NEOS

NEoplasm Open-Source Environmental Risk Factors Standardization

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Challenge 2

Air & water carcinogens

CHALLENGE: accelerating research on cancer risk factors by structuring open data sources, and completing the OSIRIS clinical and -omics databases, in order to standardize variables related to the environment (terminology, interoperability,..)

SCOPE:

Cancer	Risk factors	Environmental	Air & water	IARC Group 1	Open sources	France	Epidemiology
Other diseases	Prognostic factors	Behavioral & occupational	Other agents	IARC groups 2A, 2B, 3	Private sources	Rest of world	Care

OBJECTIVE: easing analyses of environmental cancer risk factor data by structuring and harmonizing open source epidemiological data sets, in a FAIR approach

WORK PACKAGES:
WP1: ontology
WP2: data & metadata
WP3: data sources

TARGET OUTCOME:
Standardized cancer epidemiology dataset framework & examples

RISK FACTOR SELECTION:

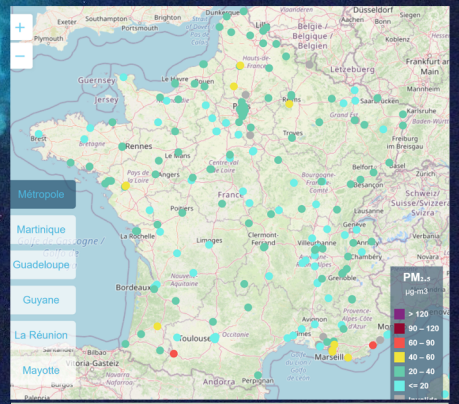
- Easily measurable → air & water agents, France
- International reference → IARC (International Agency for Research on Cancer) monographs
- Scientifically proven → Group 1 carcinogens (substances known to have carcinogenic potential for humans)

EXAMPLES:
From a list of 37 IARC Group I air & water biological, chemical and physical agents with open source data, we selected two carcinogens:

- An air pollutant: **PM 2.5** (fine particle matter), associated with lung cancer risk
- A water pollutant: **arsenic**, associated with lung, urinary bladder and skin cancer risk

NEOS FRAMEWORK (SELECTED FIELDS):

- Item group, objectives, item N°, collection status, item, item definition, expected value
- Geographic location of measure, geographic granularity of measure, date of measure, temporal granularity of measure, data source, geographic and temporal relevance
- Main cancer sites associated with agent, reference value, guidelines, monograph/backup paper, main sources of exposure
- Consent (if needed)
- Current address, for how long, past addresses (starting with most recent, as detailed as possible), for how long (years) for each past address, main occupation, usual place of main occupation, for how long (years), main mode of transportation, how many days a month, how many hours a week
- Exposure to carcinogen (concentration in medium)



Mean life expectancy gain at 30 years with the « no PM 2.5 atmospheric pollution » scenario (source : InVS, Santé Publique France). Map shows data measurement coverage

CONCLUSIONS:

- Open source environmental data are very heterogeneous
- Two types of data are crucial for the NEOS Framework: place of residence/occupation, total duration of exposure.
- Definition of variables must be in context and precise to avoid bias
- Data collection and analyses at the patient level require a precise address and geocoding.
- This work will be expanded to other IARC Group I environmental cancer risk factors with open sources, using the NEOS Framework

Possible limitations, particularly for rural areas, include the place where measurements are obtained, and agents' geographical coverage.

https://github.com/Epidemium/EPIDEMIUM-Season-3/NEOS

1 NewClin, 2 International Longevity Alliance 3 AGiR! & Hackuarium

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