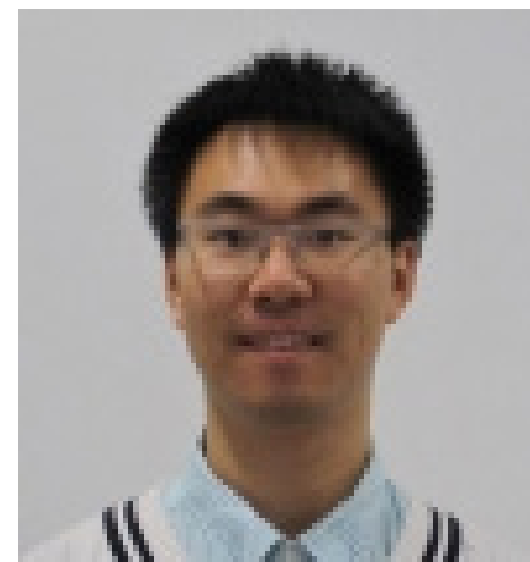# Do Population Near the Coast Have a Lower Lung Cancer Incidence Rate?

Zixia Liu[1,2], Colin Janssen[1,2], Jana Asselman[2]

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Background

There are shreds of epidemiological data suggesting that living by the sea can have positive effects on human health, but the causal factors are still unknown. A new hypothesis proposed by Moore suggested that bioactive molecules in the sea spray aerosol may benefit human health through interaction with the mTOR pathway, which related to lung cancer, diabetes, and obesity. Results from in vitro studies with lung cancer cells supported the biogenics hypothesis, but no epidemiological study has been done on this topic so far. **Do Population Near the Coast Have a Lower Lung Cancer Incidence Rate?**

Methods

Data Source

Cancer Incidence in Five Continents Volume XI   **WHO CI5 XI**

◆ 464 registry agencies (files)

◆ 2G×241C×19A=9158 records per file

    G: Gender; C: Category; A: Age group

◆ Number of cases and person-years at risk are recorded in each group

◆ http://ci5.iarc.fr/CI5-XI/CI5-XId.zip

Data Analysis

◆ Convert registry agency names to coordinates -- OpenCage Geocoder

◆ Calculate the distances to coastline -- R package: sf::st_distance()

◆ Analysis the lung cancer incidence rate of inland and coastal region. -- R function: t.test()

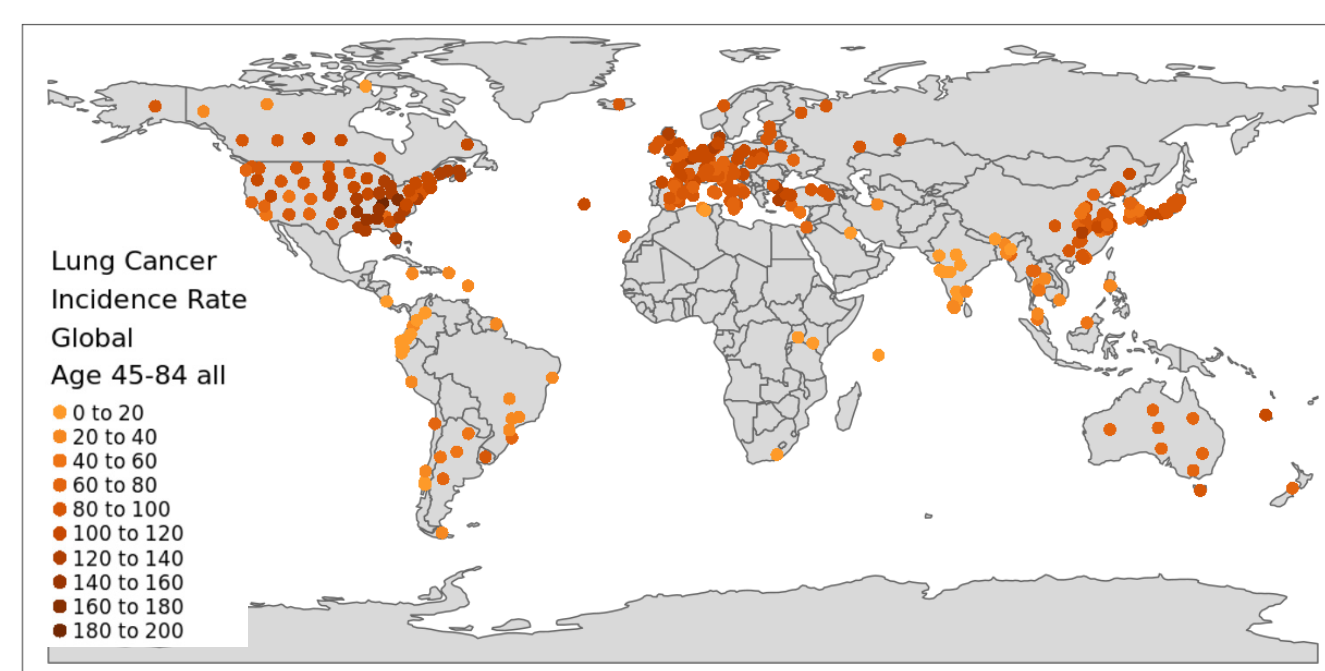◆ Analysis the relationship between incidence rate and distance to coastline -- R function: lm()

Figure 1. Global Pattern of Lung Cancer Incidence Rate with Age Group 45~84

Results

◆ On the global scale, there is a significant difference in lung cancer incidence rate between coastal regions and inland regions (p<0.05) for age group 45~84.

◆ The female group is more affected by this factor than the male group, with an extremely significant difference between coastal regions and inland regions (p<0.01).

◆ Liner regressions show the same results as mentioned above, the R-sqrs of regressions are not satisfactory, the highest is 12% (North American female group).
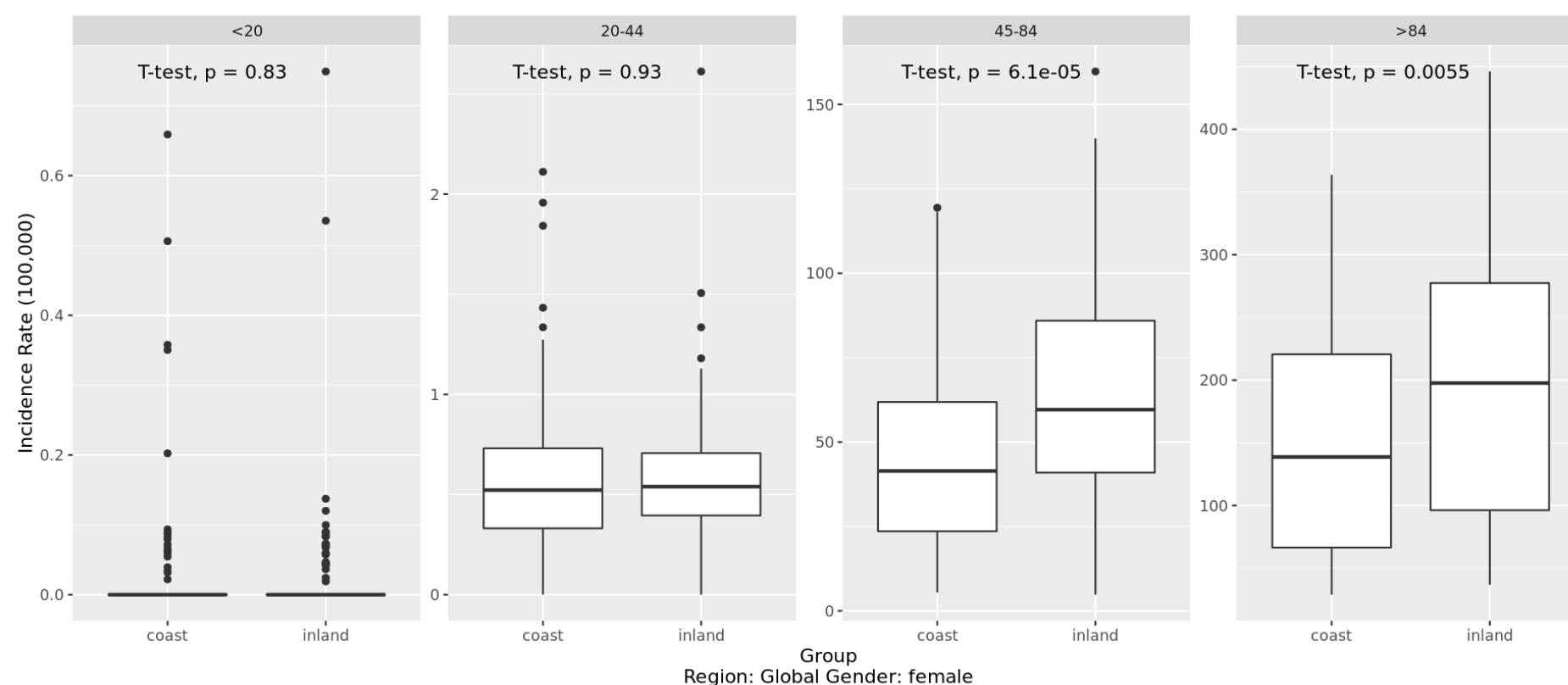
◆ See more figures in https://shiny.scicloud.eu

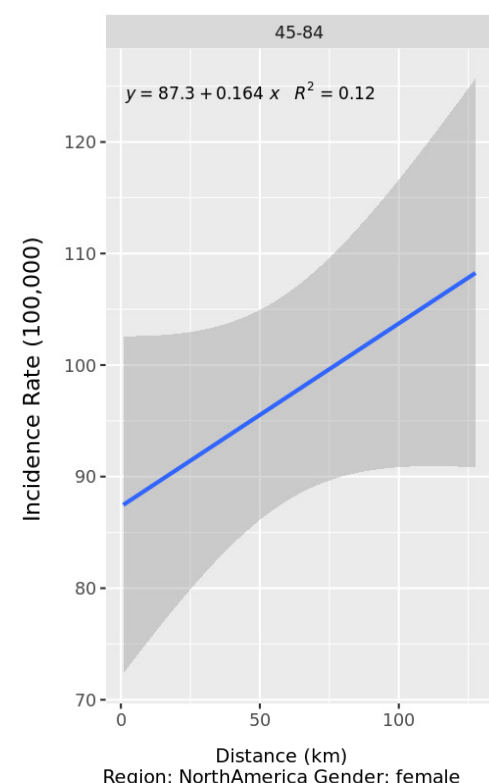**Figure 2. Differences in Lung Cancer Incidence Rate between Coast and Inland Regions**

Figure 3. Relationship between Lung Cancer Incidence Rate and Distance to Coastline with North Amercian Female, Age Group 45~84

Conclusions

The results indicate that the lung cancer incidence rate differed between coastal and inland areas. The difference is mainly in the 45-84 age group, and females are more affected.

But many underlying factors contribute to the difference in lung cancer incidence rate, not just more exposure to sea spray aerosol. It may also be related to higher population density and higher urbanization in the coastal regions.

This research investigated the human health effects of SSA from a new perspective. To obtain more accurate and convincing epidemiological conclusions, a more detailed survey is needed.

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