Marta Soler Soneira

The European Programme for Intervention Epidemiology Training (EPIET), Cohort 2023
Instituto de Salud Carlos III, Madrid, Spain

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/2023/23 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 Soler Soneira is a public health professional with over 25 years of national and international experience in vaccine-related fields. She holds a Doctorate in Pharmacy from the University of Navarra and is a specialist in microbiology. She currently works at the Spanish Ministry of Health as Coordinator of the Vaccination Programmes and Registry Area. Previously, she served as an epidemiologist at the Spanish National Centre of Epidemiology (CNE), Institute de Salud Carlos III (ISCIII), where she completed the EPIET fellowship, led surveillance of vaccine-preventable diseases, and acted as the Operational Contact Point for the European Centre for Disease Prevention and Control (ECDC). In addition, Marta has represented Spain in major regulatory and health agencies such as the European Medicines Agency (EMA), Food and Drug Administration (FDA), World Health Organization Regional Office for Europe (WHO/Europe), and the European Commission.

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, 2026

1. Epidemiological investigations

1.1. Outbreak investigations

Three serogroup B outbreaks occurred in Spain within a period of less than three months (from March to May 2024). As similar outbreaks had not been reported in the past 15 years, there was concern that a virulent strain might be spreading across regions. However, it was ultimately confirmed that the outbreaks were caused by different strains. This section mainly focuses on the outbreak in which Marta played the most significant role, involving two affected regions.

1.1.1. Outbreak of invasive meningococcal disease (IMD) caused by a rare serogroup B strain in Spain, 2024

Supervisor: Rosa Cano (CNE, ISCIII)

Category: Vaccine-preventable diseases

Aim: To describe a cluster of four cases of invasive meningococcal disease (IMD) caused by a rare serogroup B strain

Methods: Cases were classified according to the Spanish IMD protocol. Diagnosis was confirmed by detecting *Neisseria meningitidis* in blood or cerebrospinal fluid via culture or polymerase chain reaction (PCR). Demographic, clinical, and social data were collected via interviews. Contact tracing was performed following key social events. The CNE coordinated stakeholders during the outbreak, supporting affected regions with surveillance activities, including case identification, transmission chain construction, implementation of control measures (vaccination and prophylaxis), laboratory data management (microbiological and molecular analyses), and reporting to the Spanish Ministry of Health (MoH).

Results: Four IMD cases were identified between March and April 2024 in two regions: Castilla–La Mancha and Madrid. Three young adults (aged 28–30) were linked to a social event (a bachelor party), which was identified as the common source of exposure through plotting the transmission chain, while a 17-year-old adolescent was only geographically related. All cases were caused by a rare serogroup B strain susceptible to all tested antibiotics and covered by the vaccine. Two cases were fatal. Chemoprophylaxis and vaccination of close contacts prevented further spread.

Public health implications/Conclusions: The outbreak highlights the danger of hypervirulent or rare strains and the importance of genomic and functional surveillance. Epidemiological investigations identified transmission routes, evaluated control measures, and guided timely responses. Recommendations include strengthening surveillance, maintaining ciprofloxacin prophylaxis, combining molecular and functional assays, and increasing public awareness. Reviewing IMD outbreak protocols in Spain as well as Europe, and developing a common response guideline is essential.

Role: Marta acted as a co-investigator in this outbreak investigation and assumed a significant role in coordination at the central level. Her responsibilities included coordinating communication between regions, the central microbiology reference laboratory, and the Coordination Centre for Health Alerts and Emergencies (CCAES) at the MoH. She also performed descriptive analysis of cases at the central level, prepared and shared regular reports with all the stakeholders, recommended vaccination and chemoprophylaxis for close contacts, and maintained continuous communication with the central administration for each new step. She contributed as a co-author – providing the epidemiological components of the outbreak investigation – to a publication led by the Spanish National Centre of Microbiology, which was published in the journal *Eurosurveillance* (see section 4.1). In addition, she wrote a final outbreak analysis report for the MoH, which was not published or shared with ECDC due to confidentiality. A final report for EPIET was written instead.

1.2. Surveillance

1.2.1. Annual epidemiological analysis of invasive **Haemophilus influenza** *disease in Spain, 2023*

Supervisors: Rosa Cano (CNE, ISCIII), Noemí López (CNE, ISCIII)

Type of project: Analysing data from a surveillance system.

Aim: To describe the epidemiological situation of invasive *Haemophilus influenzae* disease (IHD) in Spain in 2023 and compare it with previous years (2015–2022)

Methods: We conducted a descriptive analysis using IHD cases reported to the Spanish National Epidemiological Surveillance Network (RENAVE) in 2023. Variables included sex, age, onset date, region, death, clinical manifestation, and serotype. Adding population data from the National Statistics Institute (INE), we calculated overall and age-specific incidence rates. Data quality and completeness for each variable were assessed.

Results: In 2023, 674 IHD cases were reported (54% male), with an incidence of 1.39 per 100 000 population. The highest rates were in children under one-year old (9.37/100 000) and adults aged 85+ years (7.57/100 000). Case numbers peaked in autumn and winter. Bacteraemic pneumonia was the most common manifestation (46.1%), followed by sepsis (20.6%). Most deaths (80.4%) occurred in individuals aged 65 years and older. The serotype was unknown in most cases. Among those with known serotype, non-typeable *Haemophilus influenzae* (NTHi) strains predominated (74.7%). The 2023 incidence rate exceeded pre-pandemic levels and increased in most age groups compared to 2022. The completeness of essential case data was optimal (100%). However, for other variables, such as serotype and vaccination status, data completeness remained around 30%.

Public health implications/Conclusions: The rise in IHD incidence in 2023, particularly in vulnerable groups, highlighted ongoing public health challenges. The predominance of NTHi and limited serotype data complicate surveillance and vaccination evaluation. Improving data completeness, especially with regard to serotyping and vaccination status, is critical for effective surveillance and public health strategies. Continued monitoring and development of vaccines against NTHi are essential.

Role: Marta provided an in-depth epidemiological analysis of IHD in Spain during 2023 comparing it with previous years (2015–2022). This analysis was published as a manuscript in the Spanish-language peer-reviewed journal, *Weekly Epidemiological Bulletin* (*Boletín Epidemiológico Semanal*) (see section 4.1).

1.2.2. Annual epidemiological analysis of invasive meningococcal disease in Spain, 2023

Supervisors: Rosa Cano (CNE, ISCIII), Noemí López (CNE, ISCIII)

Type of project: Analysing data from a surveillance system

Aim: To describe the epidemiological situation of invasive meningococcal disease (IMD) in Spain in 2023 and compare it with previous years (2015–2022).

Methods: A descriptive epidemiological analysis was conducted using IMD cases reported to RENAVE in 2023. Variables analysed included sex, age group, date of symptom onset, region, death, clinical manifestation, vaccination status and serogroup. Data were collected through SiViEs up to 1 July 2024. Population data from the National Statistics Institute were used to calculate incidence rates overall, by age-group and region. Data quality and completeness for each variable were assessed.

Results: In 2023, 265 IMD cases (51.7% male) were reported, with an incidence of 0.58 per 100 000 population. The highest incidence was among children under one-year old (8.43 per 100 000), followed by ages 1–4 (1.20 per 100 000). The typical seasonal pattern was the same as IHD, with most cases occurring in autumn and winter. Meningitis (38.5%) and sepsis (33.6%) were the main clinical manifestations. Case fatality was 13.2%, slightly above the 12-year average. Serogroup was unknown in 12.8% cases. Of the cases with known serogroup, 60% were caused by the serogroup B. Galicia (0.92), Basque Country (0.90), Murcia (0.70), and Melilla (1.16) had the highest incidence rates. No cases were reported in Extremadura and Ceuta. The completeness of most of the variables analysed was nearly 100%, except for serogroup (87.2%) and vaccination status (20.4%).

Public health implications/Conclusions: In 2023, IMD incidence increased, compared to the pandemic years, but stayed below pre-pandemic levels. Low vaccination reporting limits assessment of immunisation programmes. Improved data quality, interoperability, surveillance, and public health interventions are essential to reduce the IMD burden in Spain.

Role: Marta provided an in-depth epidemiological analysis of invasive meningococcal disease (IMD) in Spain during 2023 and its comparison with previous years. This analysis was published in *Weekly Epidemiological Bulletin* (*Boletín Epidemiológico Semanal*).

Routine surveillance activities

Routine surveillance of three invasive vaccine-preventable diseases in Spain, 2023–2025

Type of project: Analysing data from a surveillance system.

Aim: To systematically monitor three invasive vaccine-preventable diseases (invasive meningococcal disease, invasive pneumococcal disease and invasive *Haemophilus influenzae* disease) by collecting information from the Spanish Surveillance System (SiViEs), as well as analyse and interpret data. This process includes tasks such as monitoring real-time data streams, identifying patterns or anomalies, and using data analysis to interpret the findings.

Methods: In this context, Marta carried out an in-depth epidemiological analysis of invasive pneumococcal and meningococcal disease in Spain during 2023 in comparison with previous years (2015–2022), which were published in a final report, and a peer-reviewed national journal, *Weekly Epidemiological Bulletin* (*Boletín Epidemiológico Semanal*) (see sections 4.1 and 4.2).

Public Health implications/Conclusions: The primary goal is to transform raw surveillance data on these three diseases into actionable insights. Since these are vaccine-preventable diseases included in the routine Spanish vaccination schedule, it is crucial to monitor them. The resultant outputs from this analysis (reports, articles, scientific conference, communication item, etc) are then used to inform decision-making such as enhancing prevention measures and recommendations, evaluating vaccination programmes, and improving operational efficiency of the public health system.

Role: Marta is the disease expert for the three invasive diseases in Spain. She regularly conducts quality checks and data analysis, in collaboration with data providers. During the first year of fellowship, she conducted a revision of national epidemiological surveillance protocols (legal frameworks). Furthermore, she imports and cleans preliminary datasets for annual reports on the three diseases (the most recent reports were based on the data for 2023) and is responsible for reporting the data to the European surveillance portal for infectious diseases (EpiPulse) (formerly The European Surveillance System – TESSy).

2. Applied public health research

2.1. Visualising the rise and fall of invasive meningococcal disease hotspots in Spain, 2003–2019

Supervisors: Noemí López (CNE, ISCIII), Javier Del Águila (CNE, ISCIII), and Diana Gómez (CNE, ISCIII)

Aim: To map IMD cases in Spain from 2003 to 2019 to identify regions with the highest incidence over time for in-depth analysis.

Methods: We used all non-imported IMD cases from RENAVE and hospital discharge records in the National Health System (Conjunto Mínimo Básico de Datos – CMBD) notified during the above-mentioned time span for our analysis. Data was stratified by sex/age. We assessed temporal trends via annual rates and joinpoint regression. Spatial analysis at the municipal level used standardised incidence ratios (SIR) and Bayesian Besag–York–Mollié modelling to estimate smoothed relative risks (RRs) and exceedance probabilities, comparing three periods (2003–2010, 2011–2015, 2016–2019).

Results: Spain experienced a marked decline in IMD cases, with notification rates falling from 1.89/100 000 population in 2003 to 0.41 in 2014, then rising slightly to 0.83 in 2019. Joinpoint analysis identified significant trend changes in 2011 and 2014. Northern regions consistently showed the highest risk. Early periods revealed a north–south bipolar pattern; by 2016–2019, the risk was concentrated in northern and north-eastern areas (e.g. País Vasco, Catalonia), while southern hotspots diminished. Surveillance and hospitalisation data were highly correlated, reflecting identical trends.

Public health implications/Conclusions: Findings demonstrate a significant reduction in IMD incidence and shrinking risk areas, indicating successful vaccination and public health interventions. Persistent regional disparities highlight ongoing spatially informed surveillance and research. Monitoring environmental, social, and vaccination factors remains critical. Future studies should integrate individual-level data, assess evolving vaccination policies, and investigate environmental determinants. Spatial analysis enables targeted research in high-risk zones, and prioritising vaccination coverage and active health promotion are essential to prevent transmission and reduce susceptible populations.

Role: Marta wrote the study protocol for the analysis, extracted and analysed the data, and submitted a manuscript to the journal, *Eurosurveillance*. Additionally, she submitted an abstract to the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2024, including preliminary results of the project, which was accepted for a poster presentation (see section 4.3). Her poster presentation led to an interview in the Spanish magazine *EL PAÍS* entitled, 'The unknown behind the success of meningitis vaccines', published on 12 July 2024 (see section 4.5).

3. Teaching and pedagogy

Lecture on vaccination during pregnancy, Hospital Universitario de La Paz, Madrid, Spain, 24 April 2024

Marta gave a one-hour lecture on updates regarding vaccination during pregnancy as part of a maternal medicine training course for gynaecologists from across Spain. The training was held at the Hospital Universitario de La Paz, Madrid. This was the seventh year of Marta's participation, which suggests that her teaching contributions are consistently evaluated positively. Marta also wrote a reflective note on this training.

Practical course, 'How to be an epidemiologist for a day', ISCIII, Spain, 6 November 2023

Marta led a two-day practical course, 'How to be an epidemiologist for a day' for two different groups of health administration students at the CNE, ISCIII, as part of Science Day. The course included database analysis and the creation of pivot tables and charts in Excel. Students found the sessions engaging and accessible, with most reporting no major difficulties. Evaluation results (collected via a questionnaire) were very positive: the majority gave high scores, highlighting clear learning of epidemiological concepts and the usefulness of practical exercises. Feedback confirmed the effectiveness of the activity and students' appreciation for Marta's interactive teaching approach. Marta also wrote a reflective note on this training.

Lecture on evaluation of a surveillance system, Master of Public Health students, ISCIII, Spain, December 2024

This one-hour session was delivered to Master of Public Health students, focusing on the evaluation of public health surveillance systems. Marta played a key role by leading an interactive group activity in which students analysed real-world cases and discussed their findings. Under her guidance, students identified essential attributes of surveillance systems that can be assessed and suggested improvements. The results demonstrated strong engagement and understanding, reflected in students' collaborative participation and positive final feedback (collected via a questionnaire). This practical approach enhanced their ability to apply theoretical concepts to real-world challenges. Marta also wrote a reflective note on this training.

4. Communications related to the EPIET/EUPHEM fellowship

4.1. Manuscripts published in peer-reviewed journals

- **Soler-Soneira M**, Muñoz-Martinez L, Alcaide-Jimenez A, Arroyo Nebreda V, Cano Portero R. Enfermedad invasiva por *Haemophilus influenzae*. España 2023. Boletín Epidemiológico Semanal. 2024;32(3):137–149. doi: 10.4321/s2173-92772024000300004. Available at: https://revista.isciii.es/index.php/bes/article/view/1397/1696
- **Soler-Soneira M**, Alcaide-Jimenez A, Muñoz-Martinez L, Castellares-González CI, Cano Portero R. Enfermedad meningocócica invasiva en España en 2023. Boletín Epidemiológico Semanal. 2024;32(4):194–208. doi: 10.4321/s2173-92772024000400005. Available at: https://revista.isciii.es/index.php/bes/article/view/1411
- Abad R, Navarro C, García-Amil C, Montes M, Castañeda-García A, Cuadros JA, Galar A, Martin F, Mena E, Pérez de Madrid S, Román C, **Soler M**, Vázquez JA. Outbreak of invasive meningococcal disease caused by a meningococcus serogroup B expressing a rare porA genosubtype (19-54, 15), Spain, March to April 2024. Euro Surveill. 2025;30(44):pii=2500222. Available at: https://doi.org/10.2807/1560-7917.ES.2025.30.44.2500222
- **Soler-Soneira M**, Del-Águila-Mejía J, López N, Gómez D. Spatio-temporal epidemiology of invasive meningococcal disease in Spain, 2003–2019. [Submitted to *Eurosurveillance*]

4.2. Other reports

- **Soler-Soneira M**, Del-Águila-Mejía J, Acosta-Gutiérrez M, Sastre-García M, Amillategui-Dos-Santos R, Cano Portero R. Enfermedad Neumocócica Invasiva en España en 2023. Boletín Epidemiológico Semanal. 2024;32(2):74-93. doi: 10.4321/s2173-92772024000200003. Available at: https://revista.isciii.es/index.php/bes/article/view/1381/1685

4.3. Conference presentations

International Conference presentation(s)

- Uneven geographical distribution of invasive meningococcal disease in Spain, 1996–2022 (poster presentation). Presented at: European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE); November 2024; Stockholm, Sweden. [As Marta was unable to attend the conference, her supervisor, Noemí Lopez, presented the poster on her behalf.]
- Spanish infographics for healthcare professionals to mitigate measles outbreaks in Spain: an overview of the national strategies and measures currently being implemented (oral presentation). Presented at: National Focal Point (NFP) meeting of the Vaccine-Preventable Diseases and Immunisation (VPI) programme. 15–16 May 2025; Stockholm, Sweden.

4.4. Other presentations (national conferences)

- **Soler-Soneira M.** Online presentation on inclusive language in Scientific Journals. Inclusive and non-sexist language in scientific journals. National Library of Health Sciences (ISCIII). Good practices and open access in scientific journals - Training sessions for editors. 6 March 2023. Available at: https://repisalud.isciii.es/handle/20.500.12105/18894?show=full
- **Soler-Soneira M**. Online presentation on National Invasive Pneumococcal Disease surveillance report published in December 2023. Training sessions for people in charge of invasive pneumococcal disease surveillance in the different regions. 10 April 2024.
- **Soler-Soneira M.** Presentation titled: "Clinical-epidemiological research on infectious diseases in Spain". Conference organised by the Spanish Association of Vaccinology and the pharmaindustry. Training sessions for healthcare professionals. 26 September 2024. More information available here: https://www.farmaindustria.es/web/prensa/notas-de-prensa/2024/09/26/la-atencion-a-los-determinantes-sociales-clave-para-mantener-las-coberturas-vacunales/
- **Soler-Soneira M.** Online training module organised by the Spanish Association of Vaccinology. Presentation on invasive pneumococcal disease surveillance data for 2023. Analysis of the relevance of marketed vaccines. 2 October 2024. Programme available at this link: https://vacunas.org/wp-content/uploads/2024/08/BLOQUE-INMUNIZACION-A-LO-LARGO-DE-LA-VIDA-1.pdf

4.5. Other activities (in the area of communication):

- Responsible for the organisation of the annual conference of the CNE. All the information about the event and the promotional video can be found at the following link: https://www.isciii.es/Noticias/Noticias/Paginas/Noticias/III-Jornadas-CNE.aspx
- Responsible for the creation of a promotional video for the CNE. Available at: https://youtu.be/1OXhjnK0tXE
- Editor-in-chief of the journal *Boletín Epidemiológico Nacional*. Responsibilities included: supervision of the editorial process: directing and coordinating the entire process of review, editing and publication of articles; quality assurance: ensuring the scientific and editorial quality of the journal, reviewing and approving content prior to publication; strategic decision-making: defining the editorial line and making strategic decisions regarding the journal's content and direction; institutional representation: representing the journal at events and before external institutions, promoting its dissemination and impact; editorial team management: supervising and coordinating the editorial team, including editors, reviewers and support staff; promotion and dissemination: developing strategies to increase the journal's visibility and scientific impact. During EPIET, one of Marta's objectives was to advance the journal's eligibility for indexing in PubMed and SciELO. The journal was successfully indexed in SciELO on 26 May 2025 and is expected to be indexed in PubMed in the coming months. More information available at: https://revista.isciii.es/index.php/bes/indexed
- Marta was one of 15 researchers from ISCIII who received an award recognising their continued dedication to communication activities promoted by the Institute's Scientific Culture and Innovation Unit. All information related to the award can be found at the following link: https://ens.isciii.es/w/isciii-ucc-premia-labor-divulgadora-personal
- Interview in the Spanish magazine *EL PAÍS* entitled, 'The unknown behind the success of meningitis vaccines'. 12 July 2024. Available at: https://elpais.com/sociedad/2024-12-07/la-incognita-que-se-oculta-tras-el-exito-de-las-vacunas-frente-a-la-meningitis.html

5. EPIET/EUPHEM modules attended

- 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
- Writing Abstracts for Scientific Conferences, 14 March–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
- Project Review Module, 26–30 August 2024, Lisbon, Portugal
- One-Health, 12–15 May 2025, virtual
- Planned: ESCAIDE 2025, 19–21 November 2025, Warsaw, Poland [Marta was unable to attend ESCAIDE 2024 and the Time Series Analysis (TSA) Module in December 2024. However, she has since studied the TSA materials and has continuously applied TSA in her surveillance work.]

Acknowledgements

Being part of the Cohort 2023 has been an incredible professional and personal opportunity. First, I would like to thank my supervisor, Noemí Lopez, for enrolling me in the programme. Noemí has always supported me in every project and made sure I had everything I needed. I am also grateful to my Scientific Coordinator, Nadine Zeitlmann for her tireless encouragement during challenging times. I have learnt so much from her, especially her remarkable problem-solving skills. Special thanks to Andrea Parisi, the EPIET fellow from the previous cohort, for her constant guidance. I appreciate Javier del Águila and Diana Gómez for teaching me the value of geospatial studies, and Lorena Simón and Inma León for helping me apply time series analysis. Thanks to Rosa Cano for sharing her expertise in epidemiological surveillance. The Cohort 2023 is a group of wonderful people and professionals, and I look forward to staying in touch. Finally, thank you to everyone who makes EPIET feel like a family.