Womb for Concern: Air Quality Impact on Maternal Health Outcomes

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Problem Statement

We plan to determine the relationship between various metrics of air quality data and pregnancy outcomes, including prevalence of anaemia in pregnant women and low birthweight. With this relationship in mind, a machine learning model will cluster “high maternal/infant health risk countries” when provided with air quality data and possibly other geographic or economic data.

Data Gathering

Air Quality Data - Health Effect Institute’s State of Global Air

- Health Effects Institute. 2024. State of Global Air 2024. Available: www.stateofglobalair.org [accessed 05/23/2025].
- Exposure lower, exposure mean, and exposure upper of ambient PM2.5 pollution, ambient ozone pollution, household air pollution from solid fuels, and nitrogen dioxide pollution is available for years 1990-2021 for 204 countries and territories
- Downloadable CSV file from website

UNICEF Maternal and Child Health Data

- Low birthweight - Low birthweight - UNICEF DATA
- UNICEF/WHO low birthweight estimates. July 2023. [accessed 05/23/2025]
- Percentage of live births that weighed less than 2500 g (less than 5.51 pounds) by country, from 2000-2020. Estimate, lower, and upper credible intervals given.
- Amemia - Women's nutrition - UNICEF DATA
- UNICEF Women’s nutrition data. March 2023. [accessed 05/23/2025]
- Prevalence of anaemia in pregnant women aged 15-49 as a percentage, by country. Point estimate, lower limit, and upper limit given. Also listed is each country’s World Bank Income Group. Data available for 2000-2019
- All UNICEF data are downloadable Excel files from website

Defining Stakeholders

- Women and pregnant individuals
- Healthcare systems and professionals working in reproductive health, child and infant health
- World aid organizations, international climate aid organizations, peace corps

- Government, policymakers, and regulatory bodies interested in the social, political, and economic implications
- Health technology, biotech, pharmaceutical companies

Key Performance Indicators (KPIs)

Our main KPI is to minimize false negatives, such that the model minimizes the number of countries that are in reality high risk but classified as not high risk. This will be our primary evaluation metric using False Positive Rates (FPR). We will also investigate accuracy and recall for more information about the model's performance.