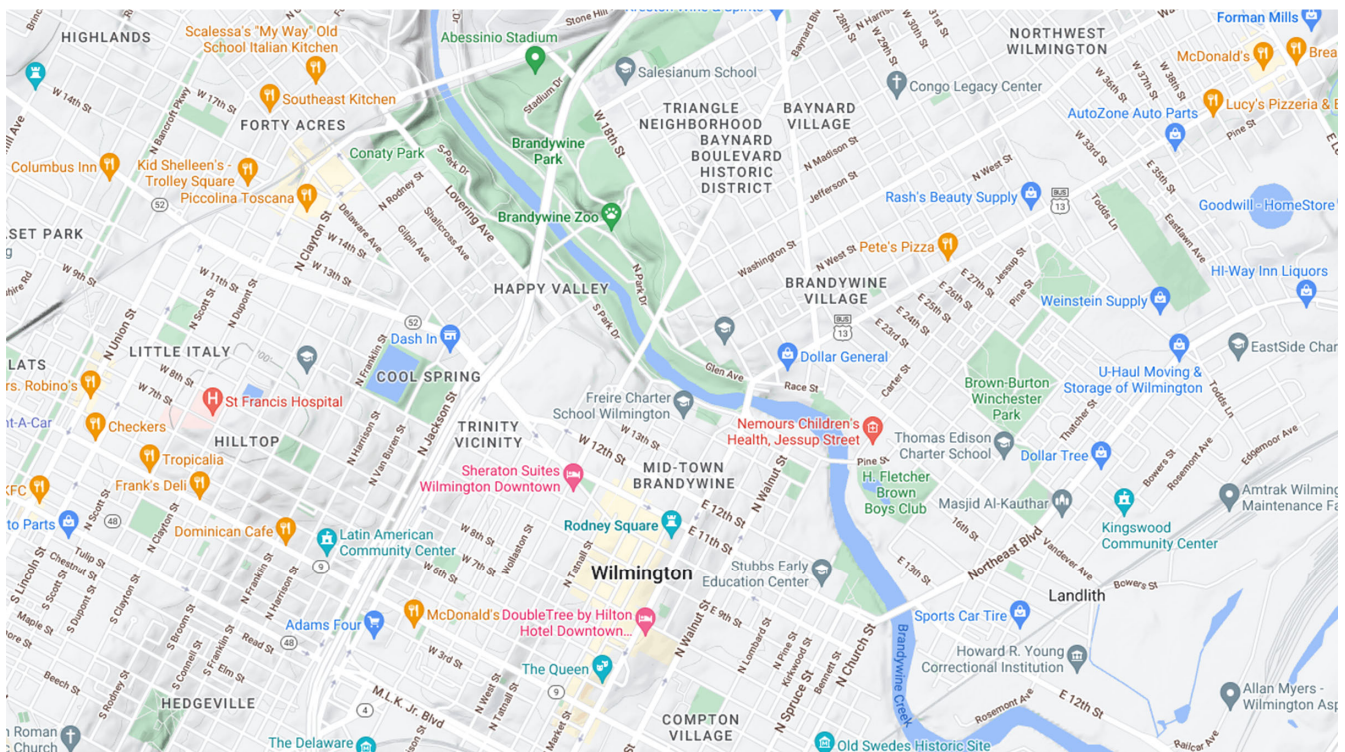
Short communication

Nature prescribing in Canada: a trainee led discussion on implementation and educational opportunities



Anna Cooper Reed^a, Victoria Haldane^a, Jacqueline Mincer^b, Emma McDermott^b, Brooklyn Rawlyk^{c,*}

- PaRx: Family physicians in Canada prescribe "nature" to their patients
- B.C. Parks Foundation helps waive or reduce fees for patients with nature prescription
- Possible DE Program



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QUESTIONS & ANSWERS

Thank you!

