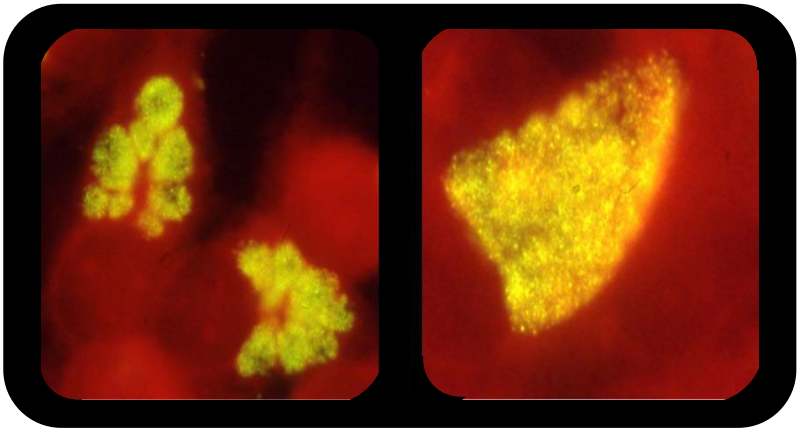
15th AACM

Fifteenth Annual Amsterdam

Chlamydia Meeting



Hotel Mercure Amsterdam City

30 June 2023
9.00 – 17.00

Preface

Welcome: This year we organise the 15th Annual Amsterdam *Chlamydia* Meeting (15th AACM). As in previous years, we have a Prize for the best presentation and pitch by a (PhD-)student. The quality of the presentations will be assessed by senior researchers present at the meeting. This year our opening keynote lecture is by prof. Raphael Validivia (USA) and in addition, we have another keynote lecture by prof Maggie Hammerschlag (USA). As from the first AACM forward, we have many junior speakers including PhD students. This year marks the fourth time we have pitches before lunch by students, PhD students, post-docs, or staff on the work in which they are engaging for the upcoming years. We are confident that the speakers will spark the minds of both young as well as established Chlamydiologists and trigger valuable discussions this day!

Acknowledgements: We would also like to thank those involved in the organization and sponsoring of this meeting.

Prof.dr. Servaas A. Morré

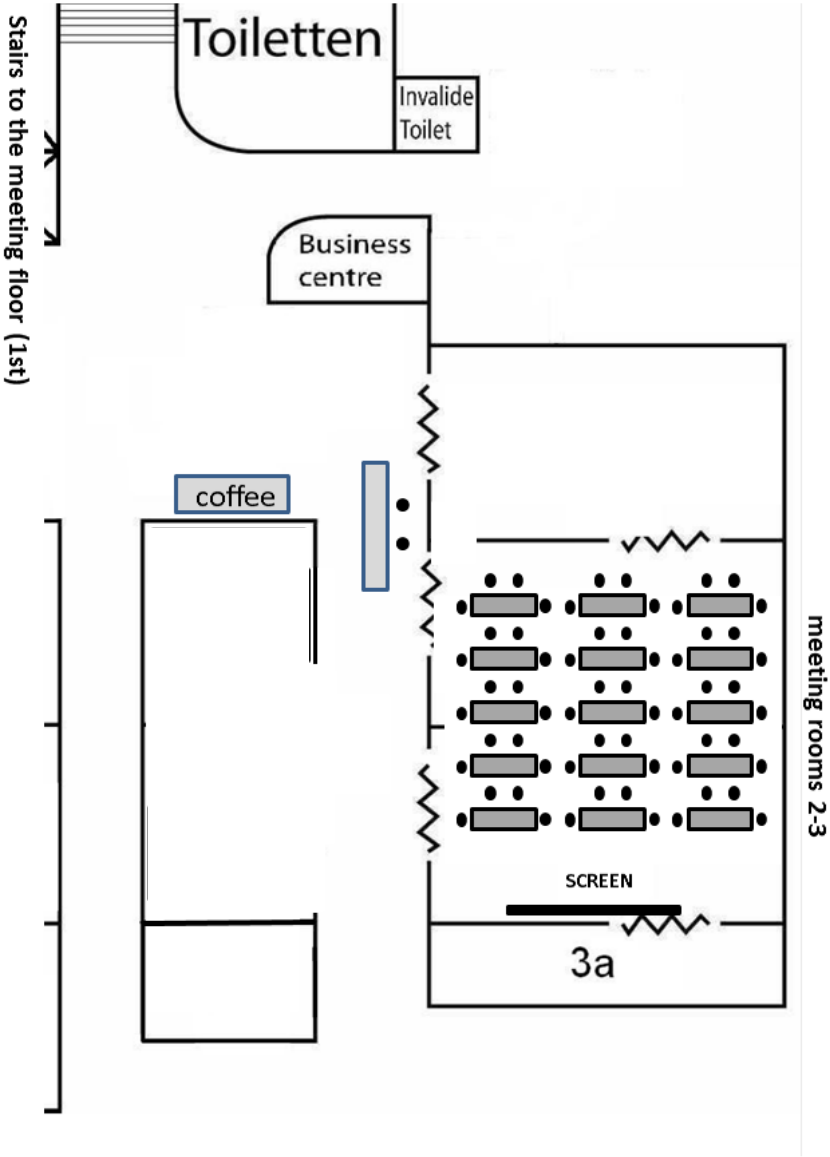
Dr. Sander Ouburg

Drs. Zoïe Alexiou

Cover photographs: Immunofluorescence staining of *Chlamydia trachomatis* within epithelial cells. HeLa cells were infected with a clinical isolate and stained with a monoclonal antibody specific for the major outer membrane protein (OmpA) of *C. trachomatis*. The left panel shows a nonfusogenic phenotype, while the right panel shows a fusogenic phenotype. Images courtesy of Yvonne Pannekoek, Department of Medical Microbiology, Academic Medical Center, Amsterdam, The Netherlands.

Amsterdam, 30 June 2023

Floor plan (1st Floor, room 3)


Stairs to the meeting floor (1st)
Toiletten
Invalide Toilet
Business centre
coffee
meeting rooms 2-3
SCREEN
3a

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Programme

8.00 – 9.00 **Registration to the symposium (1st floor, Foyer)**

9.00 Prof. Servaas Morré (NL)
Opening of the symposium

Session: *Models to study Chlamydial Infections*

9.10 Keynote: Prof. Raphael Valdivia (USA)
Organoid models to study the interactions between Chlamydia and epithelial & immune cells

9.50 Drs. Jaehyeon Kim (NL)
OviChip: Next generation (in vitro) oviduct model for Chlamydia infection

10.10 Drs. Ibe van de Casteele (BE)
LNPs as a carrier for mucosal administration of self-amplifying-mRNA based vaccines

10.30 – 11.00 **Coffee Break**

Session: *Clinical studies & Epidemiology*

11.00 Prof. Margaret Hammerschlag (USA)
Strategies for the prevention of perinatal chlamydial infection

11.30 Drs. Carlotta Gamberini (NL)
Exploring the natural course of genital infections in pregnancy: Findings from the Pemba Island Biobank Cohort

11.50 Dr. Silke David (NL)
Do we change Chlamydia trachomatis testing policy at Centers of sexual health?

Pitches

12.10 Drs. Zoïe Alexiou (NL)
Triple trouble? C. trachomatis, C. pneumoniae, and C. psittaci antibodies in women with and without reproductive tract complications

12.15 Drs. Violette Defourt (NL)
Rapidemic: a novel single-visit multiplex test for Chlamydia trachomatis and Neisseria gonorrhoeae

Programme

12.20 Ing. Roel Heijmans (NL)
First results of the Chlamydia trachomatis LAMP based Point of Care test

12.25 Dr. Alice Sijts (NL)
Animal and organoid models to determine the contribution of CD8 T cells to Chlamydia trachomatis-specific immunity

12.30 Drs. Alcira de Vries (NL)
The Comeback of the Condom

12.35 Drs. Ilja van Bergen (NL)
Assessing the impact of changing chlamydia testing policy on behaviour and STI prevalence

12.40 – 13.30 **Lunch**

Session: *Zoonosis and One Health*

13.30 Prof. Daisy Vanrompay (BE)
Emerging Chlamydia infections in animals and their zoonotic potential

13.50 Drs. Anne de Meyst (BE)
Belgian cross-sectional epidemiological study on zoonotic avian Chlamydia spp. in chickens

14.10 Drs. Jyothi Vadlamudi (NL)
One health approach on Chlamydiae: Immunoblot detection of CT, Cpneu, Cpsit.

14.30 Dr. Marloes Heijne (NL)
One Health collaboration in the detection of zoonotic chlamydial infections in the Netherlands

14.50 – 15.10 **Coffee break**

Session: *Diagnostics including Serology and Point-of-Care Testing*

15.10 Dr. Pierre Thomas (NL)
Reproductive health and serological burden of Chlamydia trachomatis and Human Papilloma Virus in the Allahabad District, Uttar Pradesh, India

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Programme

15.30 Iris Scholte (NL)
Final results of the Netherlands Chlamydia Cohort Study (NECCST): risk for reproductive health complications and chlamydia antibody response in women

15.50 Drs. Zoïe Alexiou (NL)
Trends in Chlamydia trachomatis IgG seroprevalence in the general population of the Netherlands over 20 years

16.10 Dr. Fimme Jan van der Wal (NL)
Using peptides as antigens for antibody detection

16.40 Moderators meet to select the best oral presentation by a (PhD-) student and the best pitch by a (PhD-)student

16.50 Best presentation by a (PhD-)student prize &
Best pitch by a (PhD-)student prize

Closing remarks: Prof. Servaas Morré

17:00 - 18:00 Drinks with "bitterballen" (Foyer, lobby level)

18:00 Diner (Restaurant Mercure Amsterdam City)

In Memoriam: Joe Lyons, PhD

by Servaas Morré

Photo: Steven Felschundneff, Claremont Courier

My dear friend and *Chlamydia* mentor Joseph (Joe) Lyons died Thursday December 8th 2022 at the age of 77 years. Joe was in many aspects the basis for my love of the most interesting bug *Chlamydia trachomatis* and central in my career in this field for almost 25 years.

As a third-year PhD student working on *C. trachomatis* and it's many serovars I read many of his papers. Several of those are unique and contributed tremendously to the field. When I was at my first ISHCI Chlamydia meeting in 1998 in California and was roaming the posters, I suddenly saw a poster with him as first author, thinking '*Woh he is actually here*. *I can meet this famous* Chlamydia *person in the flesh and hopefully can talk to him about collaboration options and perhaps arrange a visit to his lab.*'. And then he walked towards me and introduced himself in a very kind manner. We started talking about *Chlamydia*, research, a career in Science, and about our personal lives. And this was the start of a long-standing friendship.

I have visited his lab many times and he and his wife Sharyn invited me to his home as a post-doc many many times in a period for over 5 years. The longest duration being 4 months staying at the compounds of City of Hope in a cute white house with a red roof, which were former houses for the family of TB patients. It was an amazing time. After my PhD defence, he became my first PhD "student" and in that period we really became very close friends for life. I often talked for hours with him on the phone discussing successes and problems too; he being a true mentor to me.

The last time we met was in June 2022 in Texas, again at an ISHCI meeting. Both Joe and Sharyn were there. The circle is complete; it started in 1998 at an ISHCI meeting and ended in 2022 at an ISHCI meeting. And in Texas it was as in the good old days with the same passion in discussions as almost a quarter century ago; his spirit never changed!

Many people in my lab including Sander Ouburg, Jolein Pleijster, and Roel Heijmans, all here at the 15th AACM, have also known him a long time from his stays in the Netherlands and know he was a very passionate man in science and in politics. So it was no surprise that after his science career of over 37 years he became politically engaged and he became first a Claremont Council Member and later Mayor in his beloved city, that he and his wife lived in. He had a strong commitment to bettering his community. Steven Felschundneff from the Claremont Courier wrote on the 15th of December 2022 a very nice tribute to the former mayor of Claremont, and I am so free to take some passages to show he was so much more besides his contributions to the *Chlamydia* field.

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‘ *“Joe Lyons was so much more than a Council member and mayor,” Claremont City Council member Jed Leano told the COURIER in a text message. “He was the San Gabriel Valley’s original champion for affordable housing and homelessness, inspiring a new generation of housing and homelessness advocates. Before there was Measure H, Housing Claremont, Inclusive Claremont, or Claremont Tenants United, there was Joe Lyons. We must never stop fighting for Joe’s vision of housing all our neighbors.”*

“One of his strongest legacies will be the passage of Measure H, which raised sales tax by a quarter of a cent to fund homeless services in Los Angeles County. The measure was in danger of failing, according to Leano, but through Lyons’ efforts the campaign turned around and was approved by 69.34% of voters.”

“And when the supervisors saw Measure H was in trouble, they knew there was only one phone call to make, and that was to Joe Lyons,” Leano said Tuesday. “Because of Joe, hundreds of millions of dollars of homeless services will be working to help house our unsheltered neighbors.” ‘

I love the statement of his son Matthew Lyons. “*Dad loved Claremont and the constant pursuit for a more perfect community and world. He taught us to show up and add value, through his example of public service and action and he clearly touched the lives of many. He also pontificated with the best of them. So, the city of trees and PhDs was the perfect fit for Dad.*”

I will miss him dearly and wish his 4 sons and his wife Sharyn strength, in a new period of their live without this beautiful human being.

Some of his work really worth-while of reading for all *Chlamydia* lovers among us:
Selection of the Key publications on serovar intrinsic characteristics:

Variation in virulence among oculogenital serovars of Chlamydia trachomatis *in experimental genital tract infection*.
Ito JI Jr, **Lyons JM**, Airo-Brown, LP.Infect Immun. 1990 Jun;58(6):2021-3. doi: 10.1128/iai.58.6.2021-2023.1990.PMID: 2341189

Differences in growth characteristics and elementary body associated cytotoxicity between Chlamydia trachomatis *oculogenital serovars D and H and* Chlamydia muridarum.
Lyons JM, Ito JI Jr, Peña AS, Morré SA.J Clin Pathol. 2005 Apr;58(4):397-401. doi: 10.1136/jcp.2004.021543.PMID: 15790704

Acquired homotypic and heterotypic immunity against oculogenital Chlamydia trachomatis *serovars following female genital tract infection in mice*.
Lyons JM, Morré SA, Airo-Brown LP, Peña AS, Ito JI.BMC Infect Dis. 2005 Nov 17;5:105. doi: 10.1186/1471-2334-5-105.PMID: 16293190

Our first publication together: a letter on the effect of strain use in Chlamydia models:
Murine models of Chlamydia trachomatis *genital tract infection: use of mouse pneumonitis strain versus human strains*.
Morré SA, , Ito JI Jr.Infect Immun. 2000 Dec;68(12):7209-11. doi: 10.1128/IAI.68.12.7209-7211.2000.PMID: 11203323

Prof. Raphael Valdivia, PhD

Department of Integrative Immunobiology at Duke University, Durham, USA

raphael.valdivia@duke.edu

9:10 *Organoid models to study the interactions between Chlamydia and epithelial & immune cells*

Curriculum Vitae

Raphael Valdivia, PhD received his BS in Microbiology from Cornell University, his PhD in Microbiology & Immunology from Stanford University, and was a Damon Runyon Cancer Foundation postdoctoral researcher at the University of California, Berkeley. He started his independent career at Duke University in 2003 with a program focused on how beneficial and pathogenic microbes interact with host cells. His lab applies genetic, genomic, structural, and cell & molecular approaches to probe the host-microbe interface. His major areas of research interest include the molecular pathogenesis of *Chlamydia* infections. Dr. Valdivia has earned recognition as a Pew Scholar in the Biomedical Sciences, as a recipient of the Merck Irving S. Sigal Award from the ASM, and as a Burroughs Wellcome Fund Investigator in the Pathogenesis of Infectious Diseases. Dr. Valdivia serves as an editor in multiple journals, a standing member of NIH review panels, and was the Vice Dean for Basic Sciences at Duke University School of Medicine from 2014-2019. He is an elected Fellow of the American Association for the Advancement of Sciences and the American Academy of Microbiology. Dr. Valdivia is the Nanaline Duke Distinguished Professor of Molecular Genetics and Microbiology and the president of the *Chlamydia* Basic Research Society. He is currently Professor Chair of the Department if Integrative Immunobiology at Duke University.

Abstract

Our understanding of how the obligate intracellular bacterial pathogen *Chlamydia trachomatis* reprograms the function of infected cells in the upper genital tract is largely based on observations made in cell culture with transformed epithelial cell lines. Here we developed a primary organoid system derived from endometrial tissue to recapitulate epithelial cell diversity, polarity, and ensuing responses to *Chlamydia* infection. Using high-resolution and time-lapse microscopy, we catalogue the infection process in organoids from invasion to egress, including the reorganization of the cytoskeleton and positioning of intracellular organelles. We show this model is amenable to screening *C. trachomatis* mutants for defects in the fusion of pathogenic vacuoles, the recruitment of intracellular organelles, and inhibition of cell death. Moreover, we reconstructed a primary immune cell response by co-culturing infected organoids with neutrophils, and determined that effectors like CPAF and TepP limit the recruitment of neutrophils to infected organoids. Collectively, our model can be applied to study the cell biology of *Chlamydia* infections in three dimensional structures that better reflect the diversity of cell types and polarity encountered by *Chlamydia* in their animal hosts.

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Jaehyeon Kim, MSc

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9:50 OviChip: Next generation (in vitro) oviduct model for *Chlamydia* infection

Curriculum Vitae

Jaehyeon Kim completed her undergraduate study in Bioengineering at Hanyang University in Seoul, Republic of Korea, and then moved to Germany to undertake her Master's in Integrative Neuroscience at Otto von Guericke Universität Magdeburg. In October 2021, Jaehyeon joined MERLN Institute for Technology-Inspired Regenerative Medicine, Maastricht University as a PhD candidate. Her research aims to fabricate a reproducible and standardized full-scale 3D *in vitro* human oviduct model. Through her project, ultimately, she would like to recapitulate fibrotic responses observed during tubal inflammation by *Chlamydia trachomatis* infection.

Abstract

When *Chlamydia trachomatis* (CT) infects the female reproductive system, it severely affects the oviduct, also known as the fallopian tube in humans. As the link between upper part of the uterus and the ovaries, the oviduct serves as a pathway for gametes and embryos. In particular, the proximal isthmus section of the oviduct plays a vital role in successful pregnancy by aiding in the selection of healthy sperm and supporting early embryo's development through epigenetic reprogramming after the fertilization in the ampulla. When CT infection disrupts the oviduct, however, it triggers inflammatory responses, leading to impairment of both epithelial and stromal functions in the isthmus region that increases the risk of tubal occlusion and infertility.

Despite the importance of the oviduct, current in vitro models lack the representation of its geometrical structure and, in turn, biological functions derived from its unique features. Thus, we aim to develop a 3D *in vitro* oviduct model reflecting its physical and biological composition via biofabrication approaches. With the use of an exclusive polyoxazoline copolymer, which dissolves under the designed lower critical solubility temperature (LCST), a 1 mm diameter channel device was developed to mimic the isthmus within a collagen type I construct; this hydrogel was chosen based on its biomimetic properties and stiffness tunability.

In parallel, we have established oviduct organoids as an ideal cell source to incorporate within our 3D hydrogel tube model. We have confirmed the biocompatibility of our platform by seeding these oviduct epithelial cells, allowing them to create a homogeneous monolayer lining the tubal structure. Toward our final application, we have also developed a PDMS-based fluidic system where our tube model can be integrated. This setup serves to emulate CT particle invasion, using with fluorescent beads as a proxy, and will ultimately be used as a screening platform for the investigation of inflammatory responses caused by acute CT infection in the oviduct. This presentation will provide an overview on the conceptual framework of our model and the initial advancements achieved in its development together with the upcoming steps to be taken in this project.

Ibe van de Casteele, MSc

Laboratory for Immunology and Animal Biotechnology, Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium

10:10 LNPs as a carrier for mucosal administration of self-amplifying-mRNA based vaccines

Curriculum Vitae

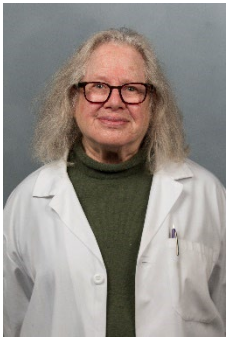
Ibe Van de Casteele graduated from the Master Bioscience Engineering in the Cell and Gene Biotechnology at Ghent University in 2020. For his Master thesis, he enrolled at the laboratory of Immunology and Animal Biotechnology after which he stayed to start his PhD project under the supervision of professor Daisy Vanrompay and professor Niek Sanders. During the project, a collaboration with Ziphius Vaccines NV (Merelbeke, Belgium) was initiated in order to study the development of a self-amplifying RNA based vaccine for human *Chlamydia trachomatis* infections using the pig as a model animal.

Abstract

Due to the SARS-CoV-2 pandemic, research on mRNA based vaccines has increased dramatically. The majority of this research is focused on administering mRNA through the parenteral route using a lipid based carrier. However, for some pathogens, such as those causing sexually transmitted infections (STIs), mucosal administration may have an edge over conventional routes as it allows to prime immune cells at the site of infection. Unfortunately, research on mucosal vaccination is limited to live-attenuated or inactivated vaccines administered intranasally or orally. Despite indications that intranasal immunization can confer protection at the genital mucosa, it may also be beneficial to investigate direct immunization at the genital mucosa when looking for a vaccine against STIs. Therefore, the goal of this research is to investigate the potential of both intravaginal and intranasal administration of a luciferase expressing self-amplifying-mRNA (sa-mRNA) reporter construct in pigs using LNPs as a carrier to evaluate the use of sa-mRNA as a vaccine platform against *C. trachomatis*.

During in vitro screening, adjustments to the PEG content of the benchmark LNP for intramuscular delivery were evaluated in order to make the particles more mucopenetrative. Afterwards, fluorescently (DiD) labelled benchmark and PEG adjusted LNPs were administered intranasally, intravaginally and intramuscularly in 10 week old female pigs through intramuscular injection and intranasal/intravaginal nebulization. Luciferase bioluminescent signal and DiD fluorescent signal in the treated tissues and in their local draining lymph nodes was then measured ex vivo using an IVIS lumina III (PerkinElmer). In vitro screening suggested that the mucopenetrative capabilities of the carrier could be improved by adjusting the PEG content of the benchmark LNP. Nevertheless, this was not confirmed in vivo as expression and uptake of sa-mRNA::Luc formulated in either the benchmark LNP or the PEG adjusted LNP was mainly observed at the muscle tissues and their local draining lymph nodes, and only faintly at the mucosal

sites and their local draining lymph nodes. Therefore, novel carriers and delivery methods for mucosal delivery of sa-mRNA are still an unmet need.



Prof. Margaret Hammerschlag, MD, PhD

State University of New York, Downstate Health Sciences University,Dept. Infectious Diseases, New York, USA

mhammerschlag@downstate.edu

11:00 Strategies for the prevention of perinatal chlamydial infection

Curriculum Vitae

Dr. Margaret R. Hammerschlag graduated from the Albert Einstein College of Medicine in New York. She completed her pediatric training at the University of Washington Seattle Children's Hospital and her Infectious Disease training at the Channing Laboratory, Harvard Medical School, Boston, Massachusetts, followed by a post-doctoral fellowship in Epidemiology at the University of Washington School of Public Health, Seattle, Washington. She is board certified in Pediatrics and Pediatric Infectious Diseases. Dr. Hammerschlag is Professor of Pediatrics and Medicine and Director of the Pediatric Infectious Diseases Fellowship Training Program at the State University of New York, Downstate Health Sciences University in Brooklyn, NY. She has served on the FDA Advisory Panels on Anti-infectives and Devices, Microbiology Section and has been an expert consultant to the CDC for the STI Treatment Guidelines since 1989. At Downstate, she established the Chlamydia Research Laboratory. Dr. Hammerschlag has served on the editorial boards of several journals including Pediatric Infectious Disease Journal, Antimicrobial Agents and Chemotherapy, Journal of Clinical Microbiology, and the Journal of Antimicrobial Chemotherapy. She is currently on the editorial board of Expert Reviews of Anti-Infective Therapy. Her research has been focused on chlamydia infections, especially the epidemiology, treatment and prevention of perinatal *C. trachomatis* infections and epidemiology, immunology, diagnosis and treatment of *C. pneumoniae* infections.

Abstract

Chlamydia trachomatis remains the most prevalent sexually transmitted infection in the United States and many countries worldwide. Women of child-bearing age, 15-25 years. have the highest burden of infection. Infection in pregnancy presents a number of problems to the pregnant woman and her infant. If a pregnant woman has active chlamydia infection there is a 50-75% chance of transmission to the infant during parturition resulting in conjunctivitis and pneumonia. Strategies to prevent perinatal infection include neonatal ocular prophylaxis and prenatal screening and treatment of pregnant women. Neonatal ocular prophylaxis, which was originally implemented for prevention of neonatal gonococcal ophthalmia has been demonstrated to be ineffective for prevention of chlamydia conjunctivitis and respiratory infections. The US Centers for Disease Control and Prevention recommended routine and screening and treatment of pregnant women >25 years of age and those > 25 who are at high risk in 1993. This has resulted in a dramatic decrease in perinatal chlamydial infection in the US. Screening pregnant women

also permits identification of sexual partners, may prevent other maternal and infant complications including endometritis, preterm labor and low birth weight. However, this strategy has not been implemented in many countries, despite high rates of maternal chlamydial infection.

Carlotta Gamberini, MSc

Institute for Public Health Genomics (IPHG)
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Maastricht University Medical Centre (MUMC), Maastricht, The Netherlands

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11:30 Exploring the natural course of genital infections in pregnancy: Findings from the Pemba Island Biobank Cohort

Curriculum Vitae

Carlotta Gamberini, born in Italy in 1996, is a researcher in the field of global, maternal and reproductive health. She began her academic journey at Maastricht University (UM), where she obtained her bachelor's degree in biomedical sciences in 2019. Afterwards she pursued a master's degree in Global Health at UM, successfully completing her studies and receiving her diploma in 2020. Since 2021, Carlotta has been actively collaborating at the Institute for Public Health Genomics at UM. Currently, she is in the final stages of her PhD, which focused on the intricate interaction between microorganisms and maternal health and healthcare on a global scale. Her research project employs a mixed-methods approach, combining quantitative analysis to investigate the role of sexually transmitted infections and vaginal microbiota in pregnancy complications, alongside qualitative research that examines the impact of infections on antenatal care.

Abstract

The prevalence and impact of *Chlamydia (C.) trachomatis*, *Neisseria (N.) gonorrhoeae*, and *Trichomonas (T.) vaginalis* infections in sub-Saharan Africa remain significant public health issues. However, there is a paucity of comprehensive data regarding their natural history, particularly among pregnant women. To address this gap, the present study aimed to investigate the persistence of these infections during pregnancy and post-delivery by analysing vaginal swabs collected from a cohort of Tanzanian women. Within the framework of an earlier biobanking initiative, vaginal swabs were obtained at three time points: two during pregnancy and one post-delivery. The detection of the microorganisms was performed by PCR using a validated detection kit. Vaginal samples of 484 pregnant women between 16 and 48 years of age were tested. The burden of infections was 12.7% at the first timepoint, 15.3% at the second, and 16.5% at the third. *C. trachomatis* infection persisted in 81% of cases (8+2weeks), while *T. vaginalis* infection persisted in 53.3% of cases (9+6weeks). During pregnancy *C. trachomatis* infection cleared within 12+6 weeks and *T. vaginalis* infection cleared within 13+0 to 21+5 weeks. Among the participants that were sampled at all three timepoints (n=138), the persistence rates were 9.1% for *C. trachomatis* infection (28+2weeks) and 10% for *T. vaginalis* infection (27+6weeks). This study presents empirical findings on the persistence and clearance patterns of curable infections among a limited cohort of women from Tanzania, during and after pregnancy.

The results obtained highlight the utility and significance of analysing bio banked samples as an effective approach for investigating the natural course of curable pathogens. Furthermore, these findings have practical implications, offering valuable insights to inform the development and implementation of targeted interventions aimed at effectively managing such infections during pregnancy.

Silke David, PhD

Center for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands

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11:50 Do we change *Chlamydia trachomatis* testing policy at Centers of sexual health?

Curriculum Vitae

Silke David works as a senior policy advisor at the Centre for Infectious Diseases Control (CIb) at the National Institute of Health and the Environment (RIVM), Bilthoven, the Netherlands. In this capacity she advises both the director of the RIVM-CIb and the Ministry of Health. Her current position mainly entails program management of STI, HIV and sexual health. As part of this job she strengthens relations and cooperation between the various stakeholders receiving subsidies from the RIVM-CIb. Among the recipients are national expert centers like Rutgers and STI-Aids-Netherlands as well as Centers for Sexual Health at Municipal Public Healthcare services. She takes a lead in the establishment of National (Action) Plans on Hepatitis and STI, HIV and sexual health, commissioned by the Ministry of Health.

Abstract

This talk reflects briefly on recent updates of the professional guidelines of GP's and the multidisciplinary guideline regarding testing for *Chlamydia trachomatis*. Do these guidelines take into account the recently published view of less testing in asymptomatic infections? In the following discussion I would like to address the impact of these guidelines on *Chlamydia trachomatis* testing policy at Centers of sexual health (CSH). On the one hand CSH would want to test only if necessary that way accommodating the paradigm shift in treating infectious diseases rather than all infections – and by doing so also saving costs. On the other hand realizing that especially young people visit CSH because of fear of an chlamydia infection. How can we prevent losing them? Which message is comprehensible for the public?

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Zoïe Alexiou, MSc

Centre for Infectious Disease Control, Epidemiology and Surveillance, STI/HIV, Dutch National Institute for Public Health and the Environment (RIVM)
Institute for Public Health Genomics (IPHG), Department of Genetics and Cell Biology, Research School GROW, Faculty of Health, Medicine & Life Sciences, University of Maastricht

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12:10 Triple trouble? *C. trachomatis*, *C. pneumoniae*, and *C. psittaci* antibodies in women with and without reproductive tract complications

Curriculum Vitae

Drs. Zoïe Alexiou (MSc) has a master's in Epidemiology with a focus on Public Health. She completed her master thesis about modelling the impact of vaccines on HSV-2 and HIV in urban China at the Erasmus University. During this project she spent three months as a visiting researcher at the CDC in Shenzhen, China. She continued to work as a junior researcher on several projects around neglected tropical diseases and HIV/AIDS. In 2021, she started working as a PhD candidate on Chlamydia control at the National Institute for Public Health and the Environment in collaboration with the University of Maastricht. She coordinated the Netherlands Chlamydia Cohort Studies, and published and presented the work at several international conferences. Her research is multidisciplinary, combining insights from epidemiology, microbiology and immunogenetics to develop tools to identify women with highest risk of Chlamydia related complications, alongside qualitative research that examines the impact of such tools on STI and fertility care.

Abstract

Roughly 1 in 6 adults worldwide experience infertility. It is not always clear what causes infertility and a range of medical, lifestyle and environmental factors have been linked. Sexually transmitted *Chlamydia trachomatis* (*C. trachomatis*) is known to cause reproductive tract complications in females, but less is known about the synergistic effect with other *Chlamydia* species. Animal experiments suggest previous exposure to multiple *Chlamydiae* could lead to more severe reproductive tract damage after a *C. trachomatis* infection. We will perform a nested case-control study within a well-defined prospective cohort of women of reproductive age. Women with a known history of *C. trachomatis* will be included. We aim to select 75 cases with chlamydia-related reproductive tract complications (pelvic inflammatory disease, ectopic pregnancy, tubal factor infertility) and 75 controls who went through uncomplicated pregnancy. For analysis of the individual antibodies the Mikrogen recomLine Chlamydia IgG immunoblot is used. This study will give us insight into population exposure to different *Chlamydiae* and associations with reproductive tract complications. Furthermore, immunoblots allow detection of antibodies directed against various *Chlamydia* antigens. We will present some preliminary results.

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Violette Defourt, MSc

Rapidemic, Leiden, The Netherlands

violette@rapidemic.com

12:15 Rapidemic: a novel single-visit multiplex test for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*

Curriculum Vitae

Violette Defourt (BE) holds a bachelor of liberal arts and sciences (Maastricht Science Program) from Maastricht University. After some endocrinology research in Denmark, she successfully completed a masters in Biomedical Sciences and Science-Based Business at Leiden University. During her master, she participated in the MIT international genetically engineered machines (iGEM) competition in 2020. Her team won the grand prize with their project “Rapidemic”. In 2021, she founded the medtech company Rapidemic B.V. with the aim to make quality diagnostics accessible to all. Since she grew the team to a 10-person team to dedicated themselves to the development of the company’s novel molecular POCT technology. Rapidemic won the Philips Innovation Award, the Sustainable Healthcare Challenge and Violette has made a TEDx talk to shed light on the current gaps to fill in infectious disease diagnostics.

Abstract

Chlamydia trachomatis (CT) and *Neisseria gonorrhoeae* (NG) are very prevalent sexually transmitted infections (STI) that infect millions of individuals every year. These infections present a great deal of shame and discomfort for patients, but can also be a real threat to public health and individual patient’s health. Current diagnostics options present important shortcomings. To make up for this important medical need and gap in the market, Rapidemic develops a novel test that combines the accuracy of lab-based tests with the ease-of-use and speed of antigen tests, for the diagnosis of CT and NG.

Amsterdam, 30 June 2023

Roel Heijmans, BASc

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12:20 First results of the *Chlamydia trachomatis* LAMP based Point of Care test

Curriculum Vitae

Roel Heijmans graduated at the higher laboratory school, Utrecht, in Microbiology in 2002. During his period of internship he studied the role of asymptomatic *Chlamydia trachomatis* infections in the development of late complications in Danish women at the Department of Pathology, Section Molecular Pathology at the VU Medisch Centrum Amsterdam under supervision of Prof. S.A. Morré, PhD.
In 2002 he joined the laboratory of Immunogenetics. During his first two years he has been studying the role of cytokine gene polymorphisms in de development of gastric cancer for the Eurogast project. Since 2004 he has been working on Rheumatic Artritis, studying several cytokine gene polymorphisms. In 2012 he joined TubaScan LTD., a VUmc spin-off company founded by dr. S.A. Morré, PhD. The company's main focus is to identify host genetic markers, pathogen markers, and environmental markers to improve diagnostics, with a main focus on Chlamydia induced subfertility/infertility. During his time at Tubascan he developed CeliaSCAN, a multiplex Real-Time PCR Assay and Melting Curve Analysis for the in vitro detection of HLA-DQ2.5, HLA-DQ2.2 and HLA-DQ8 in relation to Celiac Disease. In 2020 he joined Microbe&Lab where he helped setting up the SARS-CoV-2 diagnostics for Coronalab.eu. He also specializes in CE-IVDD and CE-IVDR registration of medical devices as well as the ISO13485 certification for production.

Abstract

The transmission from microorganisms form the environment and animals to humans (zoonosis) and the knowledge and actions to be taken as a concept is called One Health. We work on one of those One health topics via an International Globalstars grant called InPoChlam. Female Reproductive Health (FRH) is severely affected by *Chlamydia trachomatis* (Ct) due to tubal pathology and subsequently infertility and the course of infection has shown recently to be negatively influenced by the environmental *Chlamydia*-like *Waddlia chondrophila* which live in amoebae that can be found in polluted water and which are independently associated with FRH outcomes. Especially in India Infertility rates are amongst the highest in the world. From animal experiments we know that the female reproductive health is affected by the presence of multiple exposures of CT and *Chlamydiae* in general, though it is not well studied yet. It is also known that *Chlamydiae* in poultry (*i.e. C. psittaci*) is very prevalent and can be transmitted to humans via live stock, such as chicken in domestic settings, but also via poultry production plants and poultry slaughterhouses. The real unmet diagnostic need in these cases is a sensitive Point of Care (PoC) test to be able to quickly assess (within 20 minutes) *Chlamydiae* and

Chlamydia-like in humans, veterinary settings, and the environment to take quick actions including treatment. For this a Loop Mediated Isothermal amplification assay (LAMP) for the detection of *Chlamydia trachomatis* is being developed as first step. The LAMP technique is suitable for resource poor settings where proper lab facilities and skilled technicians are not there, *i.e.* in remote areas, including villages in India and Africa, as tests can be run in any heat block, oil bath, or water bath where a stable temperature can be maintained. There is no need for thermal cyclers and high-end PCR instruments. We present in this pitch the first LAMP results we obtained recently.

Alice Sijts, PhD

Dept. of Biomolecular Health Sciences,
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12:25 Animal and organoid models to determine the contribution of CD8 T cells to *Chlamydia trachomatis*-specific immunity

Curriculum Vitae

Alice Sijts performed her PhD studies in Tumor Immunology, at the Netherlands Cancer Institute and University of Leiden, under the supervision of Kees Melief. She entered the field of Infectious Diseases as a postdoc in the lab of Eric Pamer, in the Department of Medicine of Yale University Medical Center in New Haven, CT, USA, where she examined the MHC class I antigen processing pathway using the intracellular bacterium *Listeria monocytogenes* as a model pathogen. Since then, she has studied MHC processing of a variety of viral and bacterial antigens in relation to their ability to trigger T cell immunity in different model systems, first during a second postdoc at the Charité Medical School, then as an Assistant Professor at the University of Rochester Medical Center, NY, USA, and nowadays at Utrecht University. Since 2018, she is coordinating an HORIZON2020 MSCA ITN on *Chlamydia*-specific vectored vaccines (VacPath), and participates in Inno4Vac, and IMI project aimed at developing 3D models to measure vaccine efficacy.

Abstract

Chlamydia trachomatis is an obligate intracellular pathogen that, inside infected host cells, resides in a vacuole. While immunity to Chlamydia is known to involve humoral responses, the intracellular nature of this pathogen argues for a complementary role for CD8 T cells, capable of detecting intracellular infections. In VacPath, we showed that *Chlamydia*-infected host cells, unexpectedly, displayed an unprecedented high efficiency of bacterial antigen processing for presentation to CD8 T cells. Based on these results, novel vectored vaccines were developed that currently are tested in an animal model of vaginal infection with a human *Chlamydia trachomatis* serovar. Our results further are the basis for the development of functional T cell assays addressing immune protection against *Chlamydia trachomatis* in 3D organoid infection cultures of patient-derived cells.

Amsterdam, 30 June 2023

Alcira de Vries, MSc

Centre for Infectious Disease Control, Epidemiology and Surveillance,STI/HIV , Dutch National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands.

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12:30 The Comeback of the Condom

Curriculum Vitae

Alcira de Vries (1998) is a PhD student at the Dutch National Institute for Public Health and the Environment (RIVM). She has a background in Health Sciences, with a specialization in Infectious Disease and Public Health. She graduated from the Vrije Universiteit Amsterdam in 2021 with her thesis on extragenital gonorrhea infections among men who have sex with men, which she conducted at the RIVM. After a short period of working on covid as a junior epidemiologist at the RIVM, she started her PhD on condom use among youth in 2021 at the STI/HIV department of the RIVM.

Abstract

Background: Condom use among Dutch youth is decreasing. Among these young people, chlamydia is the most commonly reported STI. Since condoms are still the only effective strategy to reduce the risk of chlamydia and multiple other sexually transmitted infections, it is time for the condom to make its return and therefore: the Comeback of the Condom!

Aim: With this PhD project we plan to develop an effective condom promotion strategy.

Methods: We focus on the interaction between two people and how this affects the decision to use condoms. We do this by combining epidemiology, mathematical modelling and behavioral sciences. These different types of research will provide information on 1) the effectiveness of condom interventions, 2) condom preferences among Dutch youth, 3) which factors (e.g. self-confidence) are important in the joint use of condoms and 4) what the impact is on chlamydia transmission if those factors are targeted with interventions.

Preliminary results: Though condom interventions generally had little effect on condom use, results indicated that interventions were more effective when tailored towards either females or males. This will serve as input for the following studies.

Amsterdam, 30 June 2023

Ilja van Bergen, MSc

Epidemiology and Surveillance Unit, Centre for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands.

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12:35 Assessing the impact of changing chlamydia testing policy on behaviour and STI prevalence

Curriculum Vitae

Ilja van Bergen (1998) studied Health Economics and Healthcare Policy, Innovation and Management at the University of Cologne and Maastricht University respectively. She completed this double master degree in July 2021 with a master thesis on the beliefs regarding COVID-19 vaccination of young adults in the United Kingdom at Brunel University London. After working for 1.5 years as a policy officer at the Ministry of Health, Welfare and Sports (COVID-19 vaccination), she started as a PhD student at the National Institute for Public Health and the Environment (RIVM) in May 2023.
PhD-project: Behavioural sciences integrated in infectious disease modelling: upgrading policy advice (BEHAVING). Promotor: Prof. Dr. Marijn de Bruin (RIVM, Radboudumc), co-promotors: Dr. Janneke Heijne (GGD Amsterdam) and Dr. Daphne van Wees (RIVM)

Abstract

Background: *Chlamydia* testing policies in the Netherlands are currently reconsidered, and might shift from promoting widespread asymptomatic testing towards disease management (*e.g.*, testing only symptomatic individuals). However, the impact of this policy change on other behaviours associated with STI transmission, such as condom use or gonorrhoea testing, and on STI prevalence is unknown.

Objective: To examine 1) heterogeneity in STI healthcare-seeking behaviour, condom use, and different components of behaviour related to changes in chlamydia testing policy and 2) to assess the impact of this policy change on STI prevalence.

Study design: We will develop and validate a framework for collecting real-life data on the (possible) effect of future policy changes on (components of) current and future behaviour of people. This framework will consist of two questionnaires administered at two time points: 3 months before the anticipated policy change and 3 months after its implementation. By doing so, we aim to quantify the potential intention-behaviour gap and identify the components of behaviour that explain this gap. Data collected in these questionnaires will be incorporated in mathematical models to project the impact of changing chlamydia testing policy on chlamydia and gonorrhoea prevalence, and on long-term complications related to chlamydia infections.

Amsterdam, 30 June 2023

Prof. Daisy Vanrompay, DVM, PhD, DVP

Laboratory of Immunology and Animal Biotechnology, Faculty of Bioscience Engineering, Ghent University, Belgium

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13:30 Emerging *Chlamydia* infections in animals and their zoonotic potential

Curriculum Vitae

D. Vanrompay graduated in 1990 at Ghent University as Doctor in Veterinary Medicine (magna cum laude; first of her class) and defended here PhD on *Chlamydia psittaci* infections in turkeys to become Doctor in Veterinary Sciences in 1994 (summa cum laude). Her PhD research was awarded by the Royal Academy for Medicine, Belgium (1995) and the Flemish Association for Epidemiology and Economy (1998). Vanrompay is full professor at Ghent University. She is the director of the Laboratory for Immunology and animal biotechnology at Ghent University and Director of the National Diagnostic Reference Laboratory for *C. psittaci* infections in humans. She is a member PROVAXS (www.provaxs.com), the UGhent center for strategic prophylaxis and vaccine development. Here laboratory focuses on *Chlamydia* infections in humans and animals, *Escherichia coli* infections in ruminants, swine and poultry, and *Vibrio* spp. infections in aquatic animals.

Abstract

Avian *Chlamydia psittaci* and ruminant *Chlamydia abortus* strains are well recognized zoonotic *Chlamydia* species. *C. psittaci* is an obligate intracellular bacterium that causes respiratory disease in birds. In humans, this organism may cause psittacosis, a respiratory disease that can spread to involve multiple organs, and in rare untreated cases may be fatal. *Chlamydia abortus* is mainly responsible for ovine enzootic abortion, but it is also a dangerous pathogen for pregnant women. Interestingly, recent data illustrate zoonotic transfer of additional *Chlamydia* species such as *Chlamydia caviae*, *Chlamydia suis*, *Chlamydia gallinacea* and the more recently discovered avian *Chlamydia abortus* strains. We intend to give and overview on zoonotic *Chlamydia* infections focusing on clinical disease and diagnosis and will try to illustrate the importance of early diagnosis and awareness. Indeed, 'veterinary' chlamydial agents have received less attention by physicians. Human medicine should be more aware of the zoonotic potential of *Chlamydia* as there is accumulating evidence that these species are more abundant in animals than previously assumed. Also, recent data stress the need for a close collaboration between physicians, medical microbiologists, veterinarians and public health officials, as crucial information for source tracing, such as potential animal reservoirs can otherwise be missed.

Amsterdam, 30 June 2023

Anne de Meyst, MSc

Laboratory of Immunology and Animal Biotechnology, Faculty of Bioscience Engineering, Ghent University, Belgium

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13:50 Belgian cross-sectional epidemiological study on zoonotic avian *Chlamydia* spp. in chickens

Curriculum Vitae

Anne De Meyst is a PhD student at the faculty of Bioscience Engineering at the University of Ghent. She obtained a Master's degree in Industrial Sciences in Biochemistry in 2017, and subsequently started a Master education in Bioscience Engineering, specializing in Cell and Gene Biotechnology. During her Master's studies, Anne had the opportunity to conduct her dissertation in the laboratory of Immunology and Animal Biotechnology, under the guidance of Professor Daisy Vanrompay. Professor Vanrompay's research team is dedicated to studying host interactions of *Chlamydia* species, and to the development of alternative antimicrobial treatments and vaccines targeting these species. Having completed her Master's degree in 2019, Anne decided to continue her research in the same laboratory and began her PhD journey. Her current research focuses on the epidemiology of avian *Chlamydia* species in chickens and pet birds, and on the development of an mRNA vaccine targeting *Chlamydia psittaci* in pet birds.

Abstract

Chlamydia psittaci is an established respiratory pathogen in the poultry industry. However, recently, the landscape of avian *chlamydiae* has been altered by the discovery of the species *Chlamydia gallinacea* and *Chlamydia abortus* avian strains. *Chlamydia gallinacea* is currently considered a commensal, as it has not yet been associated with a clear pathology. On the other hand, *Chlamydia abortus* primarily infects small ruminants, but a number of strains has been detected in birds as well. These three species have confirmed or suggested zoonotic potential and are the most common *Chlamydia* spp. in the chicken industry. No recent data are available on their prevalence and impact in the Belgian chicken industry or in the recreational chicken branch. Therefore, a cross sectional epidemiological study was executed where samples were collected from both factory-farmed and backyard chickens. More specific, pharyngeal chicken swabs were obtained from 20 chicken farms, 5 chicken abattoirs and 38 different backyard locations, and were analysed with PCR for the presence of the three avian *Chlamydia* spp.. To investigate their zoonotic potential, samples were simultaneously collected from 54 chicken backyard caretakes and 37 professional chicken caretakers, and analysed with PCR. This study confirmed the presence of all three species in both the chicken industry and in backyard settings. *Chlamydia psittaci* was the most prevalent in the industry (11%) whereas *Chlamydia gallinacea* was the dominant species in backyard chickens (14.5%). *Chlamydia abortus* infections were more common in industrial chickens (9%) compared to backyard

chickens (2.6%). All three species were also detected in humans (3.9% *Chlamydia psittaci*, 2.9% *Chlamydia gallinacea* and 0.98% *Chlamydia abortus*). To our knowledge, this is the first study that reports transmission of *Chlamydia abortus* avian strains to humans.

Jyothirmayi Vadlamudi, MSc

Institute of Public Health Genomics (IPHG), Department of Genetics & Cell Biology, GROW Research school for oncology and development biology. Maastricht University, Maastricht, The Netherlands

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14:10 One health approach on *Chlamydiae*: Immunoblot detection of CT, *Cpneu*, *Cpsit*.

Curriculum Vitae

Jyothi (a.k.a Jyothirmayi) has a background in bioinformatics and neurosciences. She has gathered real-life experience in dealing with large biological datasets mainly in the fields of genomics, proteomics and neuroimaging and translating it into research findings and evidence. She is currently partnering with the Institute of Public Health Genomics (IPHG), Maastricht University, where she investigates new data-driven approaches for the detection and surveillance of *Chlamydiae* using a OneHealth approach, she focuses on the establishment of data repositories and analytics tools to improve the understanding of transmission dynamics in resource-limited settings.

Abstract

The overarching aim of the study is detection and surveillance of *Chlamydia trachomatis* (CT), *Chlamydia pneumoniae* (Cpneu), and *Chlamydia psittaci* (Cpsit), with a focus on female reproductive health. For this study, seroprevalence of CT, Cpneu, Cpsit were tested in women attending the Hayes Memorial Hospital (SHUATS, India). Epidemiological, demographic and clinical data (Questionnaire) were collected from the women. In total 225 serum specimens were analyzed by the recomLine Chlamydia IgG immunoassay. The test principle allows the identification of specific antibodies against various antigens of *Chlamydia trachomatis* (MOMP, OMP2, TARP, CPAF, HSP60), *Chlamydia pneumoniae* (MOMP, OMP2, TARP, CPAF, YwbM), and *Chlamydia psittaci* (MOMP, OMP2, TARP, CPAF) through the separate line-up of the individual antigens.

Results & Follow-up:

The preliminary results show a low prevalence of *Chlamydiae*, in the current population: Cpneu 35+=15,6%, CT 6+=2.7% and Cpsit 5= 2.2%., which can be explained in parts by the nature of the population. It consists mostly of married housewives with an overall low risk profile, particularly for Sexually Transmitted Infections. In the future, it is necessary to establish a connection between the epidemiological and clinical data. This study demonstrates the potential use of immunoblots to gather data in settings with limited resources. It emphasizes the significance of adopting the One Health approach and highlights the requirement for diverse data sources, including clinical, environmental, and veterinary data, to uncover the transmission pathways of the pathogen.

Amsterdam, 30 June 2023

Marloes Heijne, PhD

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14:30 One Health collaboration in the detection of zoonotic chlamydial infections in the Netherlands

Curriculum Vitae

Marloes Heijne graduated as a veterinarian with a differentiation in Farm Animal Health in 2008. From 2008 to 2011 she worked as a farm animal veterinarian at a veterinary practice in Friesland. In 2011, she returned to Utrecht to work as a lecturer at the Farm Animal Health department of the Faculty of Veterinary Medicine. In her current job at Wageningen Bioveterinary Research (WBVR) in Lelystad, she is project leader on statutory tasks for notifiable bacterial animal diseases and zoonoses including avian chlamydiosis. Marloes participated in several research projects including a ZonMW funded research project “Plat4m-2bt-psittacosis”. In 2021 she finished her PhD thesis on “Avian chlamydiosis in chickens: from cell to population”. Since 2022 she is recognized as a Dutch Specialist Veterinary Microbiology.

Abstract

In 2014 the ZonMW funded project Plat4m-2Bt-psittacosis was a starting point to improve the One Health collaboration on zoonotic chlamydial infections by creating an online data-sharing platform that would aid source tracing. It turned out data sharing between different organisations in the medical and veterinary domain is a major legal hurdle, because of privacy regulations. Although data sharing was a hurdle, the project did result in improved source tracing protocols and harmonization of the ompA (outer membrane protein A) based typing method between the medical and veterinary reference laboratories. Furthermore, the project resulted in adaptation of the (human) reporting requirements to include all zoonotic chlamydial infections. This adaptation was also due to other developments in the chlamydial field, such as the detection of zoonotic cases of *Chlamydia caviae* and the discovery of new chlamydial species, *i.e. C. avium* and *C. gallinacea*.
In the Plat4m-2Bt-psittacosis it was shown that *C. avium* could be detected in pigeons and *C. gallinacea* is highly prevalent in layer hens. To get further insight in the possible zoonotic potential of these new species, a small follow up study was undertaken in which 152 samples from people with pneumonia were examined with PCR. In none of these samples *C. avium* or *C. gallinacea* could be detected, but *C. pneumoniae* was detected once and *C. psittaci* twice. Therefore, no evidence could be collected that *C. avium* and *C. gallinacea* are zoonotic but the sample size was small and with limited geographical spread. In addition, it the presence of *C. gallinacea* in broiler chickens was investigated at

90 farms, but *C. gallinacea* was not detected in any of the samples in contrast to earlier results in layers. Differences in husbandry might explain these results.
In the winter of 2019 and 2020 a higher incidence of human psittacosis patients was identified in the Netherlands, but a clear source could not be detected. Multi locus sequence typing (MLST) of human samples revealed that not all patients had been exposed to the same source. Retrospective MLST typing of animal samples revealed that garden birds might have played a role as the possible a source. These results have to be interpreted with caution, but the above examples show that One Health collaboration helps to identify or exclude possible sources of zoonotic chlamydial infections.

Pierre Thomas, PhD

Institute of Public Health Genomics (IPHG), Department of Genetics & Cell Biology, GROW Research school for oncology and development biology. Maastricht University, Maastricht, The Netherlands

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15:10 Reproductive health and serological burden of *Chlamydia trachomatis* and *Human Papilloma Virus* in the Allahabad District, Uttar Pradesh, India

Curriculum Vitae

Pierre currently works as an Assistant Professor at the Institute of Public Health Genomics at Maastricht University, where the focus of his research lies on Sexual and Reproductive Health, Sexually Transmitted Infections with a focus on the global south and resource-limited settings and more particularly in India. He also active as faculty member in several programs at the faculty of Health, Medicine and Life sciences, where he is involved in the Public Health and Global Health trajectories as a lecturer, tutor and mentor.
He graduated with a Doctoral thesis entitled “ChlamIndia, burden of *C. trachomatis* in India, implication for policy and practice” in 2018. Before joining IPHG, Pierre graduated with a Master’s degree in Clinical Epidemiology and a bachelor’s in European Public Health from Maastricht University.

Abstract

This study aimed to assess the burden of sexually transmitted infections (STIs), specifically *Chlamydia trachomatis* (*C. trachomatis*) and *Human Papilloma Virus* (HPV), and their impact on reproductive health outcomes in a semi-rural district in India. A total of 238 women attending the gynaecology Outpatient Department (OPD) in Allahabad, Uttar Pradesh, were recruited between 2016 and 2018. Clinical samples were collected, including vaginal swabs, urine, and blood, for testing *C. trachomatis* and HPV using RT-PCR and ELISA serology, respectively.

The study revealed a high burden of adverse pregnancy outcomes, such as stillbirths, miscarriages, and ectopic pregnancies, among the enrolled women. The prevalence of HPV (14.29%) and *C. trachomatis* (8.40%) infections was observed, with HPV16 being the most prevalent genotype. Notably, two patients were found to have co-infections of *C. trachomatis* and high-risk HPV (hrHPV). Furthermore, a significant association was observed between HPV infection and a history of miscarriages, suggesting a potential role of HPV in adverse reproductive outcomes.

The study population consisted mostly of monogamous and low-risk women, indicating that the burden of symptoms, particularly vaginal discharge, and adverse pregnancy outcomes could be attributed to infections. These findings highlight the presence of an encapsulated epidemic in India, where a few individuals bear the majority of the STI burden. Limited access to sexual and reproductive health (SRH) services, including HPV vaccination, was noted in this region, contributing to the under-diagnosis and under-treatment of STIs. Although the study lacked statistical power to establish a significant relationship between *C. trachomatis* and HPV co-infection and reproductive health outcomes, it provides valuable insights into the transmission dynamics of STIs in Indian communities. The results emphasize the urgent need for increased awareness, education, and comprehensive SRH services in rural areas to address the unmet needs and design effective prevention and outreach efforts. Future research with larger sample sizes and standardized diagnostic methods should be conducted to further investigate the synergistic effect of C. trachomatis and HPV on reproductive health and explore potential interventions to mitigate their impact.

Iris Scholte

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15:30 Final results of the Netherlands Chlamydia Cohort Study (NECCST): risk for reproductive health complications and chlamydia antibody response in women

Curriculum Vitae

Iris Scholte is a first-year Biomedical Sciences master student at the Radboud University in Nijmegen, with a specialization in epidemiology. She did her bachelors in dentistry, after which she decided to gain work experience in health promotion. In 2021, she returned to university for a premaster in Biomedical Sciences. During this year she did an internship at the department of Health Evidence at the Radboudumc Nijmegen, where she wrote a thesis on the topic: *Quality of life in children with orofacial clefts*. She currently works as an intern at the RIVM, researching *Chlamydia trachomatis*, and specifically looks into changes in Ct IgG antibody status over time and determinants of persistence.

Abstract

Background *Chlamydia trachomatis* (Ct) infections can have serious long-term complications, such as pelvic inflammatory disease (PID), tubal factor infertility (TFI) or ectopic pregnancy (EP). However, studies that address the natural course of Ct infection are limited and complications are not often monitored. To estimate the risk for late complications, the NECCST was initiated. Additionally, we explored persistence of Ct IgG antibodies over time.

Methods NECCST is a cohort of 5,704 women of reproductive age all tested for chlamydia by PCR in a chlamydia screening study (CSI) between 2008-11. Participants provided a self-collected blood sample in 2015/16 (n=3,318) and 2021/22 (n=2,089) that was tested for Ct IgG antibodies using the SERION ELISA. *Chlamydia*-status (positive/negative) was defined using CSI-PCR results and/or Ct IgG presence and/or self-reported past Ct. Data on pregnancies and late complications, i.e. PID, EP and TFI were self-reported. Complications were compared between Ct-positive and Ct-negative women using multivariable Cox regression. Multivariable logistic regression was used to determine predictors of antibody persistence.

Results Incidence of complications (per 1000 py) was higher among chlamydia-positive as compared to chlamydia-negative women: PID 5.2 (4.2-6.4) versus 1.6 (1.4-1.9), EP 1.9 (1.3-2.6) versus 0.7 (0.5-0.9) and TFI 1.5 (1.0-2.1) versus 0.3 (0.2-0.5). Overall pregnancy proportions were similar across chlamydia status (65.0%). 1,405 women provided a repeated blood sample after six years. Of those who initially tested Ct IgG positive 118 (42%) were persistent positive and 163 (58%) became negative. Of those who initially tested Ct IgG negative, 1,065 (94.8%) remained negative and 59 (5.2%) became newly

positive. Educational level and number of partners were positively associated with Ct IgG persistence. Having an unnoticed untreated Ct infection was negatively associated with Ct IgG persistence.

Conclusion A previous Ct infection is strongly associated with EP, PID and TFI in (Ct-treated) women, but incidence rates are low. Ct IgG antibodies waned in about half of the women after six years of first Ct antibody test.

Zoïe Alexiou, MSc

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15:50 Trends in *Chlamydia trachomatis* IgG seroprevalence in the general population of the Netherlands over 20 years

Curriculum Vitae

Drs. Zoïe Alexiou (MSc) has a master's in Epidemiology with a focus on Public Health. She completed her master thesis about modelling the impact of vaccines on HSV-2 and HIV in urban China at the Erasmus University. During this project she spent three months as a visiting researcher at the CDC in Shenzhen, China. She continued to work as a junior researcher on several projects around neglected tropical diseases and HIV/AIDS. In 2021, she started working as a PhD candidate on Chlamydia control at the National Institute for Public Health and the Environment in collaboration with the University of Maastricht. She coordinated the Netherlands Chlamydia Cohort Studies, and published and presented the work at several international conferences. Her research is multidisciplinary, combining insights from epidemiology, microbiology and immunogenetics to develop tools to identify women with highest risk of Chlamydia related complications, alongside qualitative research that examines the impact of such tools on STI and fertility care.

Abstract

Background In the Netherlands, *Chlamydia trachomatis* (Ct) reporting rates are rising, but it is unclear if this is due to increased transmission or better case-finding. Nation-wide Ct seroprevalence surveys are a tool for understanding the impact of control activities in countries. We report sex and age-specific Ct seroprevalence estimates in the general population of the Netherlands between 1996 – 2017.

Methods Three representative independent nation-wide population-based serosurveillance studies were conducted in 1996, 2007 and 2017. Participants provided a questionnaire and a blood sample. 5158 men and women (aged 15-59) were included. The Medac Ct IgG ELISA was used to test for Ct IgG antibodies. Census weights were used to achieve estimates representative for the general Dutch population. Weighted seroprevalence estimates were stratified by gender, age and birth cohort. Trends and risk factors were identified using multivariable logistic regression.

Results Among women <25 years there was a non-significant increase in seroprevalence from 5.9% in 1996 to 7.6% in 2007 and 8.8% in 2017, during a period of intensified Ct testing-and-treatment in this group. Among women ≥25 years, the seroprevalence

significantly decreased from 15.6% in 1996 to 9.5% in 2007 and remained lower in 2017 at 11.2%. In men we did not observe trends.
Conclusion We found no evidence for a decrease in population Ct seroprevalence in under 25-year-olds, despite decades of targeted Ct testing-and-treatment efforts. Our study contributes to the increasing body of (indirect) evidence for limited effect of Ct control activities on transmission in the population

Fimme Jan van der Wal, PhD

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16:10 Using peptides as antigens for antibody detection

Curriculum Vitae

I am research scientist at Wageningen Bioveterinary Research (WBVR), a research institute located in Lelystad, and part of Wageningen University and Research.
After a study biology (1990, Rijksuniversiteit Groningen, NL) I worked on protein secretion by bacteria and the biotechnological application of bacterial secretion systems (PhD 1995, Vrije Universiteit, Amsterdam, NL). As a post-doc I studied the interactions of chaperones with glycoproteins in the secretory pathway of mammalian cells (The University of Manchester, UK) and quality control of proteins in the secretory pathway (National Institute for Public Health (RIVM), Bilthoven, NL; Leiden University Medical Center, NL). In 2002 I started at WBVR, with research on *Campylobacter* and from there moved in to assay development. My current focus is on rapid diagnostic tests such as LAMP assays, and multiplex tests in the format of bead-based suspension arrays for the detection of antibodies against bacteria and viruses that occur in livestock.

Abstract

The available differentiating tests for *Chlamydia* are based on detection of genetic material and only give information about the actual infection status, but nothing on past infections. The goal of this study was to investigate if it is possible to differentiate between antibodies against different *Chlamydia* species in chicken sera. To this end, a bead-based Luminex suspension array was built with peptides to capture antibodies. The suspension array correctly identified antibodies against various *Chlamydia* species in sera from experimentally infected mice and was also able to differentiate between antibodies against *C. psittaci* and *C. gallinacea* in sera from experimentally infected chickens. Results of the suspension array with field sera are supported by published data on the occurrence of *C. gallinacea* in Dutch laying hens, thereby demonstrating the proof of concept of multiplex serology for Chlamydial species in poultry.

Amsterdam, 30 June 2023

Symposium Organizer
Servaas A. Morré

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Curriculum vitae

Professor Servaas A. Morré is working on *Chlamydia trachomatis infections* for almost 25 years, with a central focus on female infertility and women's reproductive health. He is a serial entrepreneur in the field of (infectious) disease diagnostics, human biomarkers and personalised medicine to generate new application in health care systems. Coordination of large international consortia, in which SMEs take place, funded by European money is the basis for his translational output.

Education: He graduated at the VU University, The Netherlands, in Biochemistry and Molecular Biology in 1994. His internships were at The Zaadunie, Department of Cell biology on plant genetics: polyploidization of *Brassica oleracea* (Cauliflower) during cell culture (M. Tan, PhD) and at the Department of Biochemistry and Molecular Biology VU on processing of ribosomal RNAs in *Saccharomyces cerevisiae* (Prof. H. Raué, PhD). His PhD thesis (1999) was performed at Department of Pathology (VU University, Amsterdam) on the epidemiology, transmission, natural course, diagnostics and immunopathogenesis of human urogenital Chlamydia trachomatis infections. Finally, in 2009-2010 he got his Master in Biobusiness and Entrepreneurship to gain further experience for the management of spin-off companies of the VU University Medical center.

Positions: He was working as Head of the Laboratory of Immunogenetics (started in 2001-2021, Monday-Wednesday), VU University medical center, Amsterdam and is currently working as Director of the Institute of Public Health Genomics (IPHG) (started in 2011, Thursday-Friday), University of Maastricht. From Feb 2012 he is Professor Host-pathogen Genomics in Public Health at IPHG. Since 1st of Sept 2009 he coordinates together with Prof.dr. Christian Hoebe the Dutch Chlamydia trachomatis Reference Laboratory (Amsterdam) for the RIVM including specific CT research tasks and since 2023 the Reference Laboratory is positioned in Maastricht in the Department of Medical Microbiology and Dr. Petra Wolffs and Dr. Inge van Loo have been added to the coordinating team. Finally since 2015 he is Professor of Biotechnology and Immunogenetics at SHUATS, Allahabad, India and since May 2021 he is working parttime in Microbe&Lab BV one of his spin-off companies.

Studies abroad: As an Erasmus Fellow he studied at the Universidade Do Porto, Laboratório de Genética Molecular, Portugal, on POLO: an essential kinase for mitosis in Drosophila melanogaster (Prof. C. Sunkel, PhD). As a postdoc, the Van Coeverden Adriani Foundation made it possible to extend his Chlamydial research at the Department of Infectious Diseases, The City of Hope Medical Center, California, USA, in collaboration with Dr. Joseph Lyons, specialists in murine modelling in a period of 5 years yearly visits were made, the longest 4 months.

Research, grants and consortia: He is working on infectious diseases and inflammatory diseases for more than 20 years and has over 180 publications, from which most are on *Chlamydia trachomatis*. His research is for the major part focused on the immunogenetics of infectious diseases with special attention to *Chlamydia trachomatis* and Bacterial meningitis (collaboration Pediatrics, VUmc). He was Scientific Consortium Director, of the European Framework Programme 6 (FP6) grant (LIFESCIHEALTH FP6, Co-ordination Actions (CA)) on functional genomics research entitled: "Contribution of molecular epidemiology and host-pathogen genomics to understand Chlamydia trachomatis disease (Acronym: (EpiGenChlamydia)" with 20 European, African and US groups. This consortium had his first meeting on 12 December 2007. This consortium is extended via new collaborative activities including a EuroTransBio grant (Start 2012) and a Eurostars grant (Start 2015) into a spin-in company (TubaScan Ltd). In addition, he is PI in 5 other grants. As a partner he is participating in several other European programmes and grants (ao 4 Eurostars grants as PI). In December 2016 the H2020 SME Associate grant was awarded entitled "Using proteins, amoebae, Waddlia chondrophila and zebrafish to conquer the human reproductive market". This grants ended 31 December 2018. Finally, since 2019 the EUREKA Globalstars grant is running together with Belgium and 4 parties in India to develop a One Health Chlamydiae PoC tool.

Organisation on scientific meetings: Together with Prof. Salvador Peña, he organised the "First Annual Amsterdam Chlamydia Meeting" (AACM) in December 2004 and 6th of February 2015 he organized together with Dr. Sander Ouburg the Lustrum "10th AACM", and in 2023 we have the 15th AACM. In July 2005 at the 16th Biennial meeting of the International Society for Sexually Transmitted Diseases Research (ISSTDR) he was a member of the Scientific Committee and organized amongst others the workshop "Immunogenetics of Chlamydia trachomatis Infections", with Prof. David Mabey (London, UK, Trachoma research). He was organizing Committee member of 6th Meeting of the European Society for Chlamydia Research, University of Aarhus, Aarhus, Denmark, July 1-4, 2008 and at this meeting also session organizer: "Immunogenetics of Chlamydia trachomatis infections". Finally, he was the organizer (youngest ever) of the 7th Meeting of the European Society for Chlamydia Research in 2012 (1-6 July) in Amsterdam, a meeting held only once every 4 years. In July 2018 he organised the ISHCI. This meetings held every 4 years is held once every 8 years outside the USA. Together with Prof.dr. Angelika Stary he is the only one who had the honour to organised both the European and International Chlamydia meeting.

Entrepreneurship: Intellectual Property (patents and know-how) has been obtained and linked to several VUmc Spin-in companies including Microbiome Ltd, (Co-Founder and Co-Director) which won the Amsterdam Inventor Award in 2008 and the FD Gazellen Award in December 2011 and 2012. The second spin-in company founded is named TubaScan Ltd (Founder & Director since 2011) a company focusing on medical diagnostics on the basis of human biomarkers including host genetic markers amongst others for Periodontitis, Rheumatology, Female subfertility and HLA typing. Finally, he is involved in 4 other spin-off companies.

Amsterdam, 30 June 2023

Future STI / *Chlamydia* Meetings

2023 STI (ISSTDR / IUSTI) and HIV World Congress
July 24th – 27th 2023, Chicago, IL, USA
https://www.astda.org/event/isstdr-iusti-2023/

36th IUSTI Europe
October 26th – 28th 2023, Valletta, Malta
https://iustimalta.eventsair.com/iusti-europe-congress-2023/

6th European Meeting on Animal Chlamydiosis, EMAC-6
November 28th – 29th 2023, Edinburgh, Scotland (UK)
https://www.um.es/esacz/meetings.html

20th Chlamydia Workshop (DCW 20)
February 21st – 23rd 2024, Ascona, Switserland
https://chlamydienworkshop.org/

16th Annual Amsterdam Chlamydia Meeting (AACM)
2024
http://www.aacm.nl/

10th Meeting of the European Society for Chlamydia Research & ESCCAR international congress on Rickettsia and other intracellular bacteria
2024; expected end of August

10th Biennial Meeting of the *Chlamydia* Basic Research Society (CBRS)
2025, United States of America
https://www.chlamydiabasicresearchsociety.org/

An overview of PhD work in The Netherlands on *Chlamydia trachomatis*

Table I: *PhD theses in the Netherlands*

2021 Bernice Hoenderboom	Maastricht University / National Institute for Public Health and the Environment
2021 Jeanine Leenen	Maastricht University / Public Health Service ZL
2021 Naomi Juliana	Maastricht University / VU University Amsterdam
2020 Ymke Evers	Maastricht University / Public Health Service ZL
2020 Julien Weijers	Maastricht University / Public Health Service ZL
2020 Daphne van Wees	Utrecht University of Amsterdam / National Institute for Public Health and the Environment
2019 Eleanne van Ess	VU University Amsterdam
2019 Kevin Janssen	Maastricht University / Public Health Service ZL
2019 Martijn van Rooijen	University of Amsterdam / Public Health Services (GGD) Amsterdam
2019 Martin Singer	VU University Amsterdam
2019 Charlotte van der Veer	University of Amsterdam / Public Health Services (GGD) Amsterdam
2018 Pierre Thomas	Maastricht University
2018 Anne Dirks	Maastricht University / Public Health Service ZL
2018 Dewi de Waaij	VU University Amsterdam
2018 Nynke de Vrieze	University of Amsterdam / Public Health Services (GGD) Amsterdam
2018 Bart Versteeg	University of Amsterdam / Public Health Services (GGD) Amsterdam
2017 Esmée Lanjouw	VU University Amsterdam
2017 Vitaly Smelov	VU University Amsterdam and St. Petersburg State Medical University, Russia
2017 Menne Bartelsman	University of Amsterdam / Public Health Services (GGD) Amsterdam
2017 Catherine Alberts	University of Amsterdam / Public Health Services (GGD) Amsterdam
2016 Titia Heijman	University of Amsterdam / Public Health Services (GGD) Amsterdam
2016 Jan Henk Dubbink	Maastricht University / VU University Amsterdam
2016 Amy Matser	University of Amsterdam / Public Health Services (GGD) Amsterdam
2016 Kevin Theunissen	Maastricht University
2016 Marleen Jansen	Maastricht University / VU University Amsterdam
2015 Amy Matser	University of Amsterdam / Public Health Services (GGD) Amsterdam
2015 Geneviève van Liere	Maastricht University / Public Health Service ZL
2014 Monique Pereboom	VU University Amsterdam
2014 Jelena Malogajski	Maastricht University / VU University Amsterdam
2014 Ivan Brankovic	Maastricht University / VU University Amsterdam
2014 Rianne Vriend	University of Amsterdam / Public Health Services (GGD) Amsterdam
2014 Jannie van der Helm*	University of Amsterdam / Public Health Services (GGD) Amsterdam
2014 Stephan P. Verweij*	VU University Amsterdam
2014 Reinier Bom*	University of Amsterdam / Public Health Services (GGD) Amsterdam

2013 Jonathan Lal	Maastricht University / VU University Amsterdam
2013 Laura van Dommelen*	Maastricht University
2013 Marlies Heiligenberg*	University of Amsterdam / Public Health Services (GGD) Amsterdam
2012 Janneke Heijne*	University of Bern / RIVM
2011 Ouafae Karimi	VU University Amsterdam
2011 Koen D. Quint*	VU University Amsterdam
2010 Caroline J. Bax*	University of Leiden / Medical Center Haaglanden
2010 Janneke E. den Hartog*	Maastricht University
2010 Ingrid Rours	Erasmus University Rotterdam
2008 Liesbeth Duijts*	Erasmus University Rotterdam
2007 Denise A.M. Perquin	University of Leiden / Medical Center Haaglanden
2006 Sander Ouburg	VU University Amsterdam
2006 Joke Spaargaren*	University of Amsterdam and VU University Amsterdam
2006 Tanja P. Gijsen*	Maastricht University
2006 Hannelore M. Götz*	Erasmus University Rotterdam
2005 Jan E.A.M. van Bergen*	University of Amsterdam
2004 Joseph M. Lyons*	City of Hope Medical Center, CA, USA, and VU University Amsterdam
2003 Laura S. Murillo	VU University Amsterdam
2002 Monica Molano Luque	VU University Amsterdam
2001 Irene G.M. van Valkengoed*	VU University Amsterdam
1999 Servaas A. Morré*	VU University Amsterdam
1999 Johannes W. Trum	University of Amsterdam
1999 Bernardus W.J. Mol	University of Amsterdam
1998 Yvonne T.H.P. van Duijnhoven	University of Amsterdam
1997 Marita J.W. van de Laar	University of Amsterdam
1995 Jar Lan*	VU University Amsterdam
1994 Josina van Ulsen	Erasmus University Rotterdam
1994 Jacobus M. Ossewaarde*	University of Utrecht
1993 Hans J.H. Theunissen*	Erasmus University Rotterdam
1992 Johannes T.M. van der Schoot*	University of Amsterdam
1992 Arent J.P. Boeke and Janny H. Dekker	VU University Amsterdam
1992 André H. van der Willigen	Erasmus University Rotterdam
1991 Eric C.J. Claas	VU University Amsterdam
1990 Gijsbertus J.H.M. Ruijs*	Rijksuniversiteit Groningen
1989 Henk J. Vonsée	Rijksuniversiteit Limburg
1987 Kie H. Tjiam*	Erasmus University Rotterdam

**Chlamydia trachomatis* is the major focus in the thesis.

Table II: *Current PhD fellows working (partially) on* Chlamydia trachomatis.

Jay Narayan	Maastricht University / SHUATS India
Zoïe Alexiou	Maastricht University / RIVM
Carlotta Gamberini	Maastricht University
Ilja van Bergen	Radboud University Nijmegen / RIVM
Alcira de Vries	Utrecht University / RIVM
Raissa Derks	Maastricht University / Public Health Service ZL
Anne-Marie Niekamp	Maastricht University / Public Health Service ZL
Arlieke Gitsels	Ghent University, Belgium
Roel Achterbergh	University of Amsterdam / Public Health Services (GGD) Amsterdam
Jaehyeon Kim	Maastricht University

An overview of PhD work on *Chlamydiae*

Table III: *PhD theses on* Chlamydiae

2021 Marloes Heijne	Wageningen University, The Netherlands	CPs
2018 Cindy de Boeck	Ghent University, Belgium	CPs
2016 Sarah van Lent	Ghent University, Belgium	CPs
2015 Stefanie Lagae	Ghent University, Belgium	CPs
2015 Kristien de Puysseleyr	Ghent University, Belgium	C
2015 Leentje de Puysseleyr	Ghent University, Belgium	C
2014 Evelien de Clercq	Ghent University, Belgium	C/CT
2013 Lizi Yin	Ghent University, Belgium	CPs/CAb
2011 Veerle Dickx*	Ghent University, Belgium	CPs
2010 Katelijn Schautteet*	Ghent University, Belgium	C / CT
2010 Caroline van Droogenbroeck*	Ghent University, Belgium	CPs
2009 J.J.M. Bouwman	Utrecht University, The Netherlands	CP
2009 Delphine Beeckman*	Ghent University, Belgium	CPs
2008 Kristel Verminnen*	Ghent University, Belgium	CPs
2008 Taher Harkinezhad*	Ghent University, Belgium	CPs
2008 M.D. de Kruif	University of Amsterdam, The Netherlands	CP
2007 Edou R. Heddema*	University of Amsterdam, The Netherlands	CPs
2007 Ellen Boelen*	Maastricht University, The Netherlands	CP
2006 Arnaud Daniël Hauer	Leiden University, The Netherlands	CP
2005 Tom Geens*	Ghent University, Belgium	CPs
2005 Marnix Van Loock*	Catholic University Leuven, Belgium	CPs
2005 Manuela Voorend*	Maastricht University, The Netherlands	CP
2005 Tryphon Vainas	Maastricht University, The Netherlands	CP
2004 H.F. Berg	University of Amsterdam, The Netherlands	CP
2004 Boulos Maraha*	VU Universtiy, Amsterdam, The Netherlands	CP
1997 Roel P.A.J. Verkooyen*	Erasmus University Rotterdam, The Netherlands	CP
1994 Daisy Vanrompay*	Belgium	CPs

Table IV: *Current PhD fellows working (partially) on* Chlamydiae.

Matthias van Gils	Ghent University, Belgium	C
Ibe van de Casteele	Ghent University, Belgium	CT
Anne de Meyst	Ghent University, Belgium	CPs

**Chlamydiae* are the major focus in the thesis.
C: Chlamydiae
CAb: C. abortus
CT: C. trachomatis
CP: C. pneumoniae
CPs: C. psittaci

Attendants:

Title	Last name	Surname	Affiliation	E-mail
Drs	Alexiou	Zoïe	RIVM / MUMC	zoie.alexiou@rivm.nl
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Drs	Bloem	Patricia	Soa Aids Nederland	pbloem@soaaids.nl
	Bos	Hanna	Soa Aids Nederland	hbos@soaaids.nl
Dr	Bruisten	Sylvia	GGD Amsterdam	sbruisten@ggd.amsterdam.nl
Dr	David	Silke	RIVM	silke.david@rivm.nl
Dr	David	Silke	RIVM	silke.david@rivm.nl
Drs	de Meyst	Anne	Ghent University	anne.demeyst@ugent.be
Drs	de Vries	Alcira	RIVM	alcira.de.vries@rivm.nl
Drs	Defourt	Violette	Rapidemic BV	violette@rapidemic.com
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Prof	Hammerschlag	Margret	State University of NY	mhammerschlag@downstate.edu
Ing	Heijmans	Roel	Microbe&Lab	r.heijmans@microbenlab.com
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Dr	Hoenderboom	Bernice	RIVM	bernice.hoenderboom@rivm.nl
Drs	Kiekens	Celien	Ghent University	celien.kiekens@ugent.be
Drs	Kim	Jaehyeon	MUMC	j.kim@maastrichtuniversity.nl
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Drs	van Bergen	Ilja	RIVM	ilja.van.bergen@rivm.nl
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Dr	van der Wal	Fimme Jan	Wageningen Bioveterinary Institute	fimme.vanderwal@wur.nl
Drs	Vander Donck	Paulien	Ghent University	Paulien.VanderDonck@UGent.be
Prof	Vanrompay	Daisy	Ghent University	daisy.vanrompay@ugent.be
Drs	Verhaeghe	Margaux	Ghent University	margauve.verhaeghe@ugent.be
	Watertor	Sophie	Rapidemic BV	s.watertor@rapidemic.com
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Dr	Wieringa	Paul	MUMC	p.wieringa@maastrichtuniversity.nl

Announcement

16th
Annual Amsterdam *Chlamydia* Meeting

2024

Organisers: Servaas Morré & Sander Ouburg
Microbe&Lab BV, Amsterdam

We hope to welcome you all in Februari 2024

Amsterdam, 30 June 2023

Notes

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Amsterdam, 30 June 2023

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Amsterdam, 30 June 2023