



Introduction

To help provide new (planning) strategies for healthier urban environments, this project proposes to display diverse non-pre-determined spatial, socio-cultural as well as Corona-related datasets (Covid-19 cases, vaccinations) in space and time. Our research aims to overcome challenges of existing research due to biases, and lack of detail that result from a varying and inconsistent (pre-) selection of static, singular, or limited socio-cultural data. The main purpose of this project is to ascertain the relationships between health factors and Covid-19-related features (outcomes) by visualizing and analyzing crossed datasets in space over time in a data-driven approach.

Goals



Analysis of the relationships between the Corona and socio-cultural factors to identify their significance
Examination and implementation of new methods to draw evidence-based conclusions from large datasets
Identification of the most affected cities and regions in relation to the socio-cultural factors and deriving a transferable framework

Methods



Empirical social & explorative research



Secondary analysis of quantitative data



Geodata visualization with the help of Geographic Information Systems (GIS)

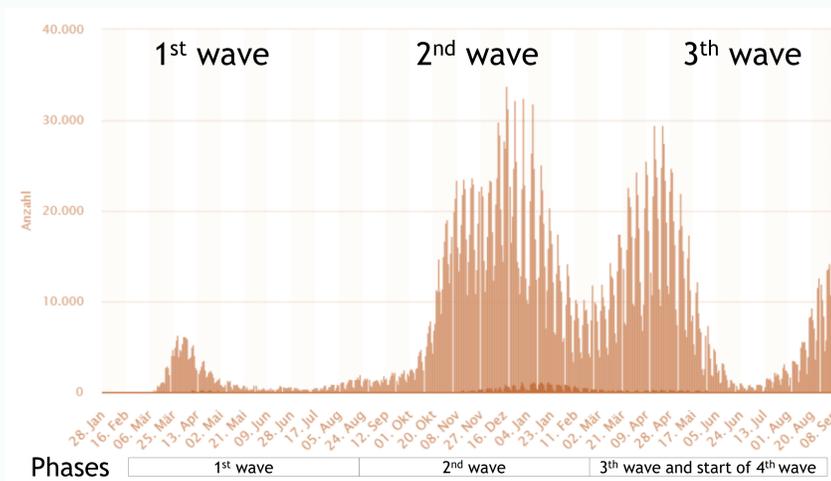


Machine Learning models

SPATIAL

COVID-19

Daily new cases/deaths



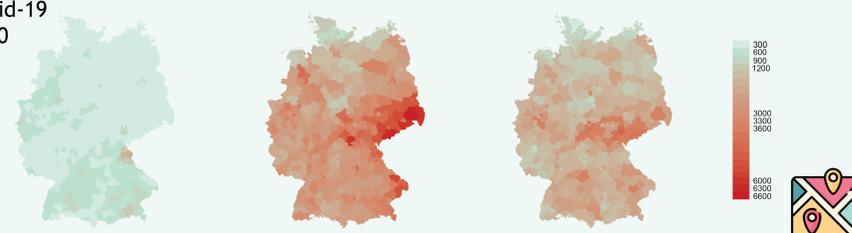
Daily confirmed new cases and deaths of Coronavirus (Covid-19) in Germany from January 2020 to September 2021¹

3 Phases (6 Monthly) of the Corona disease from March 2020 to the end of August 2021



MUNICIPALITIES

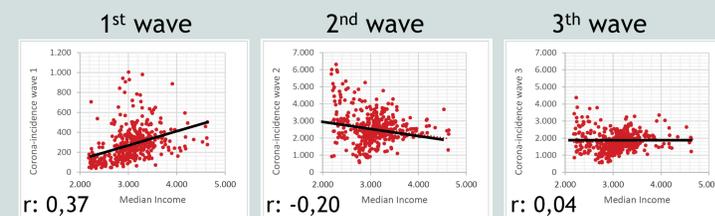
Incidence of Covid-19 cases per 100 000 inhabitants 6 Monthly



Incidence of Covid-19: Cases/Day per 100.000 Inhabitants in Municipalities (Summarized Time Series Data by 6 Months)²

INCOME

Pearson correlation between Covid-19



Median income relationships with Corona incidence in three waves of the COVID-19 pandemic in municipalities³

SOCIAL

TIME

First results

- Explorings: Corona incidences - phases/waves - spread of Covid-19 - socio-cultural factors
- At the beginning phases of pandemic were found different spatial relationships between socio-cultural factors and the spread of Covid-19 comparing to later stages of the pandemic.
- Graphics show spatial relationships between Corona incidences and income in different phases of pandemic as an example to the provided research for Germany and Netherlands.

Spatial, temporal and social analysis

- Spatial analysis of corona-related data leads to better understanding of the role of the built environment on the spread of the corona virus and the impact of vaccination
- Temporal analysis leads to better understanding of the dynamics and complexity of the evolution of the spread of the Covid-19 disease and vaccinations
- Social analysis leads to better understanding existing socio-cultural factors on the spread of Covid-19

Socio-cultural factors of health



Socio economics

Inhabitants
Household Structure
Housing
Education
Economics
Tourism
Crime/Security



Environmental and Health

Health Services
Airpollution
Noise Pollution
Urban Nature
Climate
Drinkwater
Waste



Spatial

Urban Degree
Transport and accessibility
Access to Services of General Interest (SGIs)

Time Travel Project has identified more than hundred indicators that can be explored in relation to corona-related data sets (the spread and development of the Covid-19 disease over time and through space, the impact of vaccination related to the built environment)

Caution with Interpretation!

- There is not automatically a causality just because of an identified relationship/pattern between factors
- Research risk for discovering unmeaningful overlaps and challenging discovered results to verify and draw conclusions
- The selection of methods and scales provides diverse insights

Conclusion and next steps

Developing a Machine Learning methodology based on non-predetermined datasets can help reveal evidence of unknown relations between corona and socio-cultural factors, reduce health-related socio-cultural inequalities and promote healthier environments.

- Translating those new outcomes to arrive at planning and policy strategies for healthier cities
- Pilot study on spatial, temporal and social data for Hamburg Metropolitan Area (Germany) and the Province of South-Holland (The Netherlands)
- Identification of the most affected cities and regions on Covid-19 in relation to the socio-cultural factors

Sources:
¹ Own illustration according to Statista /RKI (Stand: 8. September 2021)
<https://de.statista.com/statistik/daten/studie/1100739/umfrage/entwicklung-der-taeglichen-fallzahl-des-coronavirus-in-deutschland/#:~:text=Am%2014.,auf%20mehr%20als%2019%20Millionen.>
² Own illustration according to RKI History/ COVID-19 Datahub ESRI
https://npgao-corona-npgao-de.hub.arcgis.com/datasets/6d78eb3b86ad4466a8e264aa2e32a2e4_0/about
³ Own illustration according to Corona-Datenplattform Infas https://www.corona-datenplattform.de/dataset/?_tags_limit=0&tags=finanzen
 Icon images: Flaticon.com and thenounproject.com

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