

**Dr Andrea Parisi, PhD**

The European Programme for Intervention Epidemiology Training (EPIET), Cohort 2022

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 EU-track and MS-track, respectively, of the ECDC Fellowship Programme, field epidemiology path (EPIET) and public health microbiology path (EUPHEM).

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

Dr Andrea Parisi (the fellow) is a Czech-Australian medical epidemiologist, researcher, university tutor and a public health specialist, member of the Czech Medical Chamber, with a PhD in epidemiology of invasive and multi-drug-resistant infections. Recently, Dr Parisi has been awarded an Associate Fellowship of The Higher Education Academy (AFHEA) (United Kingdom) and has received other Australian and international awards including the Peter Baume Award, Geoff Mercer Award, Australian Society for Infectious Diseases Council Scholarship, Endeavour Award (Australian Government), and Australian Epidemiological Association Student Award.

Prior to the fellowship, the fellow worked as a public servant at the Australian Capital Territory Health Directorate as a Medical Epidemiologist within the Epidemiology Section of Health Systems, Policy and Research Branch. During the COVID-19 pandemic, she was deployed to Papua New Guinea by the Australian Government as part of the Australian Medical Assistance Team and later as a Health Security and Pandemic Response Lead to assist with epidemiological and public health response to COVID-19 and to develop and implement new and existing health programmes in health security. This was done within the scope of the 'Papua New Guinea – Australia Transition to Health Programme'. She later worked as a clinician in Motol teaching at a hospital and a vaccination centre in Prague, Czechia. The fellow has also experience in conducting key epidemiological activities in the field, in Africa and Asia.

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The fellow has 13 years of experience in the health sector and specialises in infectious disease epidemiology, vaccine-preventable diseases, public health policy and public health response in health emergencies. She has published 11 research articles in international, high-impact journals including *The Lancet* and co-authored several governmental publications including Australia's Health 2020.

## Results

The objectives of these 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<sup>1</sup>.

### 1. Epidemiological investigations

#### 1.1. Outbreak investigations

##### *Case–control study of foodborne botulism in Spain, June–July 2023*

**Supervisor:** Carmen Varela Martínez

**Category:** Food- and waterborne diseases

On 11 July 2023, an EU Member State reported via the Early Warning and Response System two cases of botulism who had purchased and consumed a common food item in Spain – a commercially refrigerated potato omelette (tortilla). In the following months, cases of botulism were also detected in Spain. An outbreak investigation including a matched case–control study was conducted to investigate the source of the outbreak. Cases were collected through national surveillance and defined as persons developing botulism-compatible symptoms between 1 June and 31 July 2023 and being visitors or residents in Spain seven days prior to symptom onset. Controls were recruited from the same primary healthcare centre as their respective case in a 3:1 ratio and matched on place of exposure, sex and age. In tailored surveys, cases and controls were asked about food consumption in the cases' incubation period. Odds ratios (OR) and 95% confidence intervals (CI) for the most common food items were calculated in univariable and multivariable logistic regressions (adjusted for various food items).

Between June and July 2023, 12 cases of botulism (eight laboratory confirmed) meeting the case definition were reported in Spain. Of those, 10 (83.3%) reported having consumed the packed tortilla in the incubation period. In the univariable regression, only this product displayed a statistically significant OR of 14.9 (95% CI: 1.8–123). Similar results were observed in the multivariable regression (OR=13.7; 95% CI 0.96–194.7). Commercially refrigerated and packed tortilla was the most likely vehicle in this botulism outbreak, although potential contamination pathways remain unknown.

**Role:** The fellow was the lead investigator of the analytical study. She developed a questionnaire for Autonomous Communities in Spain to interview cases and controls and collaborated with the Ministry of Health on the development of an outbreak case definition and a case–control study protocol. The fellow developed a data analysis plan, data entry mask, performed data entry and data analysis. The fellow wrote a section on data analysis and its results which fed into the final governmental report (in Spanish) published on the website of the Ministry of Health (see Communication 4.1.2.1). The fellow also submitted an abstract to the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE 2024) which was accepted for an oral presentation.

##### *COVID-19 outbreak, ECDC Introductory Course, Spetses, Greece, 26 September–14 October 2022*

**Supervisor:** There was no onsite supervisor, but decisions taken within the team were made based on recommendations from onsite coordinators.

**Category:** Respiratory disease (including influenza and TB)

During the EPIET Introductory course in Spetses, Greece (26 September 2022–14 October 2022), several fellows fell ill with COVID-19. An outbreak investigation team comprising 10 fellows was formed, which Andrea was a part of. The team established a case definition, a protocol for a newly occurring case, guidelines for cases, guidelines for contacts and performed other related tasks (e.g. caring for the sick).

<sup>1</sup> European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2020. Available from: <https://www.ecdc.europa.eu/en/publications-data/ecdc-fellowship-programme-manual-cohort-2021>

**Role:** The fellow was the co-investigator. She collaborated with other fellows in an Outbreak Investigation team on the development of protocols and case definitions, data collection, data analysis, report writing (done by four fellows and delivered to ECDC in October 2022) and providing recommendations to ECDC staff onsite. Other tasks of the outbreak team included providing care to ill fellows (ensuring food, medicaments and distribution of rapid antigen tests).

### **Educational outcome**

During the two outbreaks described above, the fellow was able to build on her previous experience in outbreak investigation and furthermore deepened her understanding of the role of a surveillance system in outbreaks (e.g. for identifying cases) and fostered her skills in data analysis using STATA. The Spanish outbreak was the first time for the fellow to independently analyse matched case–control data. With these outbreaks, the fellow improved her skills in drafting documents, scientific writing and communication by conducting a variety of tasks such as designing a questionnaire, communicating with different stakeholders, writing parts of the final report (with a focus on data analysis) as well as preparing an abstract for an international conference (ESCAIDE 2024). The fellow has also improved her organisational and coordination skills, as the outbreak in Spetses required the coordination of various aspects of care.

## **1.2. Surveillance**

### ***Epidemiology of HIV and other sexually transmitted infections in women in Spain in 2021 and trends in previous years***

**Supervisor:** Asunción Díaz

The project describes the epidemiology of HIV and other sexually transmitted infections (STI) in women in Spain in 2021 and also describes the trends in previous years (2013–2021) using data from various sources: the Information System on New Diagnoses of HIV Infection (SINIVIH), the National Registry of AIDS Cases, a Hospital Survey of patients with HIV and AIDS, the Mortality register (National Statistics Institute), and National Epidemiological Surveillance Network (RENAVE). In summary, women represent a quantitatively small group within the HIV epidemic in Spain but with distinct characteristics and needs. More than half of the new HIV diagnoses in women are immigrants (from Sub-Saharan Africa, North Africa, Latin America, Central-East Europe and Western Europe). In addition, both Spanish women and women from other countries of origin are being diagnosed at an increasingly older age (mean age 39.4 years). Diagnostic delay in women remains high, with a slight decrease in the last two years, indicating the need to continue promoting HIV testing. During the study period, the incidence rate of new HIV diagnoses in Spain has decreased, although in the case of women, the decline is less pronounced. Regarding the STIs under surveillance, the incidence is lower in women than in men, except for *Chlamydia trachomatis* infection. The age of onset in women varies depending on the STI, although gonococcal infection and *Chlamydia trachomatis* infection are concentrated in the younger population (women aged 20–24 years). A major recommendation of the study is that even though the number of cases of women with HIV infection or other STIs is lower than in men (excluding *Chlamydia trachomatis* infection), there should be an emphasis on screening based on risk practices, as many cases are asymptomatic and go unnoticed.

**Role:** The fellow was the Lead Researcher. She analysed surveillance data from various sources, wrote a project proposal and two versions of the surveillance report (both in English and Spanish) which will be published on the Carlos III Health Institute's (referred to as 'Institute' hereafter) website (see Communication 4.1.2.2 and 4.1.2.3). This report was a part of regular reporting done at the Institute. The previous report on women included data until 2018.

### ***Sentinel surveillance of acute respiratory infections during the 2022–2023 respiratory infection season in Spain***

**Supervisors:** Amparo Larrauri, Susana Monge Corella

The aim of the project was to describe the epidemiology of mild and severe acute respiratory infections in the 2022–2023 respiratory infection season (influenza, COVID-19 and RSV) in Spain, to provide evidence of sentinel integrated respiratory surveillance system data reliability by incorporating uncertainty into incidence rate estimates in the surveillance system (both for the Autonomous Communities of Spain and at the national level). Furthermore, the aim of the project was to contribute to the automatisisation of data analysis and transition from STATA to R. No results can be presented for this project, as it was discontinued due to key collaborators leaving the Institute.

**Role:** The fellow was the Lead Researcher. She prepared a project proposal and co-developed a draft methodology for calculating of uncertainties. These have not been finalised due to a key collaborator leaving and the project being discontinued.

### **Educational outcome**

The fellow was part of the whole process of analysing surveillance data: she prepared two study protocols, analysed data by selecting appropriate statistical methods using STATA, and wrote a final report (in both Spanish and English) covering the following sections: introduction to the topic, methodology, results and interpretation, conclusions and recommendations. Moreover, the fellow deepened her understanding of the existing surveillance system of STIs in Spain which combines information from various data information systems. The fellow also learnt the country-specific aspects of writing a governmental report in Spain.

## **2. Applied public health research**

### ***The impact of pertussis vaccination in pregnant women on disease epidemiology in Spain (2005–2019)***

**Supervisor:** Josefa Masa Calles

In this ecological study, the fellow investigated whether there was a change in the disease severity for pertussis in infants upon introduction of prenatal pertussis vaccination in Spain. Using national register data, the fellow performed a time-series analysis of infant pertussis hospitalisations during 2005–2019 in Spain. Annual hospitalisation rates per 100,000 population and the mean length of hospitalisation were calculated for infants <3 months of age (target group benefiting from the prenatal vaccination) and a reference group aged 3–11 months.

The fellow compared the overall rates and annual per cent changes of the above variables in both groups for the time period before (2005–2014) and after vaccination introduction (2015–2019), using segmented Poisson regression. During the pre-vaccination period, infants aged 0–2 months had a five-times higher rate of pertussis hospitalisation and spent on average 50% longer in hospital than the reference group. After the maternal vaccination introduction, the hospitalisation rate decreased more rapidly in infants aged 0–2 months than in infants aged 3–11 months: annual reduction of 34% (95% CI: 31–38) versus 26% (95% CI: 21–31) in the hospitalisation rate and 13% (95% CI: 11–15) versus 6% (95% CI: 2–9) in the mean hospital stay, respectively. In 2019, the mean hospital stay for pertussis was about 4.5 days in both groups. In conclusion, maternal pertussis vaccination in Spain led to a reduction in disease severity in the target group as compared to older infants.

**Role:** The fellow was the lead researcher. With this project, the fellow independently conducted all aspects of a research project: she prepared a study protocol, framed a research question, formulated epidemiological objectives, outlined the analysis plan, collected data, performed data analysis and formulated conclusions (based on a discussion and limitation) as well as recommendations.

The fellow prepared two abstracts which she submitted to the ESCAIDE 2023 conference (see Communication 4.2.1) and to the Australasian Epidemiological Association Annual Scientific Conference 2023 (see Communication 4.2.2). The research project was accepted for an oral presentation at an international conference in Australia (see Communication 4.3), where the fellow presented it based on the funding of the Institute of Health Carlos III (ISCIII) and the Australian government. Furthermore, she wrote a manuscript and submitted it to a peer-reviewed journal where it was accepted and published as an open-access article (see Communication 4.1.1.1). After the publication, there was considerable media interest in this topic in Spain and the fellow had the opportunity to engage with media (see Communication 4.1.2.4).

### **Educational outcome**

Through the research project, the fellow learnt about different surveillance data in Spain as well as the coding of infectious diseases and mortality data (ICD-9 and ICD-10). The fellow deepened her knowledge of pertussis, its clinical presentation and possible outcomes in small infants. The fellow also learnt and applied the segmented Poisson regression (a time-series analysis) – a complex statistical analysis with which she had limited familiarity before starting the project. Furthermore, she developed communication skills in various areas through the project: abstract writing, presenting at an international conference, and even received some media attention such as being mentioned on the radio and on the ISCIII website.

### 3. Teaching and pedagogy

#### *Training of community volunteers and public health nurses on cholera surveillance and detection of cholera outbreaks in Zambia, 4–5 March 2024*

The fellow delivered a training on surveillance and epidemiology of cholera in Zambia, which was part of her Global Outbreak Alert and Response Network (GOARN) deployment working with the World Health Organization (WHO) in Zambia. It formed part of a two-day training in Chilanga district from 4–5 March 2024 and complemented the trainings of other pillars (water and sanitation, case management, and infection prevention and control). Over the course of two days Andrea delivered two trainings to two different target groups (a two-hour training on 4 March to community volunteers and a 1.5-hour training on 5 March to public health nurses).

Under time pressure (she was asked to give a training only a day in advance), the fellow screened and investigated current technical documents and guidelines on cholera and combined these materials with previous presentations from the WHO. She created two presentations covering the following topics: surveillance of cholera in Zambia, main functions of integrated disease surveillance response (IDSR), case definition, early detection of cholera, rumor management, community-based surveillance, and management of alerts. As part of the training, she also asked participants to write down any issues they experienced in the field, which she collected and analysed further with her colleagues.

Due to lack of time and materials, no structured training evaluation could be done. However, the fellow distributed blank pages to participants after the training and asked them to write their feedback. The feedback received was very positive overall.

#### *Educational outcome*

The fellow has previously worked on cholera outbreaks, but this was the first time her role was focused on training and capacity building rather than dealing with surveillance and epidemiological analysis. The preparation of the training and interaction with participants allowed the fellow to better understand the public health surveillance system in Zambia as well as learn the importance of cultural sensitivity. In her training, she tried to encourage active participation of her target group by asking frequent questions, reflecting on and clarifying any issues that arose, and keeping participants alert by walking around the room and maintaining eye contact. To foster participatory training approaches, the fellow welcomed contributions from participants, for which she received positive feedback. The fellow improved her skills under time pressure, preparing the training material and adapting it to different audiences very quickly. In addition to preparing materials, the fellow wrote a reflective note on her training experience in Zambia.

### 4. Communication

#### 4.1 Publications related to the EPIET fellowship

##### *4.1.1 Manuscripts published in peer-reviewed journals*

1. **Parisi A**, Nuñez O, López-Perea N, Masa-Calles J. Reduced pertussis disease severity in infants following the introduction of pertussis vaccination of pregnant women in Spain, 2015–2019. *Vaccine*. 2024;42(11):2810–2816. doi: 10.1016/j.vaccine.2024.03.028 (<https://www.sciencedirect.com/science/article/pii/S0264410X24003153>)

##### *4.1.2 Other reports and published communication outputs*

1. Centro de Coordinación de Alertas y Emergencias Sanitarias (CCAES) 2023 (English: The Coordination Centre for Health Alerts and Emergencies). Informe de fin de seguimiento: Brote de botulismo en España vinculado al consumo de tortilla de patata envasada, junio-julio 2023. (English: Final report: Botulism outbreak in Spain linked to a consumption of a commercial packed potato omelette, June–July 2023.) Madrid: CCAES. ([https://www.sanidad.gob.es/areas/alertasEmergenciasSanitarias/alertasActuales/botulismo/docs/Informe\\_botulismo\\_Final.pdf](https://www.sanidad.gob.es/areas/alertasEmergenciasSanitarias/alertasActuales/botulismo/docs/Informe_botulismo_Final.pdf))

2. Carlos III Health Institute 2024. Epidemiology of HIV and Other Sexually Transmitted Infections in Women in Spain, 2021. Madrid: National Centre for Epidemiology

3. Instituto de Salud Carlos III 2024. Epidemiología del VIH y de otras Infecciones de Transmisión Sexual en mujeres. España, 2021. Madrid: Centro Nacional de Epidemiología



4. Media communication on pertussis research published at the Institute's website: [La vacuna prenatal frente a la tosferina reduce en España la gravedad de la enfermedad en recién nacidos \(isciii.es\)](https://isciii.es/la-vacuna-prenatal-frente-a-la-tosferina-reduce-en-espana-la-gravedad-de-la-enfermedad-en-recien-nacidos)

## 4.2 Submitted abstracts

1. Reduced infant pertussis severity following vaccination of pregnant mothers in Spain, 2005–2019 (submitted to ESCAIDE 2023 – rejected)
2. Reduced infant pertussis severity following vaccination of pregnant mothers in Spain, 2005–2019 (submitted to Australasian Epidemiological Association Annual Scientific Conference 2023 – accepted for an oral presentation)
3. Outbreak of botulism in Spain linked to a commercial refrigerated potato omelette, June–July 2023: A case-control study (submitted to ESCAIDE 2024 – accepted for an oral presentation)

## 4.3 Conference presentations

Australasian Epidemiological Association Annual Scientific Conference, 18–20 October 2023, Melbourne, Australia. Reduced infant pertussis severity following vaccination of pregnant mothers in Spain, 2005–2019 (oral presentation on 19 October 2023)

ESCAIDE 2024, 20–24 November 2024, Stockholm, Sweden. Outbreak of botulism in Spain linked to a commercial refrigerated potato omelette, June–July 2023: A case-control study (oral presentation to be presented)

## 4.4 Other presentations

Instituto de Salud Carlos III, Madrid, Spain; 15 December 2022.

"Salud en Australia: ¿Primer o tercer mundo?" (translation: Health in Australia: First or Third-World Country?). The presentation was delivered at the Training Site to other colleagues as part of the regular seminar series (oral presentation)

## 5. EPIET/EUPHEM modules and activities attended

1. Introductory Course, 26/09/2022–14/10/2022, Spetses, Greece
2. ESCAIDE 2022, 23/12–25/12/2022, Stockholm, Sweden
3. Outbreak Investigation, 05/12/2022–09/12/2022, Berlin, Germany
4. Multivariable Analysis, 22/05/2023–26/05/2023, Frankfurt, Germany
5. Rapid Assessment Survey and Methods, 19/06/2023–23/06/2023, Stockholm, Sweden
6. Project Review Module, 28/08/2023–01/09/2023, Lisbon, Portugal
7. ESCAIDE 2023, 22/11–24/11/2023, Barcelona, Spain
8. Time-series analysis, 11/12/2023–15/12/2023, Rome, Italy
9. Management, Leadership and Communication in Public Health, 24/06/2024–28/06/2024, Stockholm, Sweden

The fellow did not attend the Vaccinology and Qualitative Research Module due to an international assignment in Zambia during the same period.

## 6. Other training

1. Applied Epi: R-training, 28/11/2022–02/12/2022, online (16 hours)
2. WHO – Prevention of sexual abuse and exploitation, 12/02/2024, online (GOARN pre-departure training)
3. WHO – United to Respect: Preventing Sexual Harassment and other Prohibited Conduct, 12/02/2024, online (GOARN pre-departure training)

4. WHO – Ethics Empowerment, 12/02/2024, online (GOARN pre-departure training)

5. WHO's New Policy and Strategy on Preventing and Addressing Sexual Misconduct, 12/02/2024, online (GOARN pre-departure training)

## 7. International assignments

### 1. 28 February 2024–28 March 2024, Lusaka, Zambia

The fellow undertook a deployment in Zambia for the duration of one month to assist with the control of an ongoing cholera outbreak. She contributed mainly to the surveillance, infection prevention and control (IPC) and WASH pillars. The fellow provided several trainings of community volunteers, healthcare workers and governmental employees on various aspects of surveillance and IPC/WASH in different provinces of the country and evaluated various cholera treatment centres and oral rehydration points using a standardised questionnaire. The fellow wrote a reflection note on one of her trainings in Chilanga district. The fellow provided hand-over notes and a end-of-mission report to the Incident Manager in Zambia and briefed a new epidemiologist in the field before her departure. In addition to weekly reports provided to ECDC, the fellow has also written an overall mission report that was also uploaded to EVA. Prior to her departure, the fellow completed four obligatory pre-deployment trainings by WHO (online) described above in the section 'Other training'. The fellow learnt how to work under time pressure and in an environment with limited resources.

## 8. Other activities

### 1. Sao Paulo School on Epidemic preparedness, 10–22 July 2023

In July 2023, the fellow attended a two-week summer school on epidemic preparedness in Sao Paulo, Brazil. The fellow was selected in a very competitive process together with other 50 international and 50 Brazilian researchers out of more than 1,000 applicants. She was given a full scholarship for the school. During the summer school, the fellow delivered a presentation of her group's assignment, a public health investigation (Mpox). She also wrote a short report for the ECDC fellowship programme outlining activities undertaken during the Summer School.

### 2. EPIET Cohort 2022 representative

As a cohort representative, the fellow fulfilled important roles such as collecting feedback from fellows on various issues and identifying recommendations for improvement of the Fellowship experience. In this context, the fellow helped to design, distribute and evaluate various questionnaires to other fellows, obtain the results and presented them to the ECDC Fellowship office. She attended regular meetings with the EAN Board, the ECDC Office and the National Focal Points for Public Health Training. Furthermore, she co-organised an online career-series seminar in April 2023 which she chaired.

### 3. Reviewer of a peer-reviewed journal

One of the two reviewers of a manuscript submitted to a peer-reviewed journal, *Boletín Epidemiológico Semanal* (Spain).

### 4. Chair of an Infection/Injury session during the Australasian Epidemiological Annual Scientific Conference in Melbourne, Australia, 19 October 2023

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