
INVITATION TO PHD DEFENCE
**The Airborne and Oral Microbiome in
Relation to Allergy, Asthma and Chronic
Rhinosinusitis**

Friday June 27th 2025 at 14:00

Samfundsmedicinsk Auditorium,

Building 1262, Room 101

Aarhus University

Bartholins Allé 4, 8000 Aarhus C



Christine Wulff Cramer
MD

The defence can also be viewed online. To request a link,
please contact Gitte Nielsen: gn@ph.au.dk

Research has long suggested that the microbiome plays a role in the development of allergies and respiratory diseases. However, most studies so far have focused on children or specific patient groups. In her PhD project, Christine Wulff Cramer investigated how the airborne and oral microbiome are related to allergy, asthma, and chronic rhinosinusitis (CRS) among adults in a large international population-based study.

As part of the European Community Respiratory Health Survey (ECRHS), microbiome samples were collected from the bedrooms of more than 1000 participants across five countries and analyzed using DNA sequencing techniques. In addition, oral microbiome samples were collected from participants in Norway, Estonia, and Australia.

The study found no clear association between microbial diversity in indoor air and current respiratory diseases. However, in a 10-year follow-up, greater microbial diversity in the home was associated with worsening respiratory symptoms over time. Increased bacterial and endotoxin load in indoor air was also linked to asthma, CRS, and respiratory symptoms. In the oral microbiome, greater diversity was associated with lower lung function and non-allergic CRS. Several microbial species and gene functions were more common among individuals without asthma, CRS, or allergies — suggesting that both the composition and function of the microbiome, rather than diversity alone, may be important for respiratory health.

This is the first large-scale, population-based study to examine both the airborne and oral microbiome in relation to adult respiratory health. While the results cannot be translated directly into clinical guidelines, they underline that childhood is probably the critical period for the influence of microbial exposure on respiratory health — but also suggest that high bacterial load in indoor air may be harmful to adults.

Assessment committee

Associate Professor Bodil Hammer Bech, MD, PhD, DMSc (Chair of the assessment committee)

Department of Public Health, Aarhus University, Aarhus, Denmark

Professor Lidwien Smit, MSc, PhD

Veterinary Medicine; Department Population Health Sciences; Institute for Risk Assessment Sciences, Utrecht University, Utrecht, The Netherlands

Professor Allan Linneberg, MD, PhD

Center for Clinical Research and Prevention, Fredriksberg Hospital, University of Copenhagen, Copenhagen, Denmark

Professor Vivi Schlünssen, MD, PhD (main supervisor and non-voting member)

Department of Public Health, Danish Ramazzini Centre, Aarhus University, Denmark

After the defence, everyone is welcome to join the reception hosted by the Department of Public Health