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Corneal Disease and Air Pollution Levels in Detroit: Preliminary Results and Future Directions

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Purpose: To determine if Detroit zip codes with elevated air pollution levels demonstrate increased incidence of corneal disease.

Background: 82 million people in the United States live in counties with air quality concentrations above the National Ambient Air Quality Standards. Air pollution's detrimental effects on an individual's health has been well documented. Much of this research has focused on the pulmonary system. The eye, another mucous membrane exposed to the external environment, has been largely ignored

Methods: After an initial literature review of similar studies, 14 corneal diseases and 5 pollutants were selected to be evaluated. Kresge Eye Institute's patient list was used to find patients with the diagnoses of interest, and the 50 most recent individuals were chosen for initial evaluation. Pollutant levels were evaluated by zip code-level data published by the Michigan Department of Environmental Quality. Zip codes were compared based on pollutant levels and the corresponding incidence of corneal disease.

Results: Preliminarily, zip codes 48202, 48234 and 48044 have three cases of corneal disease each, which represents the maximum value. The study's results were limited by small sample size and inclusion of patients with corneal disease secondary to an unrelated ophthalmic condition, such as post-cataract surgery dry eye and side effects of timolol used for glaucoma treatment. These patients must be excluded from future studies.

Conclusion: It is too early to conclude that air pollution levels in Detroit are sufficiently elevated to lead to an increased incidence of corneal disease among residents.