

# N.U.R.T.U.R.E: Neutralizing Unsafe Risks Through Unique Responsive Environmental Care

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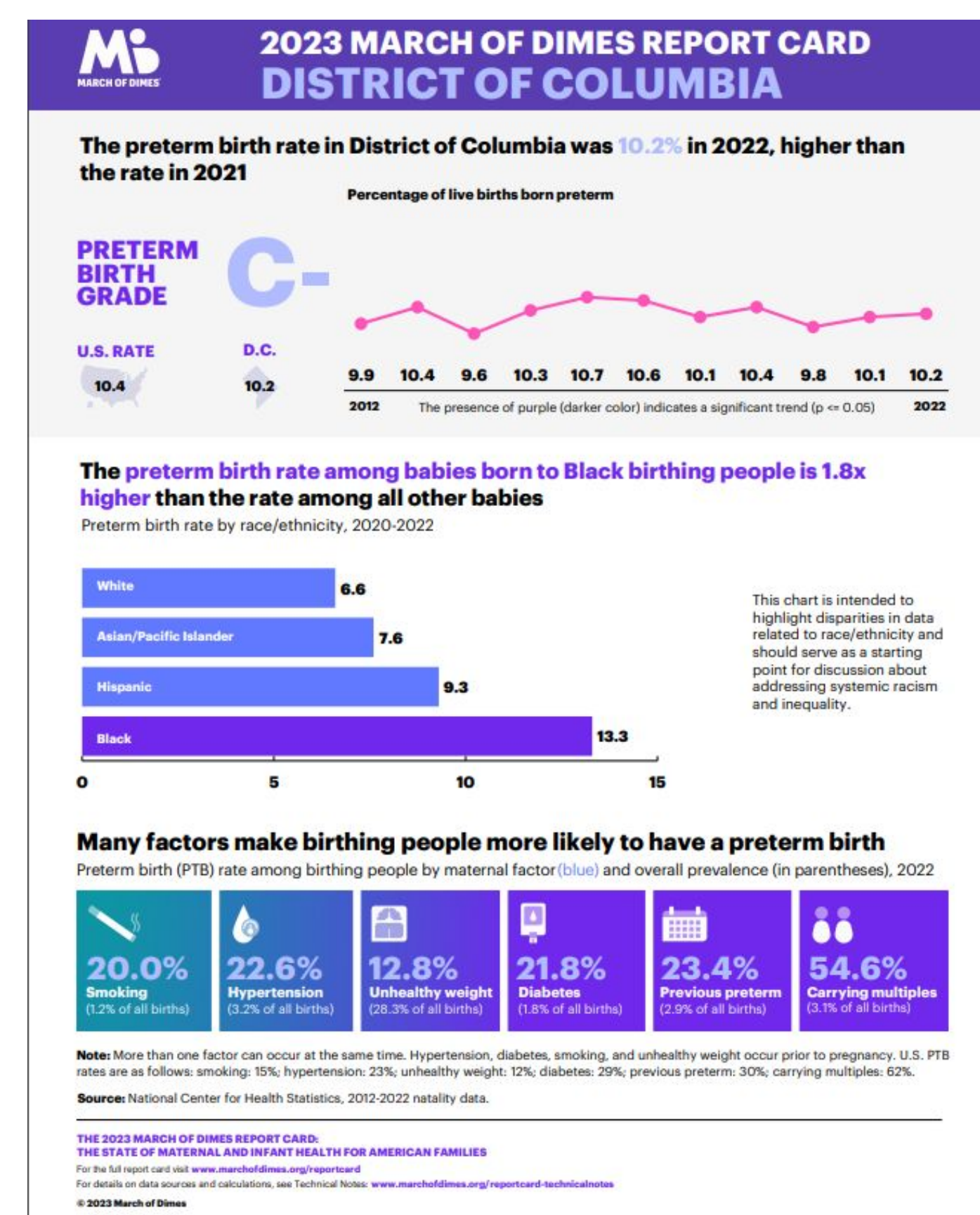
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## Abstract

Environmental factors can be distinguished by physical, chemical, biological, behavioral, and socioeconomic categories. Each category has its own individual effect on human health. These environmental factors play a critical role in determining the health outcomes of pregnancies, influencing both maternal and fetal well-being. This project aims to empower pregnant women by providing comprehensive support and education on mitigating environmental risks. Environmental factors have a significant impact on pregnancy outcomes, specifically among women from lower socioeconomic status (SES) background. Low SES is linked with increased exposure to harmful environmental toxins, high stress levels, limited access to healthcare, which contribute to pregnancy outcomes such as preterm birth, low birth weight, and congenital defects (Verbeek, 2019). Women with low SES often report high levels of stress, anxiety, and depression; these conditions have been linked with higher risks of preterm labor and hypertension (NIH, 2023). Additionally, exposure to certain daily cleaning products that contain toxic chemicals can lead to complications during pregnancy including respiratory issues, allergies and skin irritation, hormonal disruptions, and developmental and birth defects. Cleaning chemicals are a crucial component of environmental factors, particularly in the indoor environment. These chemicals can contribute to indoor air pollution, contaminate surfaces, and be absorbed through skin contact or inhalation, directly impacting the immediate living environment of pregnant women. Pregnant women need to avoid chemicals and products containing Ammonia and Bleach, Spray and aerosol cleaners, Phthalates, Air fresheners, Glycol ethers, Triclosan (Toxic household products, 2023). Water pollution, exacerbated by climate change, poses additional risks, including gastrointestinal illnesses and miscarriage (EPA, 2023). Moreover, maternal exposure to air pollutants have been associated with pregnancy complications, adverse birth outcomes including preterm birth and low birth weight. Exposures can affect fetal development and neurodevelopment in offspring (NIH, 2024).

## Epidemiology

Environmental factors have a life-threatening effect on women's health. Over 70% of pregnant women are affected by environmental factors, which are more prevalent in minority neighborhoods. According to the United States Health Foundation, the maternal mortality rate in DC was roughly 30.7 per 100,000 live births, compared to the national rate of 20.7 (MarchofDimes, (n.d.)). This high mortality rate is the leading cause of infant death, highlighting how the environment impacts both the mother and the baby. Maternal vulnerability is primarily influenced by the mother's atmosphere, including mental and physical health, socioeconomic status, and physical surroundings. In the years 2014-2018, Wards 7 and 8 accounted for 70% of pregnancy-associated deaths, while no casualties were reported in wards 2 and 3 (Grablick, C. 2022).



## Program Implementation

**NurtureNest** is a comprehensive mobile app designed to help pregnant women identify, monitor, and mitigate environmental factors that may negatively affect their pregnancy. The app combines wearable technology, real-time environmental data, and personalized health tracking to provide a holistic approach to ensuring a safe and healthy pregnancy. NurtureNests' unique software will not only help keep all your pregnancy needs in one place, but also connect you with your provider by relaying the information you give the app. Granted we do not recommend skipping prenatal care, NurtureNest is simply a tool to help make your antenatal care a little bit easier.

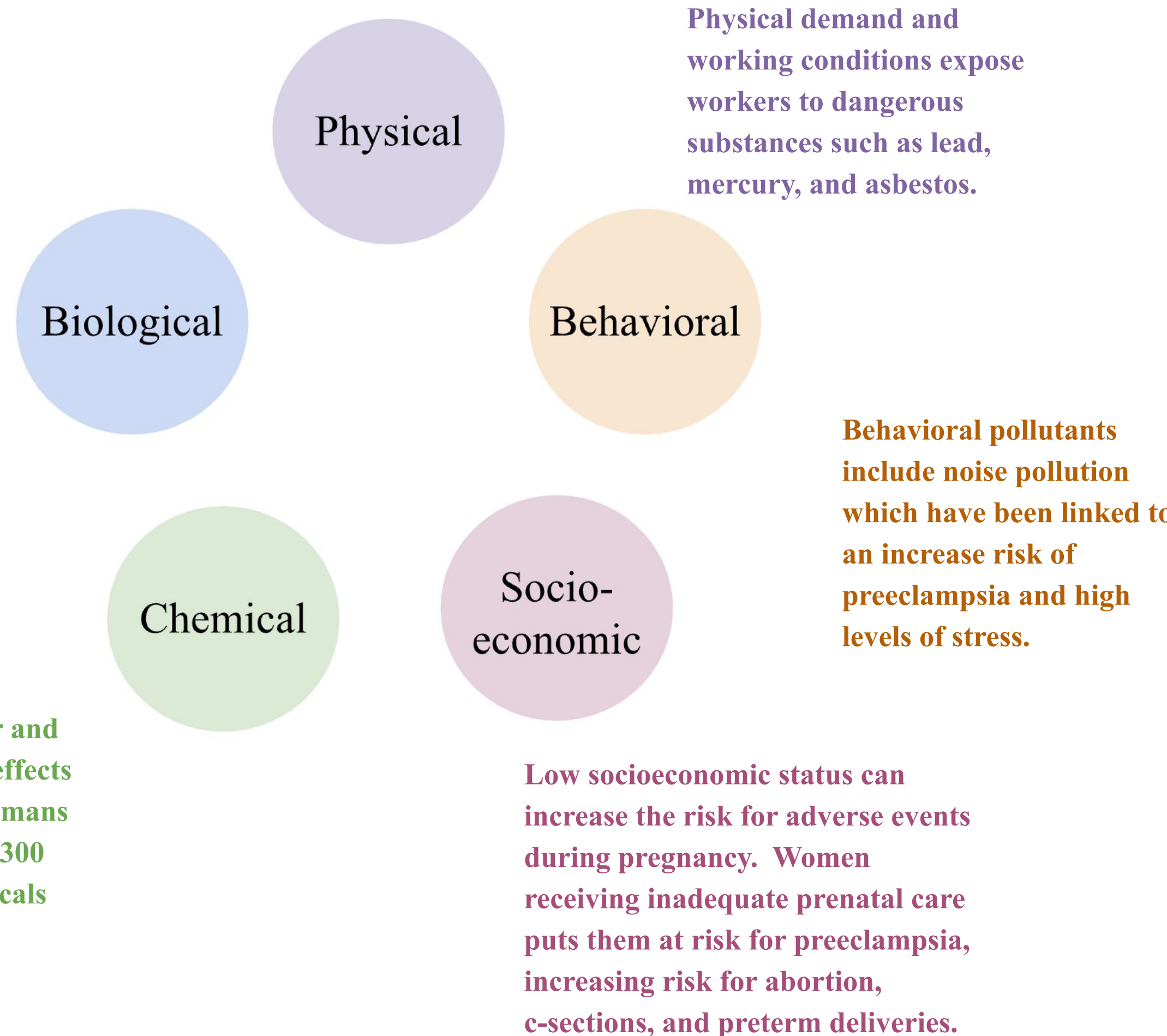
- Environmental Monitoring:
  - Real-time air quality index
  - UV index tracking
  - Water quality alerts
  - Chemical exposure warnings
- Personal Health Tracking:
  - Stress level monitoring
  - Activity and rest tracking
  - Symptom logging (headaches, nausea, pain)
  - Nutritional guidance
- Community Support:
  - Forums for expectant mothers to share experiences and advice
  - Local environmental health news and updates
- Customized Interventions:
  - Personalized action plans based on detected environmental risks
  - Suggestions for safer alternatives to potentially harmful products
- Educational Resources:
  - Information on environmental hazards and their effects on pregnancy
  - Tips for reducing exposure to harmful substances
  - Mental health support and resources

**NurtureNest** aims to empower pregnant women with knowledge and tools to create a safer environment for themselves and their developing babies. By combining cutting-edge technology with medical expertise, the app provides a comprehensive solution to address the complex interplay between environmental factors and pregnancy health.

## Theoretical Grounding

Biological contaminants are produced by living organisms, usually found in places with food and a water source. Viruses, pollen, mold, and household pets have all been linked to cause hypersensitivity pneumonitis, allergic rhinitis, and asthma.

Pollutants that contaminate natural sources such as water and air result in adverse effects on human health. Humans are exposed to about 300 environmental chemicals each day.



## Program Evaluation

To ensure our development efforts genuinely benefit participants, consent forms will be sent upon app download. We'll conduct surveys aligning with prenatal checkups (monthly, bi-weekly, or weekly), featuring a point system and required multi-select choices for feedback. Participant evaluations will be sent to physicians to access surveys. A team will analyze app data to assess its impact on wards 7 and 8. Our app provides unique information on maternal health and easy physician access. To determine long-term effects and outcomes, we'll implement a comprehensive longitudinal study approach, including continuous data collection through extended surveys up to 5 years post-partum, health outcome tracking in collaboration with healthcare providers, ongoing environmental monitoring, cohort comparisons based on app usage, and biomarker analysis where possible. We'll enhance program evaluation by establishing a control group, assessing economic impact, tracking community health indicators, analyzing user retention, conducting qualitative research, evaluating adaptive interventions, publishing peer-reviewed findings, tracking technology evolution, assessing policy impact, and exploring intergenerational effects. These strategies will allow us to comprehensively evaluate the app's long-term effects, demonstrate its efficiency, and ensure its longevity as a valuable tool for improving maternal and child health outcomes in relation to environmental factors. This approach will provide valuable information to improve our service to the community and show long-term longevity and efficiency of the program.

## Conclusion

Environmental factors significantly impact pregnancy outcomes, particularly for women from lower socioeconomic backgrounds. The **NurtureNest** app addresses this critical issue by providing targeted intervention through real-time environmental monitoring, personalized risk assessment, and tailored educational content. Our partnership with the DC government ensures the app is freely accessible to all mothers, regardless of income, demonstrating our commitment to health equity. The app's comprehensive approach considers physical, chemical, biological, and socioeconomic factors, empowering pregnant women with knowledge and actionable strategies to mitigate environmental risks. As we move forward, continuous evaluation and improvement will ensure **NurtureNest** remains effective in the face of evolving environmental challenges. This innovative integration of technology, environmental science, and public health represents a significant advancement in prenatal care, with the potential to improve maternal and fetal health outcomes and serve as a model for similar initiatives worldwide. By fostering healthier pregnancies and births, **NurtureNest** contributes to the long-term health of communities and future generations. Our vision extends beyond individual pregnancies to creating a lasting impact on public health and environmental awareness.

## Acknowledgement

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## References

