# Marta Bertrán

The European Programme for Intervention Epidemiology Training (EPIET), Cohort 2023

**National Institute for Public Health and the Environment (RIVM), the Netherlands**

## Background

The ECDC Fellowship Programme is a two-year competency-based training with two paths: the field epidemiology path (EPIET) and the public health microbiology path (EUPHEM). After the two-year training, EPIET and EUPHEM graduates are considered experts in applying epidemiological or microbiological methods to provide evidence to guide public health interventions for communicable disease prevention and control. The Administrative Decisions ECDC/AD/2022/16 Rev.01 and ECDC/AD/2023/06 govern the European Union (EU)-track and Member State (MS)-track, respectively, of the ECDC Fellowship Programme, field epidemiology path (EPIET) and public health microbiology path (EUPHEM), Cohort 2023.

Both curriculum paths provide training and practical experience using the 'learning-by-doing' approach at acknowledged training sites across the European Union/European Economic Area (EU/EEA). This final report describes the experiences and competencies the fellow acquired by working on various projects, activities, theoretical fellowship training modules, other modules or trainings, and international assignments or exchanges during the fellowship.

## Pre-fellowship short biography

Marta Bertrán graduated with a degree in Pharmacy from the Complutense University of Madrid in 2016. During her studies, she developed an interest in public health and the humanitarian field, and after graduating, she joined a six-week health promotion campaign in rural Ecuador as a volunteer pharmacist. Upon returning to Madrid, Marta joined GlaxoSmithKline's (GSK) Vaccine Medical Department as a medical advisor trainee, sparking her interest in vaccines. In 2018, as a fellowship recipient from the "la Caixa" Foundation, she completed an MSc in Public Health from the London School of Hygiene & Tropical Medicine (LSHTM). She then worked as a public health intelligence analyst at the local level in two London boroughs (Camden and Islington), focusing mainly on health inequalities, health determinants, and homelessness. In 2021, Marta joined the United Kingdom Health Security Agency (UKHSA) as an epidemiologist focusing on vaccine-preventable diseases, where she worked on national surveillance and research until she started the EPIET fellowship in 2023.

## Results

The objectives of the core competency domains were achieved partly through project and activity work, and partly by participating in the training modules. Results are presented in accordance with the EPIET/EUPHEM core competencies, as set out in the ECDC Fellowship Manual[1].

[1] European Centre for Disease Prevention and Control (ECDC). Manual for the ECDC Fellowship Programme EPIET and EUPHEM paths. Stockholm: ECDC; 2025. Available at: https://www.ecdc.europa.eu/en/publications-data/ecdc-fellowship-programme-manual



Stockholm, 2025

# 1. Epidemiological investigations

## 1.1. Outbreak investigations

### *1.1.1. Outbreak of monophasic* **Salmonella** *Typhimurium in the Netherlands, 2024*

**Supervisor:** Ingrid Friesema (RIVM)

**Category:** Food- and waterborne diseases

**Aim:** To identify the source of infection of a monophasic *Salmonella* Typhimurium outbreak in the Netherlands in 2024.

**Methods:** A cluster was defined as isolates within five allelic distances to each other based on core genome multi locus sequence typing (cgMLST). Cases completed an extensive trawling questionnaire. We compared exposures with two previous outbreaks (case–case studies) and with responses from an annual food consumption questionnaire (case–control study).

**Results:** From 29 May 2024 to 17 July 2024, 26 clustered cases of *Salmonella* Typhimurium monophasic variant were notified. Of them 14 (54%) were women and the median age was 35 (range: 0–90) years. One case, aged >85 years, died. Of the 17 (65%) cases who completed a questionnaire, one (6%) had been hospitalised. All cases were sequence type ST10649, a strain which was previously not detected in the Netherlands. No other European countries reported cases of this strain. Cases were more likely to have consumed raw *filet américain* compared with previous outbreak cases (odds ratio (OR): 4.5; 95% confidence intervals (CI): 1.0–25.4 and OR: 1.0; 95% CI: 0.3–3.9), and with controls (adjusted odds ratio (aOR): 16; 95% CI: 3.2–113). They were also more likely to have bought the *filet américain* at supermarket 'X' (OR: 3.0; 95% CI: 0.46–27 and OR: 4.2; 95% CI: 0.9–23.1). On 31 May 2024, supermarket 'X' recalled *filet américain* (expiry dates on 29 May 2024 and 31 May 2024) due to microbiological contamination, but the Netherlands Food and Consumer Product Safety Authority (NVWA) confirmed the recall was not related to *Salmonella*. No further investigations were conducted.

**Conclusions:** This outbreak highlighted the risk of eating raw meat. Consumers should be aware of this risk and the importance of hygiene practices, such as washing hands and contact surfaces, after handling and eating raw meat.

**Role:** Marta was a member of the outbreak investigation team. She conducted the epidemiological analysis and led its interpretation, communicated the results to the rest of the outbreak investigation team, and prepared the information shared with the NVWA. Marta wrote a report and reported the findings at the early warning meeting.

### *1.1.2. Cholera outbreak, South Sudan, 2024–2025*

**Supervisors:** Jetri Regmi, Eric Rurangwa (World Health Organization South Sudan Country Office)

**Category:** Food- and waterborne diseases

**Aim:** To provide epidemiological support during the cholera outbreak in South Sudan and inform targeted responses and coordination efforts by the National Ministry of Health (MoH) of South Sudan and World Health Organization (WHO).

**Methods:** We conducted a risk categorisation by county based on population movement, proximity to Renk county and Sudan, historical cholera risk, acute watery diarrhoea, and flooding data. We reviewed the line-list and case investigation form (surveillance tools) to ensure consistency and encourage better data quality. We developed an R-based pipeline to systematically clean, consolidate and analyse surveillance data reported by affected counties daily.

**Results:** The risk categorisation informed prioritisation of preparedness and response activities, including supply of testing and case management kits. Between 28 September 2024 and 7 December 2024, 1 948 cases were reported across 18 counties. The case-fatality was 1.4% (n=21) overall, and 0.9% (n=18) at health facilities. The outbreak continued to show signs of deterioration with an ongoing increasing trend at national level, new areas reporting cases, and increasing number of deaths and case-fatality. The epidemiological analyses supported the MoH and WHO situational awareness and guided monitoring and response strategies, including oral cholera vaccine (OCV) campaigns, water, sanitation and hygiene (WASH) interventions and testing strategies. Data quality analysis was used to provide regular feedback to colleagues and partners reporting data.

**Public health implications:** Monitoring the outbreak was facilitated by revised surveillance tools. Outputs were used during regular coordination meetings to guide response activities, including vaccination campaigns, testing and case management, which played a crucial role in the cholera response in South Sudan.

**Role:** Marta attended the weekly/tri-weekly coordination meetings at the public health emergency operations centre (PHEOC) and was a member of the Epidemiology and Surveillance working group. She led the revision of the surveillance tools, managed the surveillance data, and conducted daily and weekly epidemiological analyses in collaboration with the MoH and WHO colleagues. She also analysed historical cholera and acute watery diarrhoea data used in the county risk categorisation. She started the development of an R-based analysis pipeline to produce surveillance outputs for the national coordination meetings, weekly situational reports, and other requirements. She actively addressed data quality issues and reporting delays in coordination with the MoH and partners.

## 1.2. Surveillance

### *1.2.1. Spatiotemporal analysis of invasive meningococcal disease serogroup B (IMD-B) surveillance data by finetype, the Netherlands, 2005–2023*

**Supervisors:** Anneke Steens (RIVM), Mirjam Knol (RIVM)

**Type of project:** Analysing data from a surveillance system

**Aim:** To describe IMD-B finetype data and assess whether systematic use of finetypes could improve cluster identification and potentially prevent cases by implementing public health actions.

**Methods:** We extracted national IMD-B surveillance data from 2005–2023 and included cases with complete finetype data. We aggregated data by municipality and finetype. We calculated an expected baseline using generalised linear models for each finetype, including a temporal trend. To identify time-space clusters, we calculated Poisson scan-statistics comparing observed to expected counts through Monte Carlo hypothesis testing using SatScan™, with a 365-days maximum temporal window. We compared clusters with epidemiological and genomic data extracted from the public databases for molecular typing and microbial genome diversity (pubMLST).

**Results:** We observed 1 729 IMD-B cases of which 1 642 (95%) had complete finetype and municipality data. Among the 453 distinct finetypes, 308 (68%) occurred once. We identified 42 clusters within 37 finetypes accounting for 132 (8%) cases. The median cluster size was two cases (range: 2–21) with a median duration of 45 days (range: 6–356); 0–5 clusters occurred per year. Of cases with known epidemiological links, 14/18 (78%) were present in the dataset and all were within detected clusters. Genomic data from eight clusters supported some clusters but rejected others (false positives).

**Conclusions:** Systematic cluster detection using finetype could reveal missed epidemiological links, enabling public health action. However, its impact in preventing additional IMD-B cases is likely limited due to small cluster sizes, though, meaningful given the severity of IMD-B. Simple finetype mapping may provide a resource-efficient alternative to SaTScan™.

**Role:** Marta cleaned the data and conducted the data analysis. She presented the results at RIVM, submitted an abstract to the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2024 and prepared a poster (4.3.1), which was presented by one of the co-authors because Marta was in an international deployment. She also prepared a manuscript which was submitted to a peer-reviewed journal (4.1.2).

### *1.2.2. Implementing a new nationwide surveillance system for chlamydia-related complications, the Netherlands*

**Supervisor:** Birgit van Benthem (RIVM)

**Type of project:** Setting up a surveillance system

**Aim:** To implement a new surveillance system for chlamydia-related complications (pelvic inflammatory disease (PID), ectopic pregnancy (EP), and infertility) to assess unintended consequences of discontinuing asymptomatic testing in sexual health centres in the Netherlands since 2015.

**Methods:** We extracted annual numbers of women with a primary diagnosis from Dutch Hospital Data (DHD), which excluded outpatient visits, using the International Classification of Diseases, Tenth Revision (ICD-10) codes for PID, EP and infertility. For primary care, we included episodes of PID, PID due to chlamydia (ChlPID), EP and infertility. We estimated annual incidence per 100 000 population for PID and infertility, and per 1 000 live births for EP in 15–49-year-old women from 2015 to 2023 (latest available data). We assessed trends using linear regression.

**Results:** Between 2015 and 2023, median hospital incidence was 25/100 000 for PID, 40/100 000 for infertility, and 9.6/1 000 live births for EP. PID incidence decreased annually by 1.5/100 000 (95% CI: -2.5 to -0.5; p=0.007) and infertility decreased annually by 7.9/100 000 (95% CI: -12.7 to -3.1; p=0.006). EP incidence was stable (-0.005/1 000; 95% CI: -0.09 to 0.08; p=0.90). In primary care, median annual incidence (and annual change) was 128.0 (-0.012; p=0.90) for PID, 30/100 000 (0.257; p=0.60) for ChlPID, 767/100 000 (1.5; p=0.80) for infertility, and 13.9/1 000 (0.16; p=0.40) for EP. Primary care data showed no significant trends.

**Conclusions:** These data provide a baseline for monitoring trends after discontinuing asymptomatic chlamydia testing. DHD data likely underestimate PID and infertility, but captures most EP, while primary care data may better reflect true PID incidence. We recommend initially focusing on PID surveillance which manifests earlier after infection and reducing data lag for timely surveillance.

**Role:** Marta developed the surveillance protocol and the scripts to summarise the data. She developed tables and figures for future annual reports. She submitted an abstract to ESCAIDE 2025, which was accepted as an oral presentation (4.3.3).

### *Routine surveillance activities*

### *Measles national surveillance, the Netherlands, 2024*

**Activities and role:** Activities for the national surveillance of measles included: supporting routine operations for the information system, automating data analyses and reporting with R, regularly analysing surveillance data and producing health information products such as weekly situation reports, and monitoring the epidemiological situation. Marta supported the surveillance team for two months by producing weekly updates and contributing to the R scripts for the regular reports.

# 2. Applied public health research

## *2.1. Long-term vaccine effectiveness (VE) of 13-valent pneumococcal conjugate vaccine (PCV13) in adults over 65 years of age in the Netherlands, 2008–2024: a protocol*

**Supervisors:** Anneke Steens (RIVM), Mirjam Knol (RIVM)

**Aim:** To develop a study protocol to estimate long-term VE of PCV13 against invasive pneumococcal disease (IPD) in adults aged ≥65 years, up to 14–15 years of follow-up in the Netherlands.

**Methods:** We propose a registry-based retrospective cohort study using the vaccinated arm from a randomised controlled trial conducted in Netherlands between 2008 and 2013 (Community Acquired Pneumonia Immunization Trial in Adults (CAPiTA trial)). These individuals will be matched to presumably unvaccinated residents in the Netherlands on sex, age, medical conditions, and municipality of residence using Dutch population registries.

Our outcomes will include laboratory-confirmed PCV13-type IPD (primary outcome) and all laboratory-confirmed IPD, all-cause pneumonia hospitalisation, all-cause mortality, and pneumonia-related mortality within 10 years after vaccination, and as exploratory analysis, up to 14–15 years. Outcome data will be obtained from the Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM), hospitalisation and mortality databases. We will apply a Cox proportional hazards regression model with calendar time as the underlying timescale to estimate VE overall and stratified by time since vaccination. The model will include age group and nursing-home status as time-varying covariates, and socio-economic status, sex and underlying condition group, and vaccination status as fixed covariates based on baseline information. We will calculate VE=(1-hazard ratio)*100 and corrected VE estimates based on the sensitivity analyses. The study is not subject to the Medical Research Involving Human Subjects Act (WMO).

**Results:** Not applicable.

**Public health implications/Conclusions:** This study will provide essential information to guide pneumococcal vaccination in adults, particularly as recently licensed higher-valent vaccines are being considered for implementation in adult pneumococcal vaccination programmes globally.

**Role:** Marta wrote the protocol and presented the study to relevant stakeholders, who hold essential data for the study. She also prepared a summary document to be shared with the relevant stakeholders.

## *2.2. Vaccine effectiveness (VE) study of* **Haemophilus influenzae** *type b (Hib) containing vaccines against invasive Hib disease, the Netherlands, 2005–2023*

**Supervisors:** Anneke Steens (RIVM), Brechje de Gier (RIVM)

**Aim:** To estimate product- and schedule-VE against invasive Hib disease for different products and schedules used in the Dutch National Immunisation Programme (NIP) in 2005–2023, following programmatic changes.

**Methods:** We conducted a matched case–control study extracting cases reported in 2005–2023 among children born in 2005 or later from the national reference laboratory data. We selected 10 controls per case matched on birth date and sex from the population register and obtained vaccination data from the childhood vaccination registry. Using conditional logistic regression, we estimated matched odds ratios (mOR) and VE=1-mOR among children ≥6 months (overall VE), those eligible only for the primary series (6–10-month-olds), and for the booster (≥11 months).

**Results:** We included 282 cases and 2 804 controls. Overall, VE was 95% (95% CI: 90–98%) for any DTaP-IPV/Hib, 95% (95% CI: 92–97%) for DT3aP-HBV-IPV/Hib, and 97% (95% CI: 95–99%) for DT5aP-HBV-IPV-Hibup to four years after vaccination. By schedule, VE was 97% (95% CI: 93–99%) for 2+1 doses and 96% (95% CI: 93–98%) for 3+1 doses, and similar for the respective primary series (>95%). Within the first year after the booster dose, VE was 99% (95% CI: 97–100%), and after 1–3 years, VE was 91% (95% CI: 82–95%). There was no difference in the decrease in VE by time since vaccinations across products or schedules.

**Public health implications/Conclusions:** The increasing invasive Hib disease incidence in the Netherlands could not be explained by lower VE against invasive Hib disease following changes in the NIP. VE remained high, underscoring the need to maintain high vaccine coverage.

**Role:** Marta wrote the data analysis plan, cleaned and analysed the data, submitted an abstract to ESCAIDE 2025, and submitted a manuscript to a peer-reviewed journal (4.1.1). The work was also presented by a co-author at the 43rd Annual Meeting of the European Society for Paediatric Infectious Diseases (ESPID), Bucharest, Romania, May 2025 (4.3.2).

# 3. Teaching and pedagogy

## *Outbreak investigations at Radboud University Medical Center (Radboudumc), the Netherlands, 2023*

On 12 December 2023, Marta was a facilitator during a case study in a three-hour face-to-face session for students from the master's degree course, 'Applied Infectious Disease Epidemiology'. She used the case study titled, 'An outbreak of trichinosis in France' aiming to review the steps of an outbreak investigation and to get the students to reflect on the choice of different control groups in case–control studies. Students' feedback was positive.

## *Outbreak investigations at the Netherlands School of Public & Occupational Health (NSPOH), 2024, virtual*

On 1 January 2024, Marta was a facilitator during a case study in a virtual one-day session for medical residency doctors specialising in infectious diseases. This full-day session was part of the Public Health medical residents' curriculum and included lectures on study design for outbreak investigation, data collection and universal exposure, alongside the case study, 'An outbreak of trichinosis in France'. Marta facilitated this case study for a group of seven students ensuring that participants understood the concepts discussed in the lectures.

## *Bias and confounding case study at the Netherlands School of Public & Occupational Health (NSPOH), the Netherlands, 2024*

On 2 February 2023, Marta was a facilitator during a case study in a face-to-face session for medical residency doctors specialising in infectious diseases. The full-day session was part of the Public Health medical residents' curriculum and included lectures on bias and confounding, alongside a case study of a gastroenteritis outbreak in Sweden. Marta participated in the case study and helped with the facilitation. Students were encouraged to work in small groups whilst Marta and the main lecturer encouraged reflection and answered any questions.

## *Outbreak investigation of a vaccine-preventable disease at a network meeting for infectious disease epidemiologists, 2025, virtual*

This one-day virtual session took place on 1 July 2025 with infectious disease epidemiologists from the municipal public health services across the Netherlands. RIVM colleagues delivered two lectures on clinical and surveillance aspects of pneumococcal disease. The session served as a pilot for a newly developed case study titled, 'Pneumococcal disease in shipyards across Europe (2020–2023)'. Marta provided feedback for the case study prior to the activity, and with Hendrik Sauskojus (EPIET fellow), facilitated this case study for a group of six participants.

## *Development of a case study on a cholera outbreak investigation in a low resource setting, South Sudan, 2025*

Following the deployment to South Sudan, Marta developed a case study based on the cholera outbreak together with other deployed fellows and WHO staff. The case study focused on the different steps of an outbreak investigation in a low-resource setting, including reflections on case definitions, the role of different diagnostic methods, key principles of information dissemination, and outbreak response strategies. The final version of the case study was shared with other field epidemiology training programmes and will be available for future fellows.

# 4. Communications related to the EPIET/EUPHEM fellowship

## 4.1. Manuscripts published in peer-reviewed journals

4.1.1 **Bertran M,** de Gier B, Garcia-Vilaplana T, van Sorge NM, Melker HE, Steens A. Product- and schedule-specific vaccine effectiveness against invasive *Haemophilus influenzae* serotype B (Hib), the Netherlands, 2005–2023. [Submitted]

4.1.2 **Bertran M,** van de Kassteele J, Visser LJ, Melker HE, van Sorge NM, Steens A. Invasive meningococcal disease serogroup B: spatiotemporal cluster identification using finetype data, the Netherlands, 2005–2023. [Submitted]

## 4.2. Other reports

4.2.1 Soler-Soneira M, Granero-Melcón B, Sastre-García M, **Bertrán-Pérez-Hickman M**, Amillategui-Dos-Santos R, Cano-Portero R. Invasive pneumococcal disease in Spain 2022. BES. 2023;31(4):260-273. Available at: https://revista.isciii.es/index.php/bes/article/view/1344

4.2.2 Rijksinstituut voor Volksgezondheid en Milieu (RIVM). The National Immunisation Programme in the Netherlands. Surveillance and developments in 2023–2024; Bilthoven: RIVM; 2024. Available at: The National Immunisation Programme in the Netherlands. Surveillance and developments in 2023-2024 | RIVM

4.2.3 Rijksinstituut voor Volksgezondheid en Milieu (RIVM). The National Immunisation Programme in the Netherlands. Surveillance and developments in 2024–2025; Bilthoven: RIVM [Publication pending]

4.2.4 **Bertran M.** Pneumococcal vaccinations, the Netherlands, 2013–2024 [Internal report].

## 4.3. Conference presentations

4.3.1 **Bertran M,** van de Kassteele J, Visser LJ, Melker HE, van Sorge NM, Steens A. Invasive meningococcal disease serogroup B: spatiotemporal cluster identification using finetype data, the Netherlands, 2005–2023 (poster presentation). Presented at: ESCAIDE; November 2024; Stockholm, Sweden

4.3.2 de Gier B, **Bertran M,** Garcia-Vilaplana T, van Sorge NM, Melker HE, Steens A. Product-specific vaccine effectiveness against invasive *Haemophilus influenzae* type b disease, the Netherlands, 2005–2023 (oral presentation). Presented by de Gier B at: ESPID; May 2025; Bucharest, Romania

4.3.3 **Bertran M,** Kayaert L, Alexiou Z, Hoenderboom B, van Benthem B. New nationwide surveillance of chlamydia-related long-term complications using hospitalisation data, the Netherlands, 2015–2022 (oral presentation). Presented at ESCAIDE; November 2025; Warsaw, Poland

## 4.4. Other presentations

4.4.1 **Bertran M**. Career talk. Presented at: Session with master's degree students from the course, 'Applied Infectious Disease Epidemiology' at Radboud University Medical Center; 9 December 2024; Nijmegen, the Netherlands.

4.4.2 **Bertran M**. Long-term vaccine effectiveness of the 13-valent pneumococcal conjugate vaccine (PCV13) in adults: study proposal. Presented at: Meeting with stakeholders; 11 July 2024 (virtual).

4.4.3 **Bertran M**. Spatiotemporal analysis of invasive meningococcal B disease between 2005–2023 (oral presentation). Presented at: RIVM EPI Refereer meeting, 4 October 2024, Bilthoven, the Netherlands.

# 5. EPIET/EUPHEM modules attended

- Introduction to R course, 19–22 September 2023, delivered by Applied Epi, virtual
- Introductory Course, 25 September–13 October 2023, Spetses, Greece
- Study Protocol and Scientific Writing, 26–27 October and 7–8 November 2023, virtual
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2023, 22–24 November 2023, Barcelona, Spain
- Multivariable Analysis, 19–23 February 2024, Berlin, Germany
- Vaccinology, 4–8 March 2024, virtual
- Writing Abstracts for Scientific Conferences, 14 March 2024, virtual
- Rapid Assessment and Survey Methods, 15–19 April 2024, Dublin, Ireland
- Public Health Microbiology I – Basic phylogeny, 17–18 June 2024, virtual
- Project Review Module, 26–30 August 2024, Lisbon, Portugal

- Time Series Analysis, 9–13 December 2024, Utrecht, the Netherlands
- Writing Abstracts for Scientific Conferences, 21 March 2025, virtual
- Project Review Module, 25–29 August 2025, Lisbon, Portugal
- Public Health Leadership, 1–3 September 2025, Lisbon, Portugal
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2025, 19–21 November 2025, Warsaw, Poland

# 6. Other training

- Mini-module on Molecular epidemiology, 20–21 November 2024, Barcelona, Spain
- Pipelines training (hackathon preparation), 21 March 2024, RIVM, Bilthoven, the Netherlands
- GIT training (hackathon preparation), 2 April 2024, RIVM, Bilthoven, the Netherlands
- Productivity 'Ninja' workshop delivered by Think Academy, 10 April 2025, RIVM, Bilthoven, the Netherlands
- BSAFE, delivered by United Nations, 11 October 2024, virtual
- Prevention of sexual exploitation and abuse (PSEA), delivered by World Health Organization, 7 October 2024, virtual
- United to Respect: Preventing sexual harassment and other prohibited conduct, delivered by World Health Organization, 07 October 2024, virtual
- WHO's New Policy and Strategy on Preventing and Addressing Sexual Misconduct, 9 October 2024, virtual

# 7. International assignments

Mpox and cholera response, Juba, South Sudan, 15 October–9 December 2024: Marta was deployed through the Global Outbreak Alert and Response Network (GOARN) as an epidemiologist to support mpox preparedness and response activities within the WHO Emergencies, Preparedness and Response team in Juba, South Sudan. Given the declaration of a cholera outbreak in South Sudan on 28 October 2024, her role shifted to mainly support surveillance, preparedness and response activities for the cholera outbreak (1.1.2).

# 8. Other activities

- Pipelines' hackathon with hepatitis C team at EPI department, 9–11 April 2024, RIVM, Bilthoven, the Netherlands
- Four-week epidemiological support in a Municipal Public Health Service (GGD Zuid-Holland Zuid), June–July 2025, Dordrecht, the Netherlands
- Participation in weekly early warning meetings, RIVM, Bilthoven, the Netherlands
- Participation in internal vaccine-effectiveness monthly meetings, 2025, RIVM, Bilthoven, the Netherlands
- Attended the weekly scientific seminars organised by the epidemiology and surveillance department of the RIVM

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