# BERTHA

BIG DATA CENTRE FOR ENVIRONMENT AND HEALTH

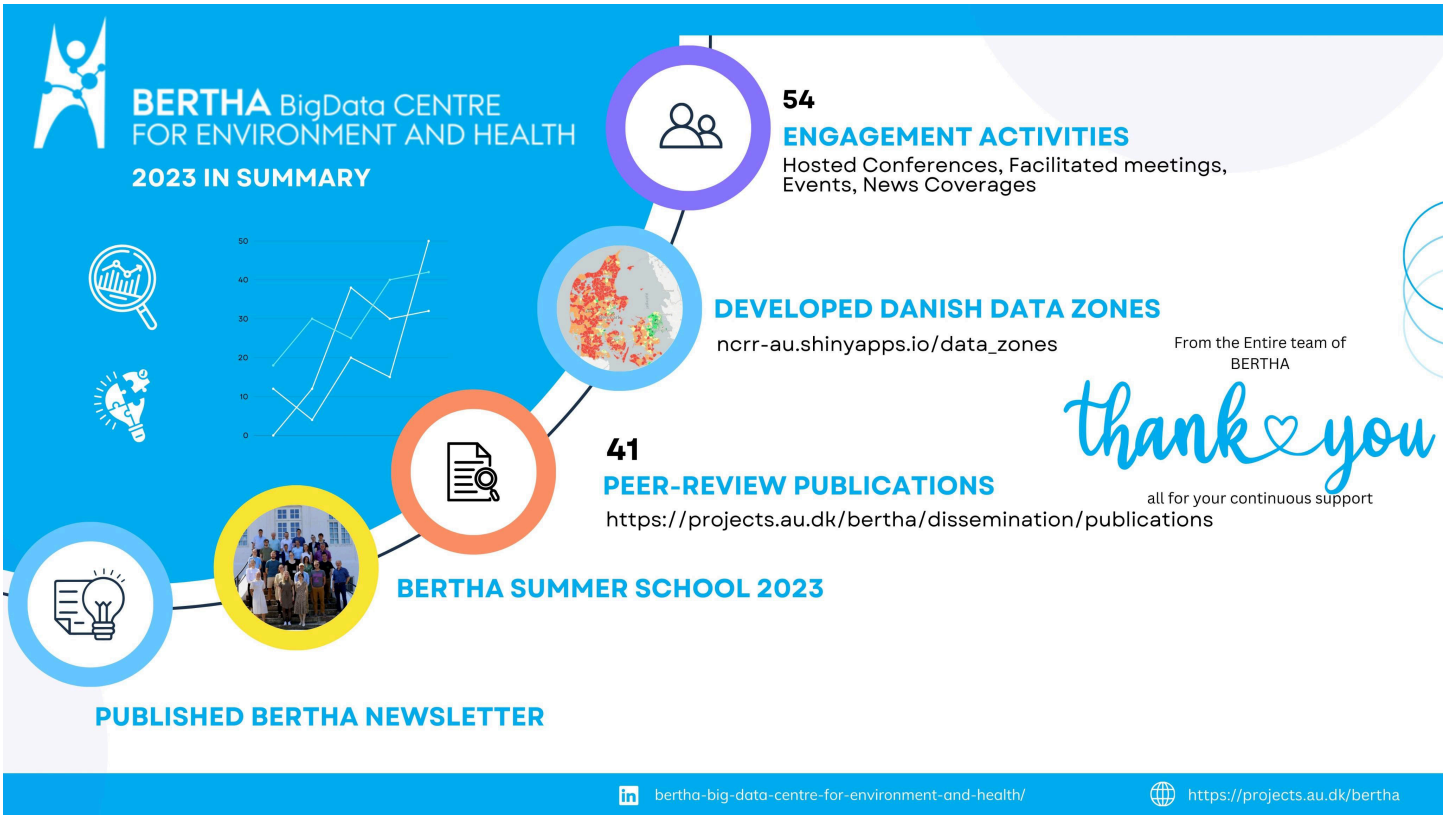
# NEWSLETTER

BERTHA BigData CENTRE FOR ENVIRONMENT AND HEALTH

March 2024

## BERTHA Summary In 2023

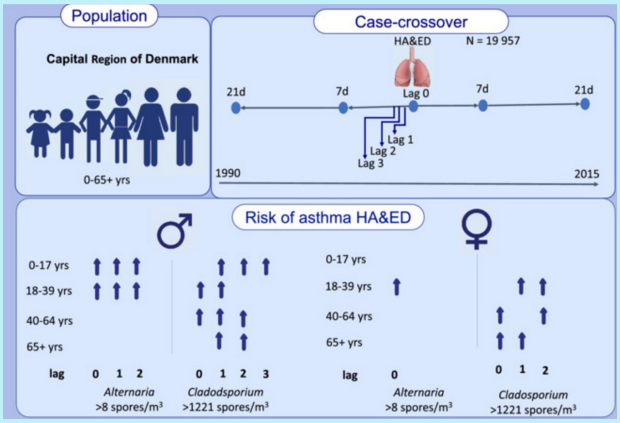
In 2023, BERTHA - Big Data Centre for Environment and Health Project marked by a series of engaging activities and insightful publications that have significantly contributed to our mission over the past year. We extend our gratitude to all the BERTHA researchers, collaborators, and the Novo Nordisk Foundation, our donor, for their significant contributions to the advancement of big data and environmental health over this impactful year.




## Inside this Issue

# Publication Highlights

## Outdoor Alternaria and Cladosporium spore concentrations are associated with increased acute asthma hospitalizations



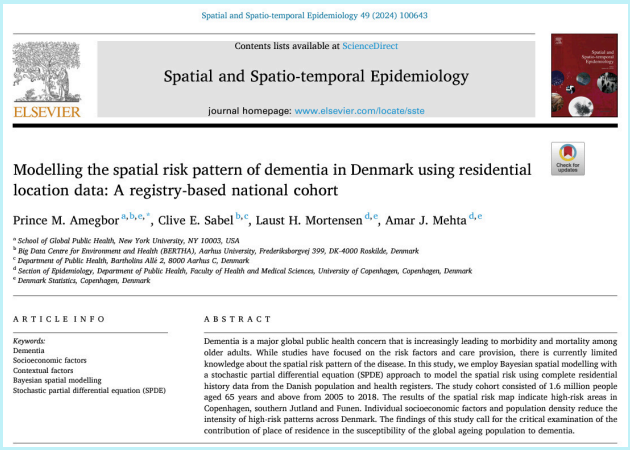

The latest publication led by BERTHA researchers Yulia Olsen and Torben Sigsgaard from the Department of Public Health at Aarhus University published in the Journal of Clinical & Experimental Allergy showed that outdoor Alternaria and Cladosporium spore concentrations are associated with increased acute asthma hospitalizations. This bi-directional case-crossover study with 26 years of national registry data at the individual level also concluded that males are more susceptible to both Alternaria and Cladosporium. Also, the age below 40 years increases susceptibility to Alternaria.
The publication was also covered in via ritzau: Svampe-astma? Skimmelsvampesporer sender astmapatienter på hospitalet

## Modelling the spatial risk pattern of dementia in Denmark using residential location data

BERTHA researchers Prince M. Amegbor and Clive E. Sabel studied spatial risk patterns of dementia in Denmark using residential location data of 1.6 million people aged 65 years and above from 2005 to 2018. The key findings are:

- Incidence rate higher among females - 9.3 per 1000 persons years at risk.
- Spatial variations in dementia risk across Denmark among persons aged 65 and above.
- Higher risk intensity in Copenhagen, southern Jutland, and Funen areas.
- Socioeconomic factors and population density mitigate risk intensity nationwide.

The results underscored the importance of considering place of residence in assessing dementia susceptibility among the ageing population.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journal homepage: www.elsevier.com/locate/sste

Modelling the spatial risk pattern of dementia in Denmark using residential location data: A registry-based national cohort

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Bayesian spatial modelling
Stochastic partial differential equation (SPDE)

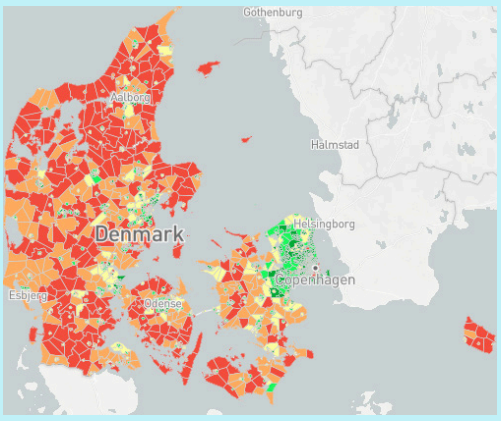
ABSTRACT

Dementia is a major global public health concern that is increasingly leading to morbidity and mortality among older adults. While studies have focused on the risk factors and care provision, there is currently limited knowledge about the spatial risk pattern of the disease. In this study, we employ Bayesian spatial modelling with a stochastic partial differential equation (SPDE) approach to model the spatial risk using complete residential history data from the Danish population and health registers. The study cohort consisted of 1.6 million people aged 65 years and above from 2005 to 2018. The results of the spatial risk map indicate high-risk areas in Copenhagen, southern Jutland and Funen. Individual socioeconomic factors and population density reduce the intensity of high-risk patterns across Denmark. The findings of this study call for the critical examination of the contribution of place of residence in the susceptibility of the global ageing population to dementia.

*More BERTHA Publications can be browsed at https://projects.au.dk/bertha/dissemination/publications*

# Data zones in Denmark for Geospatial Analysis

A transformation in Denmark's administrative boundaries over the years has posed challenges for geospatial analysis. The number of parishes and municipalities has fluctuated significantly, impacting population distribution. To address these challenges, a novel 'data zone' system comprising 1885 evenly sized geographic areas is created, ensuring consistent population density and size. This approach, distinct from traditional zoning algorithms, seeks to minimize selection bias while maintaining population homogeneity. With a mean data zone size of 2500 individuals, this innovative solution enhances the accuracy of neighborhood-level assessments from 1980 to 2016.




Reference: Pedersen, Carsten Bøcker, et al. "Urban-rural differences in schizophrenia risk: multilevel survival analyses of individual-and neighborhood-level indicators, urbanicity and population density in a Danish National Cohort Study." Schizophrenia Bulletin Open 3.1 (2022): sgab056. *https://doi.org/10.1093/schizbullopen/sgab056*

*Scan here to visit Datazones homepage*

# NNF Challenge Symposium 2023

The Novo Nordisk Foundation Challenge Symposium, which took place on September 4-5, 2023, showcased engaging discussions and the revelation of pioneering research findings within the realm of Big Data in Biomedicine. Several of our brilliant BERTHA researchers delivered presentations on the convergence of big data and environmental health.


# Louise Bøge Frederickson PhD Defense

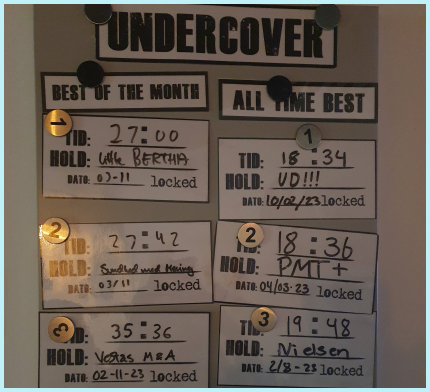
BERTHA PhD student Louise Bøge Frederickson will be defending her PhD dissertation on Monday, the 18th of March from 13:00 at H.H. Koch Auditorium, Building 112, Risø campus, and online. During her PhD studies, Louise Frederickson conducted research on low-cost sensors designed for air pollution assessments. These sensors have the potential to revolutionize urban air pollution assessments and personal exposure measurements by providing data with significantly higher resolution in both time and space compared to traditional methods, despite data quality issues. Email Louise at frederickson@envs.au.dk for signup.

***Scan below for details***

PhD

# BERTHA Researchers Top Scoreboard at Locked Aarhus


In November, BERTHA's junior researchers enjoyed a team-building outing at Locked Aarhus, impressively escaping their room in just 27 minutes. Their swift problem-solving earned them first place on the scoreboard.




BERTHA Center at bertha@ph.au.dk

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BERTHA Center is based in the Department of Public Health, Aarhus University
and collaborates with the Center for Integrated Register-based Research, Aarhus University (CIRRAU),
Department of Environmental Science, Aarhus University and
Department of Clinical Immunology, Aarhus University Hospital

**More on BERTHA at www.bertha.au.dk**

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