Oasis Innovation Hub for Catastrophe and Climate Extremes Risk Assessment

Climate services to reduce human health impact associated with environmental risk factors exposure

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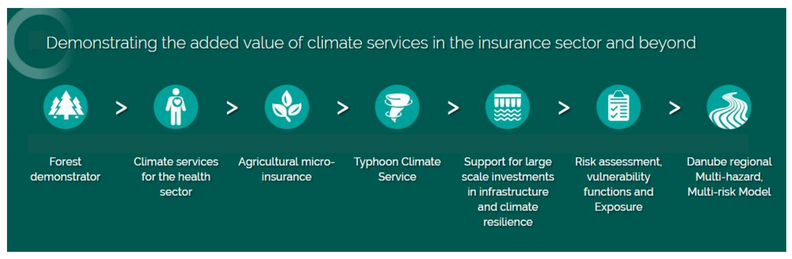
Background

- Environmental risk factors: *Air pollution* and *heat exposure*
  - *Air pollution: Especially harmful to people with a chronic respiratory disease. Inhalation of air pollutants can lead to irritation, inflammation, lowered self-cleaning and immunological defense capacity of the lungs.*
  - *Heat exposure: Heat stress leads to an excess morbidity risk of 1–9%. (Witt et al, Dt. Ärzteblatt 2016). Higher temperatures are correlated with higher ozone concentrations.*
- Climate change → *Adaptation measures* are needed to improve prevention, to increase resilience, and to protect vulnerable groups.
- *H2020 Insurance Health DEMO* → Definition and demonstration of potential services to assess climate risk for human health.

H2020 Insurance

New models, tools and services → Climate Risk Assessment



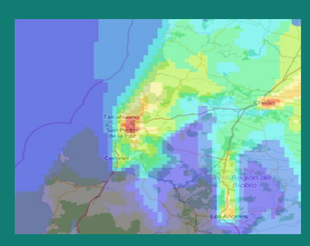
CLIMATE SERVICES – Health Sector

Risk/Impact Assessment for Planning Purposes
(health care, urban, infrastructure)

- Local-specific risk evaluation (high-resolution environmental database + user-specific health data)
- Morbidity and mortality associated cost
- Cost projections based on climate change scenarios

Risk/Impact Forecast System
(prevention/warning system, hospital management, telemedicine)

- Recommendations to prevent exacerbation
- Reduce hospital admissions
- Estimate required resources in hospitals



H2020 Insurance – Health DEMO (*https://h2020insurance.oasishub.co/*)

- **Morbidity data and high-resolution environmental data** → district specific climate relative risk for COPD hospital admissions in Berlin and Potsdam, considering the period between 2012-2016.
- **Attributable morbidity fraction and the associated cost** → present condition.
- **Climate change projections** (air quality and heat exposure) → potential future losses.
- In parallel, a clinical trial demonstrated how specific counteracting measures (**establish ideal room temperatures**, telemedicine to monitor the domestic environment, etc.) can help to reduce the hospital stay and shorten recovery time.

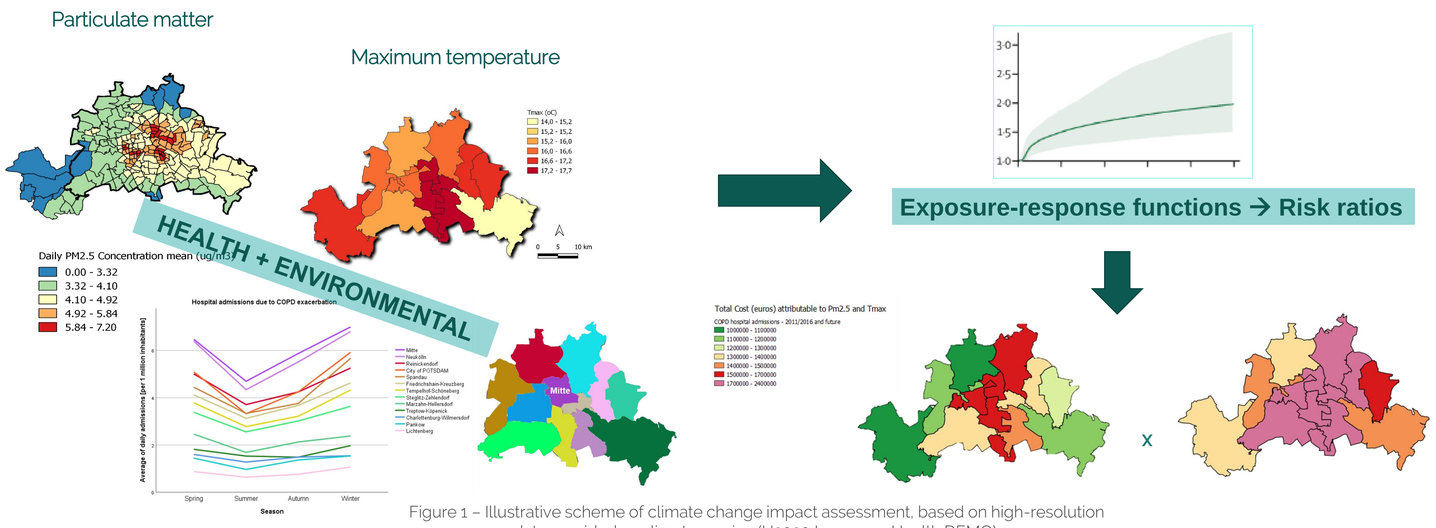


Figure 1 – Illustrative scheme of climate change impact assessment, based on high-resolution data provided as climate service (H2020 Insurance Health DEMO).

CAMS Project – AIRE Salud (*www.airesalud.cl*)

- System based on a geospatial analysis of medical consultations in public emergencies (2011 and 2018) by the **Department of Health Statistics and Information (DEIS)** of the Ministry of Health of Chile.
- Demographic/socioeconomic data + "real-time" health data + atmospheric variables = **geostatistical/machine learning** algorithms.
- Increase in respiratory infections forecast - Santiago metropolitan tegion with a **week of anticipation**.
- Confidence level of over 87%.

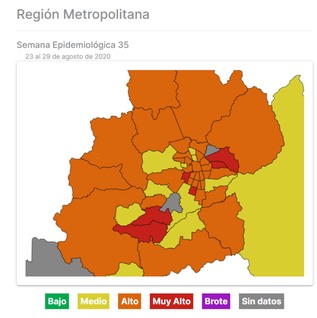


Figure 2 – Risk mapping and hospital admissions due to respiratory outcomes weekly forecast - Illustrative results (AIRE SALUD).

Conclusion

- The described applications are promising decision-making tools for adaptation strategies in urban areas, improving population resilience and/or giving support to healthcare infrastructure planning.

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