

Analysis of Air Pollution and Lung Cancer Rates

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Purpose

- Determine if there is a correlation between levels of air pollution and rates of lung cancer
- Hypothesis:
 - Higher levels of air pollution result in increased incidence of lung cancer.
- Scenario: EPA or other regulatory agency is trying to identify highly problematic pollutants in order to curb rates of lung cancer.



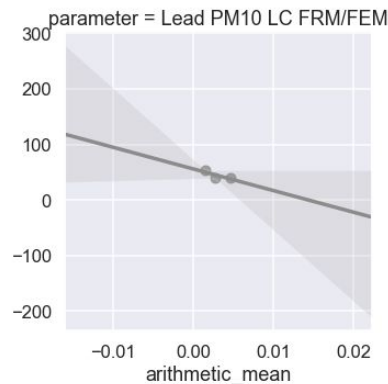
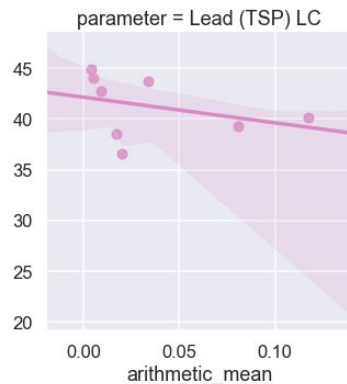
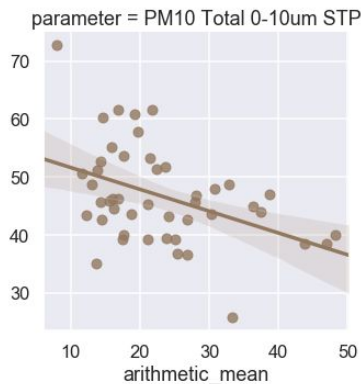
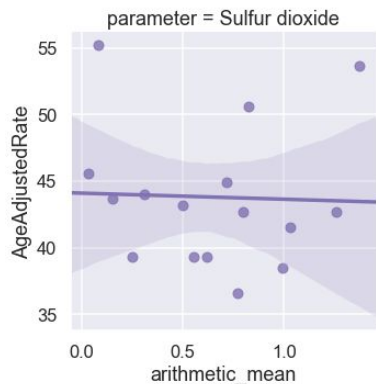
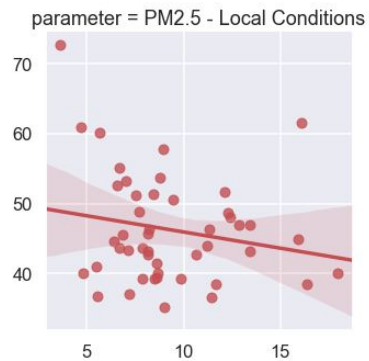
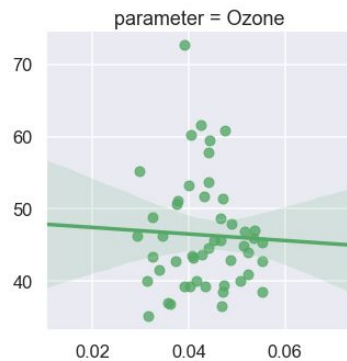
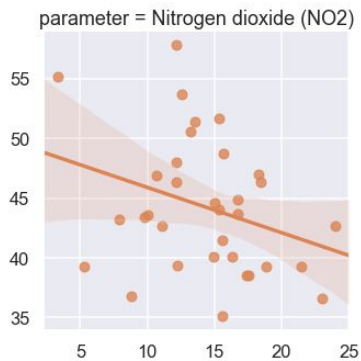
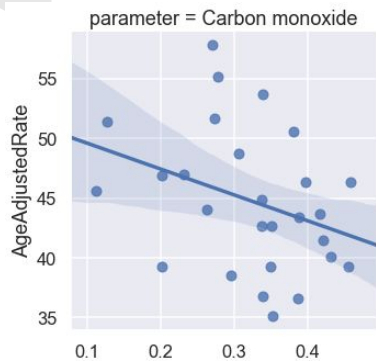
Sources

- EPA Air Quality System API
 - pyaqs: custom module to wrap API requests to pandas dataframes
- CDC Geographic Information Systems database

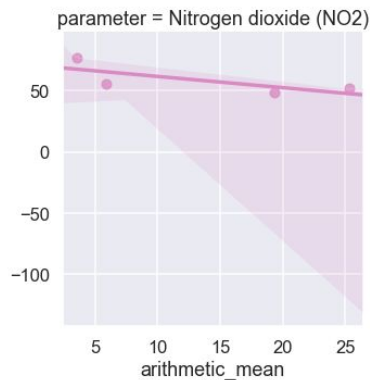
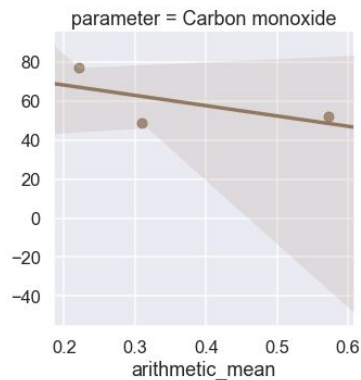
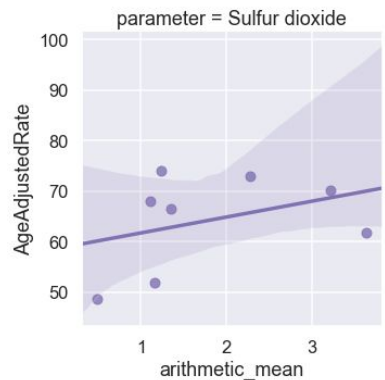
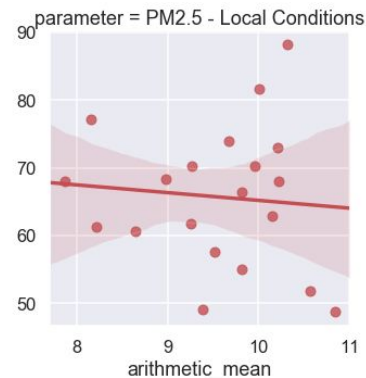
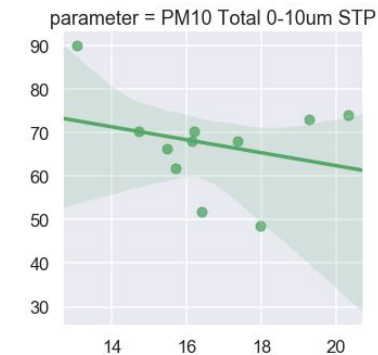
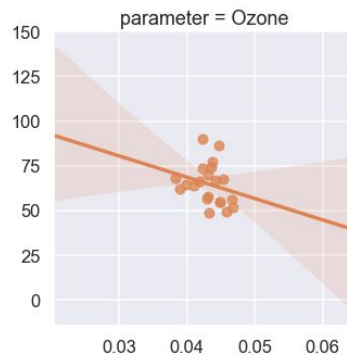
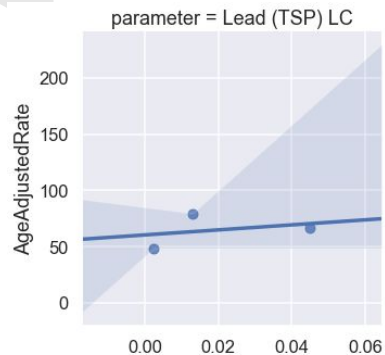


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CONTROL AND PREVENTION**

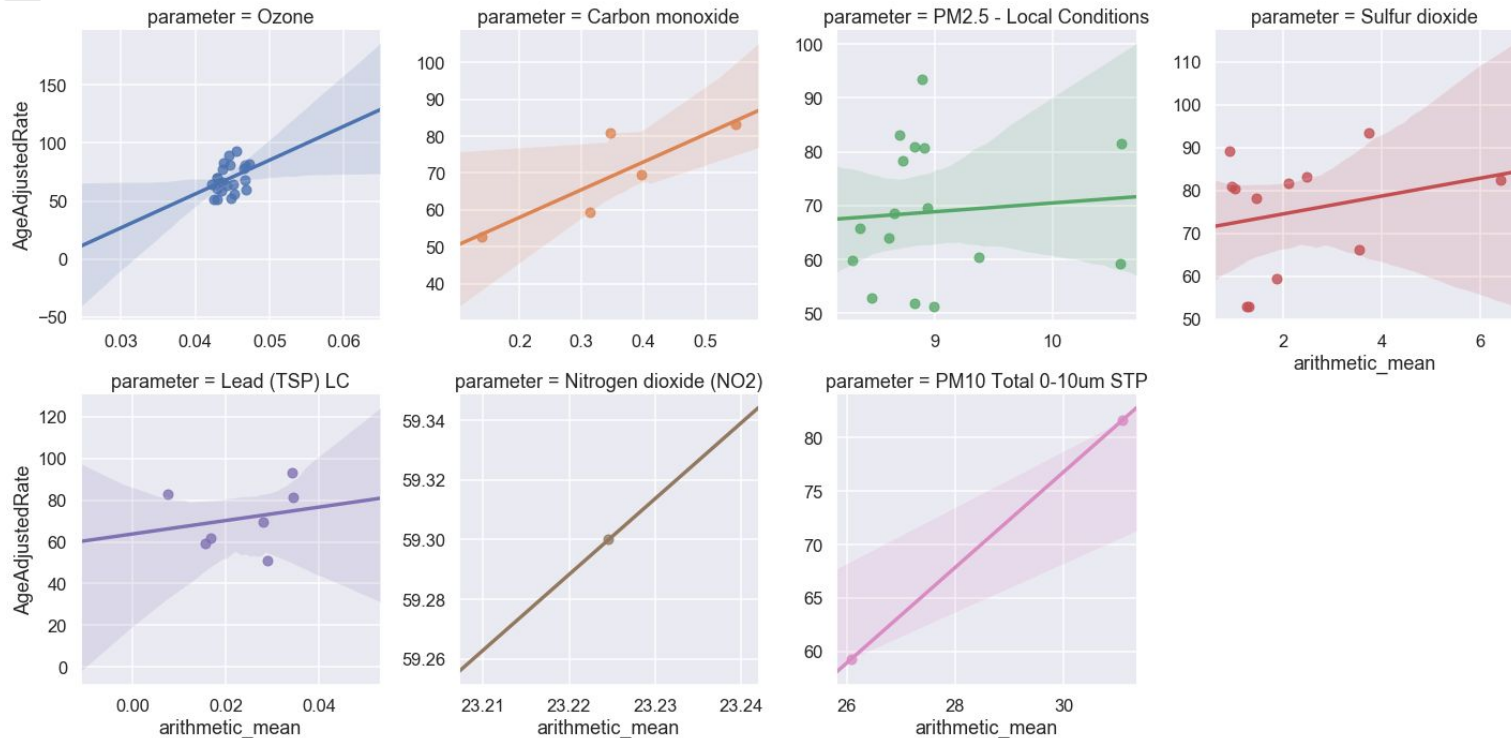
Results - CA



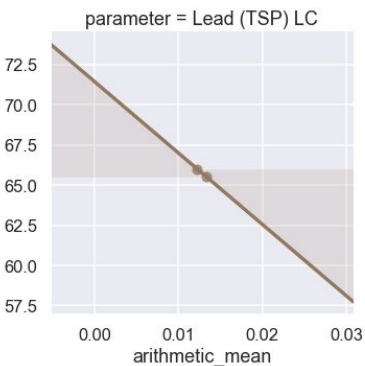
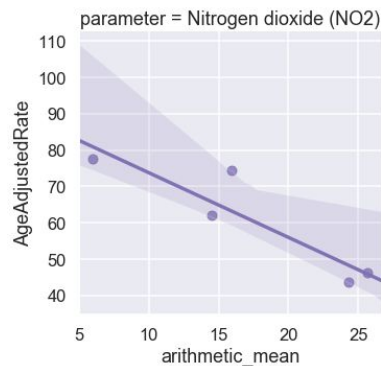
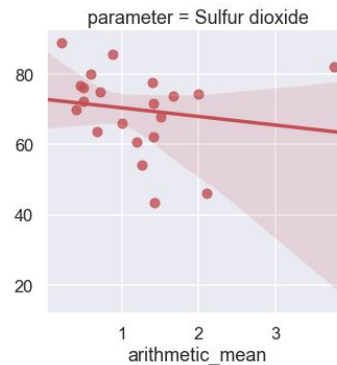
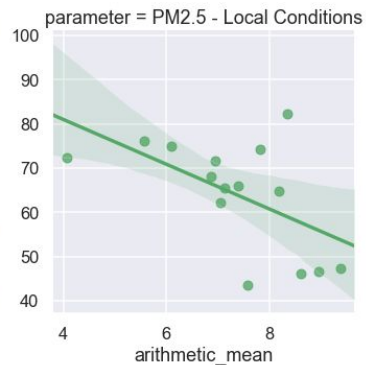
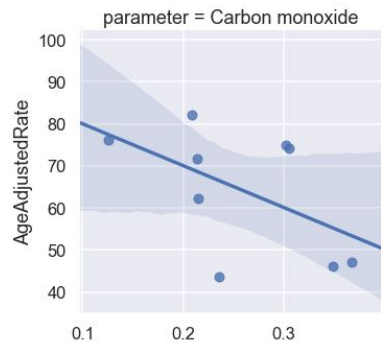
Results - GA



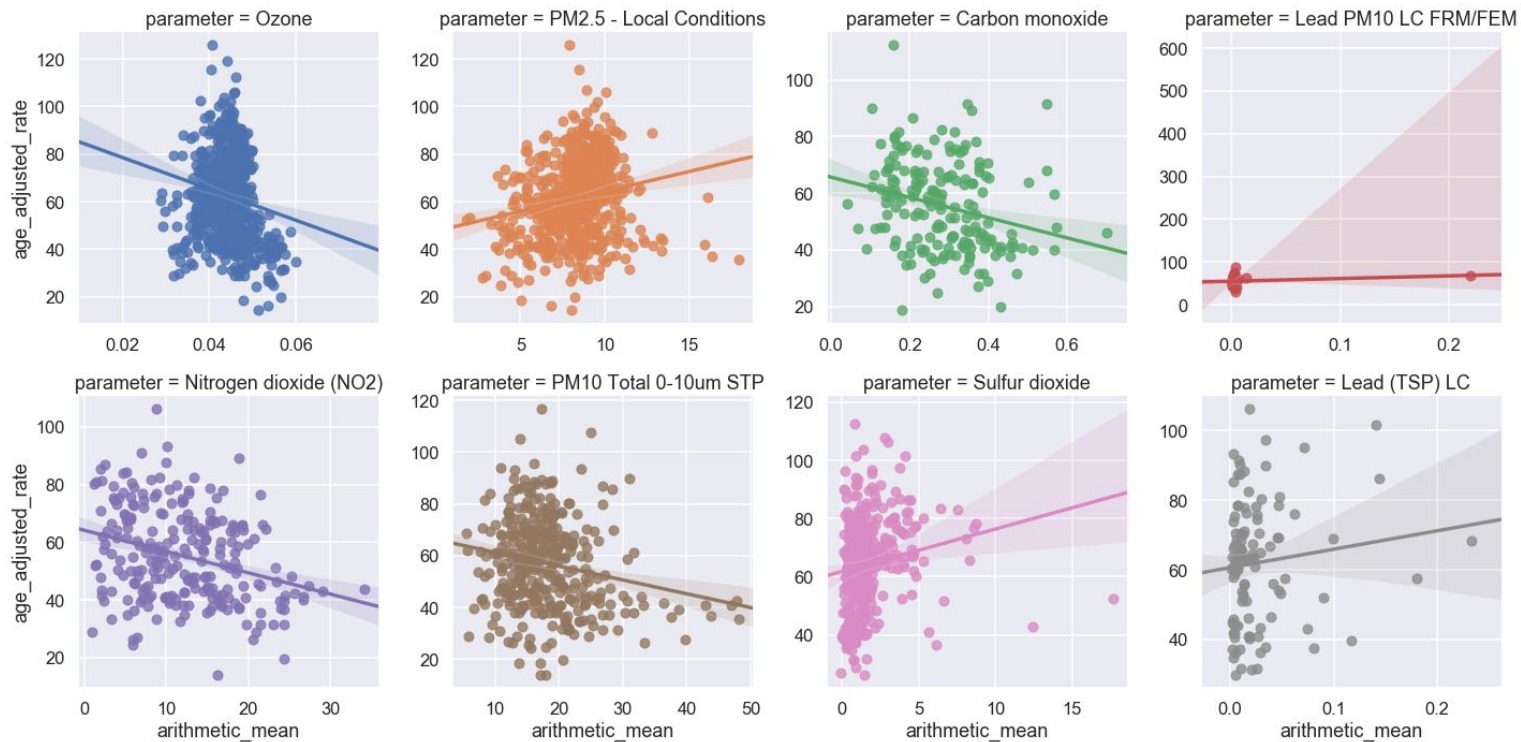
Results - IL



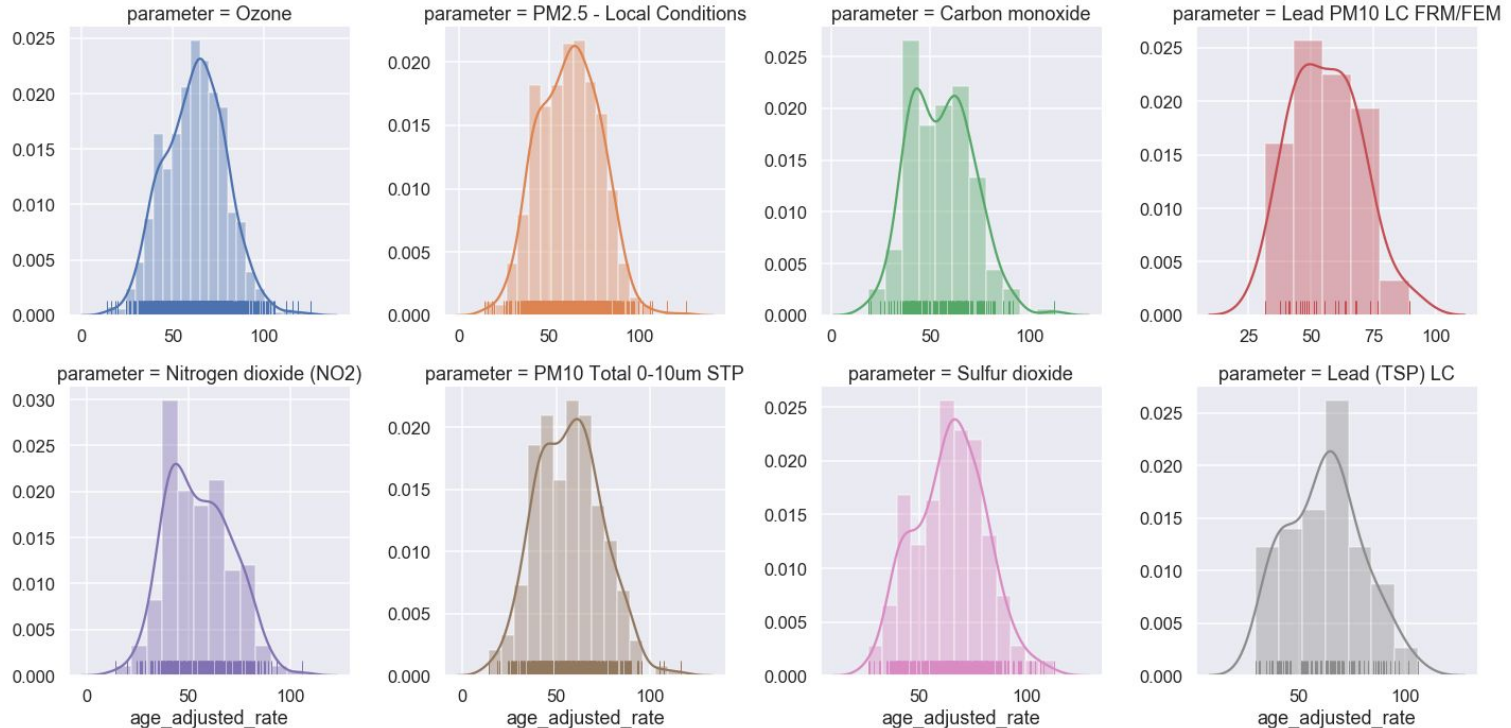
Results - NY



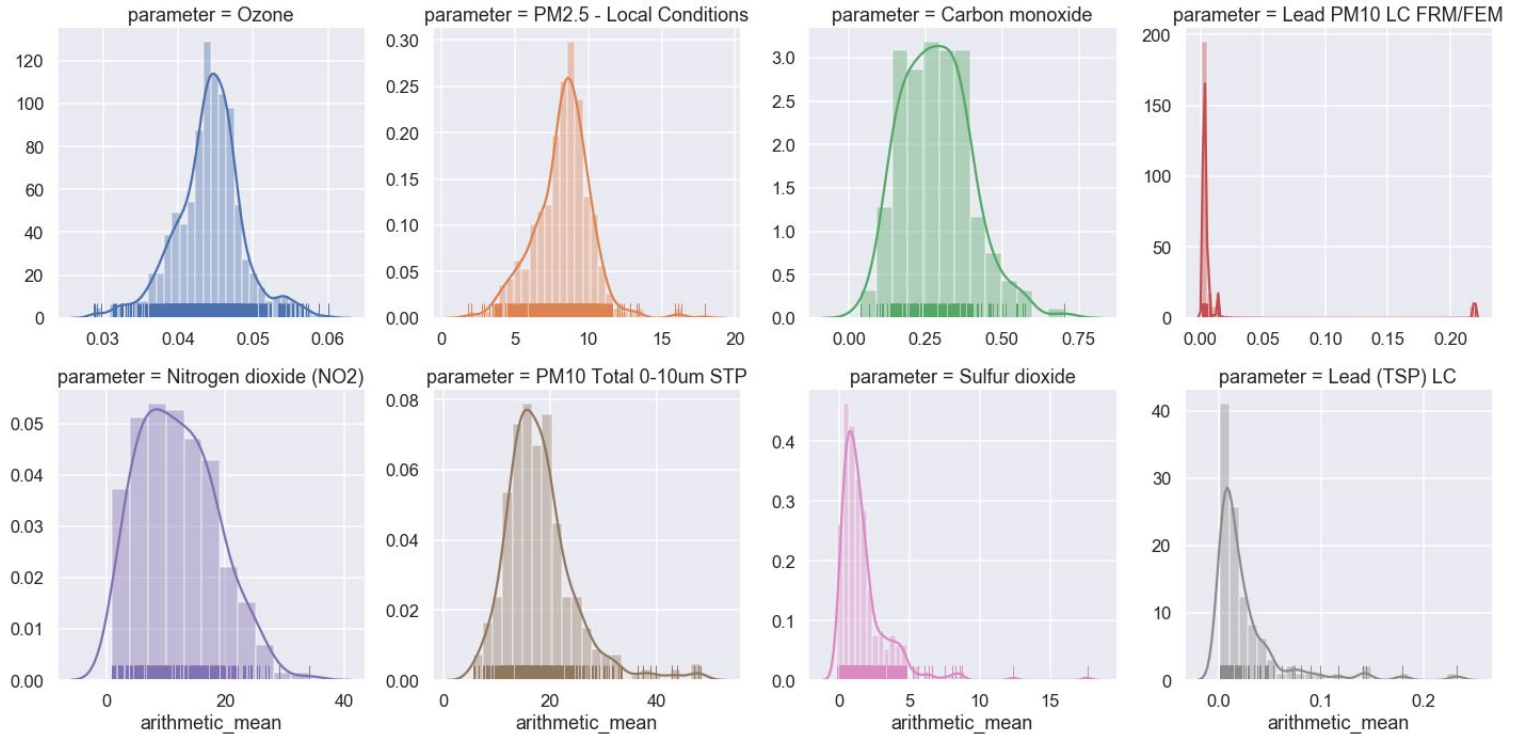
Results - United States



Distributions - Age Adjusted Cancer Rate



Distributions - Average Air Quality





Hypothesis Testing

Null Hypothesis: there is no correlation between levels of {parameter} in the air and rates of lung cancer in the United States.

Alternative Hypothesis: there is a correlation between levels of {parameter} in the air and rates of lung cancer in the United States.

Testing: automated testing for each parameter

- Split into groups based on mean air quality readings (into halves and thirds)



Hypothesis Testing - Results

No conclusive T-test results.



Conclusion

- Results: Inconclusive
 - We are unable to make any recommendations due to the lack of data points. Further study is required.
 - In general, cancer is a very complicated disease with many risk factors and triggering events.
 - Moreover, air is very fluid.
- Perhaps looking at instances of chronic lung disease would prove more fruitful.