

Do population near the coast have a lower lung cancer incidence rate?

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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. In recent years, a new hypothesis proposed by Moore (2015) suggested that bioactive molecules in the sea spray aerosol may benefit human health through interaction with the mTOR pathway. This pathway is related to lung cancer, diabetes, and obesity. Results from in vitro studies with lung cancer cells supported the biogenic hypothesis (Asselman, et al. 2019), but no epidemiological study has been done on this topic so far.

In this research, we use the global cancer registry data from the Cancer Incidence in Five Continents (CIX5), to test if a causal relationship between living by the sea and the lung cancer incidence rate exists. We defined the living location based on the coordinates of registry agencies that reported the data and calculate the closest distance to the coastline. We then investigated the difference of lung cancer incidence rates between the coastal regions and the inland regions.

We observed that on a global scale, the lung cancer incidence rate of the coastal region group is significantly lower than the inland region group ($p = 0.02$). No statistical linear relationship could be defined for the lung cancer incidence rate globally and the distance from the coastline within ~ 300km range. ($R\text{-sqr} = 3.1\%$). In the US, the distance from the coastline can explain up to ($R\text{-sqr} =$) 30.0% of the variation of lung cancer incidence rate.

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

Play with data: https://r-shiny.liujason.com/sea-lungcancer/Source_code

R scripts:

- 1_data_convert.R
https://www.rcoding.net/GhEnToxLab/Sea-LungCancer/src/branch/master/src/1_data_convert.R
- 2_data_processes.R
https://www.rcoding.net/GhEnToxLab/Sea-LungCancer/src/branch/master/src/2_data_processes.R
- 3_calculate_distance_to_coastline.R
https://www.rcoding.net/GhEnToxLab/Sea-LungCancer/src/branch/master/src/3_calculate_distance_to_coastline.R
- 4_analysis.R
https://www.rcoding.net/GhEnToxLab/Sea-LungCancer/src/branch/master/src/4_analysis.R
- R shinyapp
- app.R
<https://www.rcoding.net/GhEnToxLab/Sea-LungCancer/src/branch/master/shinyapp/app.R>
- Online Analysis Tool
<https://r-shiny.liujason.com/sea-lungcancer/>

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