

Sebastian von Schreeb

The European Programme for Intervention Epidemiology Training (EPIET), Cohort 2023
Directorate-General of Health (DGS), Portugal

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

Sebastian von Schreeb is a medical doctor (MD) and resident in public health. During his medical studies at Lund University, Sebastian also earned a BSc in Behavioural Science. Prior to the fellowship, Sebastian worked on national infectious-disease surveillance at the Statens Serum Institute (SSI) in Denmark. He has two years of clinical experience, primarily in infectious diseases at Hvidovre Hospital. As a researcher in infectious-disease epidemiology, Sebastian has published several studies on HIV pre-exposure prophylaxis (PrEP) and risk of sexually transmitted infections (STIs).

Sebastian's prior international experience includes leading an evaluation of a public health project in rural Cambodia. He also served as a consultant in quantitative methodology for the North Macedonian non-governmental think tank, Centre for Regional Policy Research and Cooperation 'Studiorum'.

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 Manual¹.

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>

1. Epidemiological investigations

1.1. Outbreak investigations

Outbreak of hepatitis A among gay, bisexual and other men who have sex with men (GBMSM) in Portugal, October 2023–April 2024

Supervisors: João Vieira Martins (DGS), Paula Vasconcelos (DGS), Vasco Ricoca Peixoto (DGS)

Category: Viral hepatitis and sexually transmitted infections (STIs)

Aim: We combined genotyping and epidemiological data of a hepatitis A outbreak in Portugal from October 2023 to April 2024 to identify the at-risk population and inform public health actions.

Methods: We conducted a retrospective case–case study using reported hepatitis A cases from the National Epidemiological Surveillance System, comparing case characteristics during the outbreak period (October 2023 to April 2024) with a baseline period (January 2020 to October 2023). Serum and/or stool samples were genotyped by the national reference laboratory, using the international hepatitis A network (HAVNet) protocol.

Results: Overall, 71 confirmed cases were reported from 7 October 2023 to 24 April 2024, significantly surpassing the incidence rates of previous years. Outbreak cases were more likely to be men (odds ratio (OR)=4.0, 95% confidence intervals (CI): 2.0–9.0), aged 18–44 years (OR=9.0, 95% CI: 3.2–32.6), reported from the Lisbon region (OR=4.0, 95% CI: 1.8–9.5), and associated with suspected sexual transmission (OR=18, 95% CI: 5.2–88.3). Genotyped samples from 25/29 tested cases were identified as sub-genotype 1A and highly similar (99–100% nucleotide identity) to the VRD 521-2016 strain, circulating during the multi-country MSM-associated hepatitis A outbreak in 2016–2018. Outbreak cases linked by genotyping differed from baseline on the same characteristics as in the main analysis. Public health actions included targeted traditional and digital communication campaigns, such as Grindr notifications and targeted Instagram ads.

Public health implications/Conclusions: Our results suggested mainly sexual transmission among a subgroup of GBMSM and indicated the resurgence of a viral strain not detected since the 2016–2018 outbreak. Early detection enabled prompt implementation of targeted interventions, including promoting vaccination recommendations for GBMSM in Portugal. As the outbreak likely posed a trans-border health risk, we advised other countries to be vigilant to limit further transmission.

Role: Sebastian was an investigator in the national task force. He performed data analysis of surveillance data and – together with the EUPHEM fellow, Ebba Rosendal – was the first author of a rapid communication published in *Eurosurveillance*. Following publication, Sebastian gave an interview to the Spanish newspaper *El Mundo*. Finally, he gave an oral presentation on the outbreak investigation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2024.

Outbreak of measles in Portugal, January–October 2024

Supervisors: Paula Vasconcelos (DGS), Pedro Pinto Leite (DGS)

Category: Vaccine-preventable diseases

Aim: We aimed to: a) support contact tracing following imported measles cases at a hospital in Lisbon, b) assist outbreak investigation in the Norte region, and c) support the national response.

Methods: We supported contact tracing and managed cases following an index case at a local hospital in Lisbon. Contacts were line-listed from hospital attendance registers and cross-matched with vaccination histories in the national e-Vacinas registry. Prioritised by risk, contacts were telephonically counselled on post-exposure prophylaxis (PEP). We created an automated R Markdown pipeline to generate weekly briefings and epidemiological bulletins for the national task force. We also collaborated with public health authorities in the Norte region to investigate suspected local transmission.

Results: In Portugal, 35 confirmed cases were recorded between January and October 2024, 13 of which were imported. Two regions were affected, Lisbon and Norte. In Lisbon, 69 contacts of the index case were identified from hospital admission lists; 39 were potentially susceptible and 23/39 (59%) received timely immunisation (< 72 hours). In the Norte region, three epidemiologically linked cases confirmed autochthonous transmission.

Public health implications/Conclusions: High vaccination coverage, early warning and response, systematic contact tracing and prompt PEP helped control the outbreak, resulting in a limited number of confirmed cases.

Role: Sebastian took part in the national task force. At the Lisbon public health unit, he performed the contact-tracing data analysis, first-authored the outbreak report, and co-authored a rapid communication published in *Eurosurveillance*. In the Norte region, he contributed to case definition discussions and epidemiological analyses. For the task force, Sebastian created an automated R workflow to produce weekly epidemiological bulletins, presenting these outputs at task-force meetings. Subsequently, he supervised a colleague who assumed the role of bulletin production during the outbreak's final phase.

*Interregional outbreak of *Salmonella* Typhimurium linked to fresh cheese: A case–case study guided by whole genome sequencing (WGS), Portugal, March–June 2024*

Supervisors: Vasco Ricoca Peixoto (DGS), Paula Vasconcelos (DGS)

Category: Food- and waterborne diseases

Aim: We performed a case–case study guided by whole genome sequencing (WGS) to identify the source of a *Salmonella enterica* serovar Typhimurium outbreak.

Methods: We compared *S. Typhimurium* cases notified between 11 May 2024 and 18 June 2024 (outbreak cases) with salmonellosis cases notified in 2023 (historical cases), as well as a subset of outbreak cases linked by WGS (cluster cases) with historical cases. We used logistic regression to calculate odds ratios (OR) for food exposures recorded in salmonellosis notifications. We performed environmental and product sampling at a cheese production site.

Results: Alentejo and Lisbon and Tagus Valley regions reported 140 outbreak cases (median age: 26, interquartile range (IQR): 7–67; 46% female). Isolates from 58 cases underwent WGS; all belonged to one core genome multilocus sequence typing (cgMLST) cluster (HierCC HC5_410410). Compared with the 552 historical cases, fresh cheese consumption was more likely among the outbreak cases (4.2% vs 27%; OR: 8.5; 95% CI: 4.5–17) and the cluster cases (4.2% vs 44%; OR: 18; 95% CI: 8.5–38). Food safety non-conformities were identified at the visited cheese production site. Three environmental and four product specimens were collected; all tested negative for *Salmonella* spp.

Public health implications/Conclusions: The case–case study suggested fresh cheese as the most likely vehicle of infection. Hygiene measures were enforced at the cheese production site. Despite limitations, including temporal bias and a non-exhaustive exposure list, the case–case design was a rapid, low-cost tool that leveraged existing surveillance data. Using WGS for the outbreak case definition increased specificity of case–case findings. We recommend this combined approach as part of the toolkit for food-borne outbreak investigations in Portugal.

Role: Sebastian was relocated to the local public health unit in Évora to support the outbreak investigation. His tasks were as follows: a) performed a preliminary case–case analysis before the cluster was identified, establishing fresh cheese as the working hypothesis; b) deployed to Alentejo Central two days per week from 20 May 2024 for three weeks to support on-site activities; c) conducted descriptive epidemiology to characterise person, place and time aspects of the outbreak; d) prepared a semi-structured interview guide for cheese producers; e) drafted a trawling questionnaire based on the ECDC Food- and Waterborne Outbreak Toolkit; f) developed an extended epidemiological inquiry to re-interview confirmed cases; g) linked WGS cluster data to cases using the national patient registry; h) carried out a new case–case analysis with WGS-confirmed cases for the outbreak report; i) presented findings and recommendations at a stakeholder wrap-up meeting; j) first-authored a manuscript.

Outbreak of mpox in the Democratic Republic of the Congo (DRC): analysis of contact-tracing data for the EU Health Task Force (EUHTF), 2024

Supervisor: Emma Löf (EU Health Task Force)

Category: Emerging and re-emerging diseases

Aim: During the 2024 mpox outbreak in the DRC, we analysed mpox contact-tracing data to identify risk factors for becoming a secondary mpox case, inform response measures in the DRC, and support preparedness in the EU/EEA.

Methods: As part of the Integrated Analytics Cell (CAI) in the DRC, we analysed contact-tracing data for the Équateur province to identify risk factors for becoming a secondary mpox case. We used univariate logistic regression to calculate OR and 95% CI.

Results: Data completeness and the outbreak descriptive analysis was described by time, place and person. Risk factors for becoming a secondary case were identified, including demographics, shared activities and exposures. Findings were presented at ECDC, and at the CAI in the DRC.

Public health implications/Conclusions: The contact tracing analysis identified risk factors for mpox transmission in the Équateur province, which was dominated by the subclade Ia mpox virus. These findings supported targeted response measures in the DRC, and informed preparedness efforts in the EU/EEA.

Role: Sebastian integrated into the EUHTF team, supported the development of a data analysis plan and independently performed the epidemiological contact-tracing analysis. He presented the analysis at ECDC and supported the presentation held by colleagues at the CAI in the DRC.

Two concurrent outbreaks of hepatitis A in Portugal: Implications for public health action, 2023–2025

Supervisors: Vítor Veríssimo (DGS), Vasco Ricoca Peixoto (DGS)

Category: Viral hepatitis and STIs

Aim: To characterise the epidemiological profiles of two concurrent hepatitis A outbreaks in Portugal and support tailored public health interventions

Methods: We conducted two retrospective case–case studies using data from the National Surveillance System (1 January 2020 to 31 March 2025). We compared cases from Outbreak 1 (from 7 October 2023 in Lisbon and Porto) and Outbreak 2 (from 30 April 2024 in southern Portugal) with baseline cases (1 January 2020 to 6 October 2023). We used logistic regression to estimate adjusted odds ratios (aOR).

Results: Overall, 97 baseline cases were identified. Outbreak 1 included 274 cases, 53% reported sexual transmission and 44% self-identified as gay, bisexual and other men who have sex with men (GBMSM). Compared to the baseline, cases were more likely to be male (aOR=2.6; 95% CI: 1.3–5.0), aged 18–44 years (aOR=4.0; 95% CI: 1.7–9.7), born in Brazil (aOR=4.0; 95% CI: 1.3–18), and GBMSM (aOR=26; 95% CI: 5.3–474). Outbreak 2 involved 191 cases, with 62% reporting person-to-person (non-sexual) transmission; 55% of the cases were children and adolescents (aged 0–17 years); cases were more likely to report contact with a confirmed case (aOR=4.5; 95% CI: 1.2–18.2), and less likely to be born outside Portugal or Brazil (aOR=0.30; 95% CI: 0.1–0.9), compared to the baseline cases.

Public health implications/Conclusions: The two outbreaks had distinct epidemiological profiles with implications for public health actions. Outbreak 1 involved people born in Brazil and GBMSM, highlighting the need for targeted vaccination and awareness campaigns, while promoting effective contact tracing. Outbreak 2 was linked to person-to-person (non-sexual) transmission mainly in children and adolescents with higher odds of reported contact with confirmed cases, highlighting the need for contact tracing, community vaccination and hygiene promotion.

Role: Sebastian was an investigator in the national task force and took part in the weekly meetings. He supported the case–case data analysis and provided input on the methodology and the interpretation of results. Sebastian co-authored an abstract which was accepted for ESCAIDE 2025, and a rapid communication to *Eurosurveillance*, supporting the EPIET fellow, Joana Vidal Castro, who was the first author.

1.2. Surveillance

Development of a data extraction tool for operations and research in epidemic intelligence (EI)

Supervisors: Vasco Ricoca Peixoto (DGS), Paula Vasconcelos (DGS), Gianfranco Spiteri (ECDC)

Type of project: Setting up a surveillance system

Aim: To develop, test and implement an automated tool that can extract structured, event-level information from weekly epidemic intelligence bulletins (RONDA) (2014–2024) to a) keep the national operational epidemic intelligence (EI) database up-to-date, and b) create an event-based research database that enables quantitative analyses of threats, responses and trends.

Methods: We prototyped five extraction strategies: two large-language-model workflows and three scripts using different R packages. We tested each prototype on a representative subset of bulletins, and then iteratively refined the most reliable script to recognise the various PDF layouts used over time. The raw extraction was cleaned, categorised and consolidated in a comprehensive database.

Results: The final tool, implemented with the R package 'pdftools', identified the coloured separators that bound each event and extracted the corresponding text blocks by their x- and y-coordinates. The tools extracted 2 218 alerts, including new events and updates, from 563 bulletins published during 2014–2024. For each event, the extracted database included date, disease, event classifications, a summary, and the full narrative description.

Public health implications/Conclusions: The operational database allowed public health professionals to access and learn from previous responses to health threats. The database served surveillance purposes by supporting an overview of past threats, including for reporting purposes to collaborating agencies, and provided a complete repository of more than 10 years of event-based surveillance, enabling EI research. The tool removed the need for manual extraction of information in the future.

Role: Sebastian worked with the DGS EI team in the Public Health Emergency Operations Centre to conceptualise the automated tool and organise a short stay at ECDC to develop prototypes for the tool. He developed and tested prototypes on the full dataset and refined the final tool for robustness across variations in PDF layout. He scripted, cleaned and categorised the raw extraction. Finally, he created a standard operating protocol (SOP) and handed over the tool to the EI team.

Surge of congenital syphilis in Portugal: a case–case analysis of driving factors, 2015–2023

Supervisors: Pedro Pinto Leite (DGS), Vítor Veríssimo (DGS)

Type of project: Analysing data from a surveillance system

Aim: To compare recent temporal trends in congenital syphilis (CS) and maternal syphilis cases in Portugal, and to identify factors associated with the rise in CS cases since 2021.

Methods: We extracted confirmed and probable CS and maternal syphilis cases in women aged 15–44 years from the Portuguese national epidemiological surveillance system (SINAVE) for 2015–2023. CS incidence was expressed per 100 000 live births and maternal syphilis incidence per 100 000 15–44-year-old women. Linear regression quantified the association between the two time-series. We performed a case–case analysis comparing CS cases diagnosed before 1 January 2021 with those diagnosed afterwards, using logistic regression to calculate OR and 95% CI.

Results: CS incidence rose from 7.0 per 100 000 live births (six cases) in 2015 to 23.3/100 000 (20 cases) in 2023. Each additional maternal syphilis case per 100 000 was associated with a 1.7-unit increase in CS incidence (95% CI: 1.0–2.3). Mothers of CS cases diagnosed from 2021–2023 were more likely to be younger than 27 years (OR: 4.2, 95% CI: 1.7–11). No significant changes were observed by maternal country of birth, nationality, region, syphilis stage, or pregnancy monitoring status.

Public health implications/Conclusions: The parallel rises in CS and maternal syphilis indicated missed opportunities for prenatal prevention and underscored the need to reinforce both syphilis control among women of childbearing age and antenatal screening/treatment, with targeted efforts for younger pregnant women. A larger case–control study is recommended to clarify additional risk factors and prevention gaps.

Role: Sebastian extracted and cleaned surveillance data, performed statistical analyses, wrote the report, submitted an abstract to Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) conference in 2025, and wrote a protocol for a larger case–control study.

Strengthening national surveillance to support response to largest cholera outbreak in South Sudan, 2024–2025

Supervisor: Jetri Regmi (World Health Organization South Sudan Country Office)

Type of project: Analysing data from a surveillance system

Aim: As a Global Outbreak Alert and Response Network (GOARN) deployee in South Sudan, we performed real-time epidemiological analysis of a national cholera outbreak data to support targeted response and coordination efforts by the Ministry of Health (MoH), and to strengthen data quality and surveillance at the sub-national level.

Methods: We refined an R-based pipeline to systematically clean and consolidate surveillance data reported daily from affected counties. The pipeline performed descriptive analysis and automated generation of PowerPoint slide decks prepared for national coordination meetings. Weekly analyses provided in-depth assessments of case trends, risk factors, case management, and rapid diagnostic tests (RDT) or laboratory testing coverage at the sub-national level. We monitored data quality and completeness through close collaboration with the MoH and partners.

Results: From 28 September 2024 to 7 February 2025, the cholera outbreak in South Sudan had affected 34 counties across seven states and one administrative area, with a total of 27 985 reported cases and 482 deaths. Daily epidemiological analyses supported the MoH and WHO situational awareness and guided response strategies, including oral cholera vaccine (OCV) campaigns and water, sanitation and hygiene (WASH) interventions. Weekly analyses identified key gaps, such as insufficient RDT/laboratory testing, challenges in case management, or case fatality rates above international thresholds, prompting targeted follow-up.

Public health implications: Real-time surveillance outputs were used for tri-weekly coordination meetings to guide response activities, support OCV applications, and promptly flag issues in case management and diagnosis, playing a crucial role in the cholera response in South Sudan.

Role: Sebastian managed and conducted daily and weekly epidemiological analyses in collaboration with the MoH and WHO colleagues. He continuously developed the R-based analysis pipeline to produce surveillance outputs for the national coordination meetings and other requests. He actively addressed data quality issues and delays in coordination with the MoH and partners, including a two-week relocation to the WHO field office in the most affected region in South Sudan to support data quality assurance and analysis.

2. Applied public health research

Individual and seasonal determinants of death among influenza patients in intensive care units, Portugal, 2012–2024

Supervisors: Vasco Ricoca Peixoto (DGS), Ana Firme (DGS), Mariana Ferreira (DGS), Paula Vasconcelos (DGS)

Aim: We aimed to identify individual and seasonal determinants of influenza-related death to inform intensive care units (ICU) capacity planning, triage and surveillance of severe acute respiratory infections (SARI).

Methods: We conducted a retrospective analysis of laboratory-confirmed influenza cases admitted to 27 ICUs in 2012–2024. Covariates included demographics, comorbidities, season, influenza type, and ICU influenza burden. We calculated case-fatality and adjusted risk ratios (aRR) for death during ICU admission using log-binomial regression. Directed acyclic graphs informed adjustments, including age, sex, influenza type and comorbidities.

Results: Of 1 071 cases, 262 (24%) died. Case-fatality increased with age and was highest for those in the age group of 80+ years (aRR: 11, 95% CI: 2.4–184), compared with 0–19-year-old cases. Case-fatality was higher among patients with chronic liver disease (aRR: 2.0, 95% CI: 1.5–2.6), cancer (aRR: 1.6, 95% CI: 1.1–2.1), and during a high caseload season (aRR: 1.52, 95% CI: 1.16–2.05). Compared with the latest season (2023–2024), case fatality was lower in 2021–2022 (aRR: 0.12, 95% CI: 0.02–0.85) and 2022–2023 (aRR: 0.46, 95% CI: 0.23–0.91). No differences were observed for other seasons.

Public health implications/Conclusions: Advanced age, liver disease, and cancer were associated with increased fatality. Few influenza cases and lower case-fatality in 2020–2023 suggest reduced influenza activity and strict prioritisations during the coronavirus disease 2019 (COVID-19) pandemic. Case-fatality was higher in seasons with higher caseload but did not increase during peak influenza weeks, and did not change significantly between non-COVID seasons suggesting consistent ICU triage throughout and between seasons. These findings may contribute to optimising ICU triage and capacity planning for future seasons and inform the establishment of SARI surveillance.

Role: Sebastian extracted and cleaned the surveillance data, performed statistical analyses, submitted an abstract to ESCAIDE 2025 which was accepted, and first-authored a manuscript.

Congenital syphilis in Portugal: Temporal-spatial characterisation and gaps in vertical transmission prevention, 2015–2024

Supervisor: Vítor Veríssimo (DGS)

Aim: To analyse confirmed CS cases reported in Portugal and the frequency of pregnancy monitoring and antenatal screening to identify gaps in preventing vertical transmission of syphilis, enabling effective strategies for its elimination by 2030.

Methods: We conducted a retrospective descriptive study including confirmed cases of CS reported through the Portuguese national epidemiological surveillance system (SINAVE) from 2015 to 2024. We calculated annual incidence of CS per 100 000 live births and the proportion of pregnancies monitored and prenatal screenings conducted.

Results: Overall, 99 cases of CS were reported in Portugal. Median age among mothers was 28 years (IQR: 22–34). Among the cases, 35% were diagnosed before one month of age and 99% before one year of age. Annual incidence rose from 5.9 to 22.2 cases per 100 000 live births between 2015 and 2024. Overall incidence during 2015–2024 was 11 per 100 000 live births, ranging from 2.5 in the Centro region to 42 in Azores. Among pregnancies, 67.7% were monitored; among these, 77.6% underwent prenatal screening and 88.5% of these showed reactive results.

Public health implications/Conclusions: Robust scientific evidence on the current context of congenital syphilis in Portugal is crucial to improve prenatal screening and STI control. Enhanced monitoring of syphilis screening during the first and third trimesters, along with targeted strategies for vulnerable populations is strongly recommended. Raising awareness among healthcare professionals and investing in reproductive, maternal, and child health programmes are priorities to effectively address this public health challenge.

Role: Sebastian participated in the study conceptualisation, provided methodological considerations, performed data extraction, cleaning and validating the formal analysis. He also reviewed an abstract accepted for ESCAIDE 2025, and a manuscript first-authored by a public health resident, Filipa Canha.

3. Teaching and pedagogy

National School of Public Health (ENSP), NOVA University Lisbon, April 2024

On 23 April 2024, Sebastian delivered a four and a half-hour face-to-face applied-epidemiology class for 11 second-year Public Health medical residents, together with EPIET supervisor, Vasco Ricoca Peixoto. The session was built around an adapted Bergen *Giardia* outbreak case study and a shortened version of a smoking and lung cancer case study. Working in two small groups before a plenary wrap-up, participants practised outbreak definition, descriptive epidemiology and study-design choices. In the evaluation survey with 100% response, respondents rated overall quality as 4.8 out of 5, and reported marked gains in key outbreak-investigation skills.

ECDC PETAL seminar (online), May 2025

On 26 May 2025, Sebastian led a two-hour webinar for 107 participants on 'Using AI in everyday epidemiology' together with ECDC expert, Angelo D'Ambrosio. The session combined a lecture, a live demonstration of GPT-based tools, and practical work in triads. The 32 respondents to the evaluation scored the session with a mean of 4.1/5. The responses highlighted the hands-on design and live coding, while some requested more training and practice time. Sebastian managed the webinar, devised all materials, tailored content to specific needs reported in a pre-course survey, and ensured alignment with ECDC guidance.

South Sudan cholera case study, 2024

Following the deployment to South Sudan, Sebastian developed a case study of the cholera outbreak together with co-deployed ECDC fellows and staff at the South Sudan WHO Country office. The case study covered the steps of an outbreak investigation in a low-resource setting, data quality evaluation and diagnostic methods. The final version of the case study will be available as a learning tool for future fellows.

4. Communications related to the EPIET/EUPHEM fellowship

4.1. Manuscripts published in peer-reviewed journals

- Rosendal E*, **von Schreeb S***, Gomes A, Lino S, Grau-Pujol B, Magalhães S et al. Ongoing outbreak of hepatitis A associated with sexual transmission among men who have sex with men, Portugal, October 2023 to April 2024. *Euro Surveill.* 2024;29(21):pii=2400272. Available at: <https://doi.org/10.2807/1560-7917.ES.2024.29.21.2400272> *Authors shared equal contribution.
- **von Schreeb S**, Ricoca Peixoto V, Firme A, Ferreira M, Lourenço Silva R, Vasconcelos P. Comment on "Assessment of the implementation of the International Health Regulations during the COVID-19 pandemic: Portugal as a case study". *Acta Med Port.* 2024;37(10):744-5. Available at: <https://doi.org/10.20344/amp.21985>
- Resendes DS, Tomás A, Cardoso MP, **von Schreeb S**, Ferrão RM, Vasconcelos P, Almeida MH, Castro BN, Peixoto VR, Silva RL, de Moraes M. Contact tracing management of a measles case in a paediatric hospital: experience of the local public health unit, Portugal, January 2024. *Euro Surveill.* 2024;29(17):pii=240022. Available at: <https://doi.org/10.2807/1560-7917.ES.2024.29.17.240022>
- **von Schreeb S**, Vidal Castro J, Firme A, Ferreira M, Crisóstomo E, Silva CD, et al. Individual and seasonal determinants of death among influenza patients in intensive care units, Portugal, 2012–2024. 2025 [Submitted]
- **von Schreeb S**, Silveira LSD, Pista Â, Gomes JP, Oleastro M, Raposo SG, et al. Interregional outbreak of *Salmonella Typhimurium* linked to fresh cheese: a case–case study guided by whole-genome sequencing, Portugal, March–June 2024. 2025 [Submitted]
- Vidal Castro J, **von Schreeb S**, Mulongeni R, Carvalho T, Gomes A, Bettencourt J, et al. Two concurrent ongoing outbreaks of hepatitis A in Portugal: implications for public health action, 2023–2025. 2025 [Submitted]

4.2. Conference presentations

- **von Schreeb S**, Firme A, Ferreira M, das Neves Salgado Crisóstomo E, Castro Silva C, Sousa Marques CF, Baptista Monteiro HF, Leitão RP, Marinho Falcão I, Vasconcelos P, Ricoca Peixoto V. Individual and seasonal determinants of death among influenza patients admitted to intensive care units, Portugal, 2012–2024. Accepted for presentation at: ESCAIDE; November 2025; Warsaw, Poland
- Mazzilli S, **von Schreeb S**, chairpersons. Strengthen resilience against emerging vector-borne diseases through the ECDC Fellowship Programmes. Workshop chaired at: 17th European Public Health Conference; November 2024; Lisbon, Portugal

- Vaz Cardoso J, **von Schreeb S**, Caleiro M, Leitão RP, Gomes A, Vieira Martins J, Pinto Leite P. Effect of risk management and communication in vaccination during a hepatitis A outbreak in Portugal. Presented at: ESCAIDE; 22 November 2024; Stockholm, Sweden
- Canha F, **von Schreeb S**, Pinto Leite P, Cabral Veríssimo V. Rising incidence of congenital syphilis in Portugal: Implications for achieving WHO Europe targets. Presented at: ESCAIDE; 21 November 2024; Stockholm, Sweden
- **von Schreeb S**, Rosendal E, Gomes A, Lino S, Grau-Pujol B, Magalhães S et al. Outbreak of Hepatitis A associated with sexual transmission among men who have sex with men (MSM) in Portugal, October 2023 to April 2024. Presented at: ESCAIDE; 22 November 2024; Stockholm, Sweden
- **von Schreeb S**, Melbardis Jørgensen K, Holm Harritshøj L, Boëtius Hertz F, Lunding S, Glindvad Ahlström M et al. Questioning Risk Compensation: Pre-exposure Prophylaxis (PrEP) and Sexually Transmitted Infections Among Men who have Sex with Men in Denmark. Presented at: ESCAIDE; 22 November 2023; Barcelona, Spain

4.3. Other presentations

- **von Schreeb S**. Overview of measles outbreak in Portugal. National task force meeting, February 2023, Lisbon, Portugal
- **von Schreeb S**. Findings from Salmonella *Typhimurium* Outbreak Investigation. National task force meeting, May 2024, virtual
- **von Schreeb S**. Mpox in the Democratic Republic of the Congo: Findings from contact tracing analysis. ECDC, September 2024, Stockholm, Sweden
- **von Schreeb S**. Paper Club Session: The concept of 'Risk Compensation' and use in Public Health. European Union Drugs Agency (EUDA), 5 December 2024, Lisbon, Portugal.

4.4. Media communication

- Interview: *Un brote de hepatitis A con una nueva cepa pone en alerta a los no vacunados en Portugal* [An outbreak of hepatitis A with a new strain puts the unvaccinated on alert in Portugal]. El Mundo. 2024 June 17 [cited 3 October 2024]; Available at: <https://www.elmundo.es/ciencia-y-salud/salud/2024/06/17/6661996bfc6c831d638b45ae.html> [Spanish]

5. EPIET/EUPHEM modules attended

- Introduction to R for Applied Epidemiology (14 hours), Applied Epi, 19–22 September 2023, 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, 14–20 March 2024, virtual
- Qualitative Research, 19 and 22 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
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2024, 20–22 November 2024, Stockholm, Sweden
- Ethics, included in Study Protocol, Ethics, and Scientific Writing, 6 November 2024, virtual
- Time Series Analysis, 9–13 December 2024, Utrecht, the Netherlands
- Social Behavioural Sciences, 24–28 March 2025, virtual
- Public Health Microbiology II – Biorisk and Quality Management, 28–30 April 2025, virtual
- One-Health, 12–15 May 2025, virtual
- Public Health Microbiology III – Whole Genome Sequencing, 23–27 June 2025, Vienna, Austria
- Project Review Module, 25–29 August 2025, Lisbon, Portugal
- Leadership and Communication in Public Health, 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: Molecular Epidemiology. Organised by EAN, 20–21 November 2023, Barcelona, Spain
- Multidisciplinary Training Workshop on Food- and Waterborne Diseases Antimicrobial Resistance – Reference Laboratory Capacity (FWD AMR-RefLabCap). Organised by Statens Serum Institut, 24–28 June 2024, Virtual
- Bi-weekly classes in Portuguese from level A1 to B2. 5 October 2023–30 April 2024, Lisbon, Portugal
- Training on homophobia, biphobia, transphobia and interphobia. Organised by the DGS, 17 February, Lisbon, Portugal
- EPI-Masterclass. Organised by the National Institute for Public Health and the Environment (RIVM), 23 May 2024–10 September 2025 (five sessions), virtual
- R coding knowledge sharing *Media HoRa*. Organised by Statistics Portugal, 10 January 2024–10 September 2025 (15 sessions), Lisbon, Portugal
- PETAL seminar: Health Economics. Organised by ECDC, 16 October 2024, virtual
- Mini-Module: MONitoring Outbreaks for Disease (MOOD) surveillance in a data science context. Organised by EAN, 18–19 November 2024, Stockholm, Sweden
- BSAFE. Organised by United Nations Department of Safety and Security, 11 December 2025, virtual
- Prevention of Sexual Exploitation and Abuse (PSEA). Organised by United Nations, 11 December 2024, virtual
- Behavioural Science in Action: Understanding Vaccine Acceptance and Uptake. Organised by ECDC Lighthouse, 12 December 2024, virtual
- Intersection of social and behavioural sciences and infectious disease prevention. Organised by ECDC Lighthouse, 4 December 2024, virtual
- Using Behavioural Science to Counteract Antibiotic Resistance. Organised by ECDC Lighthouse, 27 January 2025, virtual
- Breaking barriers for women: the role of behavioural and structural factors in HIV prevention. Organised by ECDC Lighthouse, 5 March 2025, virtual
- Behavioural science in action: Social and behavioural science in outbreak investigation and response. Organised by ECDC Lighthouse, 20 May 2025, virtual

7. International assignments

- Cholera, South Sudan: Deployment to South Sudan through the WHO Global Outbreak Alert and Response Network (GOARN) to support the WHO Country Office on an outbreak of cholera, 18 December 2024 to 10 February 2025, Juba and Bentiu, South Sudan
- Mpox, Democratic Republic of the Congo (DRC): Performed epidemiological analysis of mpox contact tracing data to support the EU Health Task Force (EUHTF) response in the DRC, 20 August to 6 September 2024, remote from ECDC in Stockholm, Sweden

8. Other activities

- Participated in ovitrap monitoring at three sites in Lisbon, shadowing activities in the vector control programme, REVIVE, 9 November 2023, Lisbon, Portugal
- Participated in the *Legionella* monitoring programme, collecting water samples from four different sources within a hospital, 10 November 2023, Lisbon, Portugal
- Participated in the Joint Assessment and Detection of Events (JADE) simulation exercise organised by WHO Europe integrating the CESP/DGS team, including discussion, search for relevant information and guidelines, and contribution on responses to injects to the EURO JADE team, November 2023, Lisbon, Portugal
- Participated in DGS scientific conference, 11–12 April 2024, Lisbon, Portugal
- Participated in ECDC Expert Exchange in Preparedness Planning, 21–24 May 2024, Lisbon, Portugal
- Revised the Country guide for new EPIET/EUPHEM fellows in Portugal for the EAN, June 2024, virtual
- Organised the social activities programme for the Project Review Module (PRM), August 2024, Lisbon, Portugal

- Pilot-participant for the Outbreak Management Gamified Exercise (OMGE) organised by the ECDC, 22 August 2024, Stockholm, Sweden
- Served as peer reviewer for *Eurosurveillance*, September 2024, virtual
- Served as peer reviewer for *European Journal of Public Health*, October 2024, virtual
- Contributed to the testimonials session during the webinar on deployments supporting the mpox response in the Democratic Republic of the Congo (DRC), organised by the EU Health Task Force (EUHTF), 17 October 2024, virtual
- Participated in the workshop, Best Practices to Eliminate HIV, STIs, and Viral Hepatitis among MSM and Transgender Migrants, organised by SOAIDS Netherlands, 7 November 2024, virtual
- Attended the 17th European Public Health (EPH) Conference, 12–15 November 2024, Lisbon, Portugal
- Participated in the Public Health Emergency Preparedness Assessment (PHEPA) of Portugal organised by ECDC, 3–7 March 2025, Lisbon, Portugal
- Contributed to the Q&A session at International assignments: Experiences from the field organised by ECDC, 31 March 2025, virtual
- Member of the ECDC AI in Training Working Group, March 2025, ongoing, virtual

Acknowledgements

I want to thank my supervisors, Vasco Peixoto and Paula Vasconcelos, for their guidance, broad public health expertise, and constant support. My sincere gratitude also goes to my frontline coordinators, Barbara Schimmer and Kostas Danis, for their scientific rigour and clear thinking. To colleagues at DSIA and CESP, thank you for warmly welcoming me and patiently enduring my faltering Portuguese.

I sincerely appreciate the teams that hosted me during EPIET: the public health units of Lisboa Central, Porto Occidental, and Alentejo Central; NOVA National School of Public Health; ECDC Epidemic Intelligence Unit and the WHO offices in Juba and Bentiu, South Sudan.

To my co-fellows, who filled this fellowship with laughter and meaningful conversations, I look forward to spending the rest of my days tackling public health challenges together. And to Ebba Rosendal, with whom I've worked side by side from Lisbon to Juba via Carcavelos, I look forward to our next adventure.