Reading for yesterday-a big picture review paper!

AIR POLLUTION, FOSSIL FUELS AND KIDS

"Pollution from fossil-fuel combustion is the leading environmental threat to global pediatric health and equity: solutions exist" (Perera 2018)

- Reviews the connections between fossil fuel emissions and children's health.
- We went over asthma ("School Haze") and CVD (paper we read and the London Smog video)-this paper focuses on **nervous systems.**
- Nervous system issues related to brain wiring and brain development! (Memory, IQ, Behavioral problems, Self Management, Attention Disorders, Autism Spectrum Disorder, Dementia, Alzheimers)
- Remember how those PM 2.5 can get deep into your lungs and body-may cause "neuroinflammation."

It also seeks to remind us of the fact that these effects are unequally distributed (not just in the US but globally) with low income or low ses communities being disproportionately burdened or exposed. ✅

You should keep asking yourself "Where is air pollution coming from and who is experiencing the negative effects of those emissions?"

I appreciate that the Lancet Commission on Health and Climate Change (one of the most respected medical journals in the country) highlighted that reducing our dependence on fossil fuels (and the change in climate that fossil fuel combustion causes) represents the biggest opportunity of our century to improve public health and redress inequality. (p2 of this paper)

In Section 2…

It reviews why children are more vulnerable! ✅

How do their points compare with the list I gave you in a previous handout?

Note the statement: "Numerous studies demonstrate that the fetal and early childhood stages are especially vulnerable to both genetic damage and **epigenetic** dysregulation from exposure to xenobiotics and stress; these molecular effects may have lifelong and **transgenerational** consequences." ✅

In Section 3….

They point out that most air pollution has its source in fossil fuel combustion! ✅

While air pollution in the US is (kind of a) success story, this section points out that many parts of the world experience much worse air quality.

That poor air quality is disproportionately experienced by lower income communities-with large numbers of children. ✅

They also mention “household” air pollution. What is that?

In Sections 4 and 5….

Some **new language**-exposed vs vulnerable.

This section reviews the idea that lower ses communities (and the children in those communities) in the US and globally are disproportionately **exposed** to particulate air pollution (especially from coal fired power plants).

While we have covered how children are more vulnerable based on their behavior and physiology, lower ses children are also more **vulnerable** because of certain **co-factors** like…..

inadequate nutrition, stress etc..

These factors may **magnify** the health effects of both air pollution and climate change.

Low SES- poor diet- **high air pollution**=big health effect of particulates.

High SES- better diet- **high air pollution**=medium effect of particulates.

Higher income families with a better diet (lots of fruits and veggies) will be more resistant to the negative effects of air pollution and so will not be impacted as much.

This point was made in the CVD article we read but we did not really focus on it at the time. ✅

In Section 6….

Climate change also disproportionately impacts children. Some more **new language**!

Direct effects -heat stress, floods, drought, forest fires, storms

Indirect effects -malnutrition and undernutrition, spread of infectious-disease vectors, food insecurity, illness due to increased air pollution and allergens, stress, mental health challenges from displacement, forced migrations, social and political instability.

The paper also points out that these climate change effects also cause neurodevelopmental problems!!

A focus on Global Air Pollution TODAY!

As a group, browse and then decide on parts of the world you are interested in. Screenshot one or two maps from the websites on the next slide to share. Find the slide show in our Google Folder.

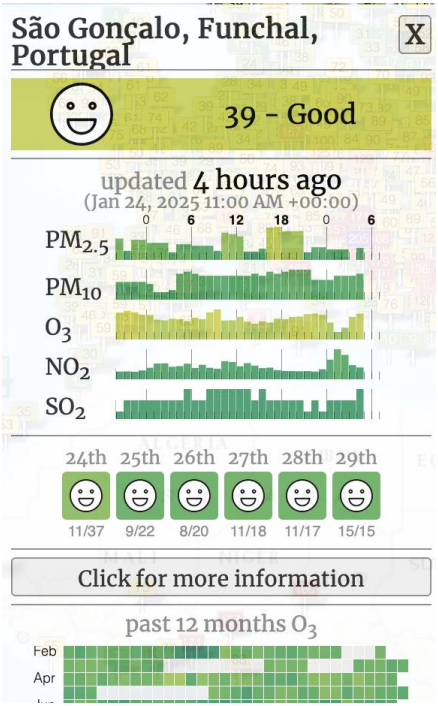
Please create several bullet points to communicate what your map shows!

Any thoughts as to WHY the air pollution in your chosen location is good or not so great? Industry, dense population, wildfires, trapped air or inversions?

Add your names to your slide and be prepared to share!

https://waqi.info/#/c/20.398/69.663/3.2z

This one lets you select more different Criteria pollutants and maybe has more global monitoring stations. You can also have it “pop out” a useful graphic.



https://gispub.epa.gov/airnow/

This website lets you select fewer Criteria Pollutants.
Make sure the link brings you to the “Interactive Map of Air Quality.” You can select Monitors or Contours on the left. If you select monitors it gives you dots where the actual air quality station is. The contours does some fancy math called (kriging) to predict the levels between all those dots.