Emily Dibba White

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

Statens Serum Institut (SSI), Denmark

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 2022.

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

Emily Dibba White holds both a bachelor's and a master's degree in Public Health from the University of Southern Denmark and the University of Copenhagen. Following her graduation, she worked for two years as a public health specialist at the Danish National Institute of Public Health (Statens Institut for Folkesundhed – SIF). During this period, she also served as a teaching assistant at the Princess Nourah bint Abdulrahman University in Riyadh, Saudi Arabia, and contributed to the reporting of the burden of infectious diseases in Denmark.

Since March 2020, Emily has been employed at Statens Serum Institut (SSI), Denmark. She was actively involved with the coronavirus disease 2019 (COVID-19) pandemic surveillance team within the Department of Infectious Disease Epidemiology & Prevention. Emily is a key member of the outbreak team, which focuses on investigating food- and waterborne disease outbreaks and is responsible for the epidemiological surveillance of Shiga toxin-producing *Escherichia coli* (STEC).

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

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1. Epidemiological investigations

1.1. Outbreak investigations

1.1.1. Outbreak of Salmonella *Infantis, Sub-Saharan country in Africa, 2023 (Food-outbreak database (FUD) number: FUD2195)*

Supervisors: Luise Müller (SSI), Lynn Meurs (ECDC)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the travel-related outbreak of *Salmonella* Infantis (*S.* Infantis) and the potential source of the outbreak.

Methods: A cohort study was performed. An electronic questionnaire was sent to all members of the travel group and descriptive analyses were performed using R. A case was defined as a person who was part of the travel group and reported gastrointestinal symptoms (diarrhoea, bloody diarrhoea, and/or vomiting), or bacteraemia, and/or had a laboratory-confirmed infection with *S.* Infantis during or in the weeks after returning from the trip.

Results: The response rate was 68%. The results showed that 75 people fulfilled the case definition, including 25 teenagers with a laboratory-confirmed *Salmonella* infection: 22 with *S.* Infantis, one *S.* Hull, one *S.* Virchow, one unknown type. In total, 25 (33%) teenagers were admitted to hospitals, 15 with *S.* Infantis, including 10 with bacteraemia. No deaths were reported. Vomiting was reported in 43 cases, diarrhoea in 40, and bloody diarrhoea in two. A specific source or place of exposure could not be identified. However, risk products such as undercooked meat and chicken were identified as potential sources.

Public health implications: This study emphasised the need to promote health advice for travellers, including teenagers, on hygiene, and precautions to be observed for food and water.

Role: Emily was the lead investigator of this outbreak. She developed a questionnaire in SurveyXact, performed data analysis in R, and wrote an outbreak report (see section 4.2, 'Other reports').

1.1.2. Outbreak of Salmonella *Enteritidis ST11, Denmark, 2023 (FUD2179)*

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of *Salmonella* Enteritidis ST11, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and interviewed cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national *Salmonella* Enteritidis ST11 outbreak with seven cases (four male, three female), between 8–32 years old, sample month between December 2022 and March 2023. The outbreak ended, with no source identified.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.1.3. Outbreak of Salmonella *Enteritidis ST11, 2023 (FUD2223)*

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of *Salmonella* Enteritidis ST11, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and interviewed cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national *Salmonella* Enteritidis ST11 outbreak with seven cases (four male, three female), between 9–60 years old, sample month between April and May 2023. The outbreak ended, with no source identified. However, there was a suspicion about chicken meat from one supermarket chain.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.1.4. Outbreak of Salmonella *Stanleyville, 2023 (FUD2252)*

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of *Salmonella* Stanleyville, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and interviewed cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national *Salmonella* Stanleyville outbreak with six cases (three male, three female), between 22–60 years old, sample month between January and August 2023. The outbreak ended, with no source identified.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.1.5. Outbreak of Salmonella *Mikawasima, 2022 (FUD2087)*

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of *Salmonella* Mikawasima, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and interviewed cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national *Salmonella* Mikawasima outbreak with nine cases (three male, six female), between 6–85 years old, sample month between June and July 2022. The outbreak ended, with no source identified.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.1.6. Outbreak of STEC O145:H28, 2022 (FUD2083)

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of STEC O145:H28, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and started to interview cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national STEC O145:H28 outbreak with 11 cases (two male, nine female), between 0–69 years old, sample month between February and September 2022. The outbreak ended, with no source identified.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.1.7. Outbreak signal of STEC O145:H28, 2022 (FUD2132)

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of STEC O145:H28, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and interviewed cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national STEC O145:H28 outbreak with four cases (three male, one female), between 0–60 years old, sample month between June and October 2022. The outbreak ended, with no source identified.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.1.8. Outbreak signal of STEC O145:H28, 2023 (FUD2194)

Supervisor: Luise Müller (SSI)

Category: Food- and waterborne diseases

Aim: To investigate, assess and describe the outbreak of STEC O145:H28, and the potential source of the outbreak.

Methods: The 10 steps in an outbreak investigation were conducted. The author started from the part with defining and identifying cases. Then the author performed descriptive epidemiology and interviewed cases. Along the way, hypotheses were evaluated and the information from the interviews were collected. Lastly, the main findings were communicated to relevant stakeholders.

Results: This was a national STEC O145:H28 outbreak with three cases (one male, two female), between 8–68 years old, sample month January 2023. The outbreak ended, with no source identified.

Public health implications: Investigating food-borne outbreaks and identifying the source of infection are critical for stopping transmission and protecting public health. Timely outbreak detection and source tracing enable targeted control measures, which help prevent additional cases and reduce the overall impact on the population.

Role: Emily was the lead investigator of this outbreak.

1.2. Surveillance

1.2.1. Surveillance of STEC, Denmark, 2013–2024

Supervisors: Steen Ethelberg (SSI), Luise Müller (SSI), Lynn Meurs (ECDC), Andreea Badache (ECDC), and Anna Machowska (ECDC)

Type of project: Analysing data from a surveillance system and setting up an interactive surveillance dashboard

Aim: To set up a routine surveillance report of STEC in Denmark to monitor the epidemiological trends in order to guide actions for prevention.

Methods: A retrospective cohort design was employed to create a comprehensive dataset incorporating demographic, clinical symptoms, and microbiological data from 2013 to 2024. The interactive dashboard was developed using the R software. In addition, an overview of annual demographic trends, along with an analysis assessing the impact of changes in diagnostic methods on the number of STEC cases, was reported by each Clinical Microbiology Department (CMD).

Results: Data from both surveillance systems were merged. The analysis of demographic trends revealed a consistent increase in the annual number of STEC episodes since 2018, observed across sexes, age groups, and geographical regions. This rise in reported cases is largely attributable to changes in diagnostic methods implemented by the CMDs, which enhanced the detection and reporting of STEC infections.

Public health implications: The interactive STEC surveillance tool enhances the ability to track and respond to unexpected increases in STEC cases.

Role: Emily developed a script that successfully merged data from two surveillance systems. She also developed the interactive dashboard, analysed the data, and wrote a report (see section 4.2, 'Other reports').

Routine surveillance activities

National surveillance of STEC notifications in Denmark

Activities and role: Emily is primarily responsible for the daily monitoring of STEC notifications in Denmark. This role involves reviewing electronic notifications to ensure that all relevant information is complete and accurate. It also includes identifying potential outbreak signals that may require further public health intervention. In cases where a STEC infection progresses to haemolytic uremic syndrome (HUS), Emily leads the source investigation. This entails conducting interviews with the affected individuals or their guardians to gather epidemiological information. Furthermore, the position requires timely and effective coordination with the Danish Patient Safety Authority and the Danish Veterinary and Food Administration to ensure appropriate follow-up and response.

2. Applied public health research

2.1. Determinants in patients with drug-resistant tuberculosis (DR-TB) in Denmark, 2000–2024

Supervisors: Maria Wessman, Louise Hedevang Holm, Anders Koch, Luise Müller, Steen Ethelberg (SSI) and Anna Machowska (ECDC)

Aim: To analyse trends in notified DR-TB episodes and determinants in Denmark from 2000–2024.

Methods: SSI monitors TB cases in the country through a collection of epidemiological and laboratory data of TB cases. Based on these data, a retrospective register-based study was performed. Data were analysed descriptively by time, place and person. This included description of TB episodes by age, sex, country of birth, country of origin, risk factors, and DR-TB. Proportion and incidence (per 100 000 inhabitants in Denmark) per year of DR-TB episodes, country of birth, and WHO regions were calculated. Uni- and multivariable logistic regression were used to determine whether characteristics of DR-TB episodes were different based on the individuals being Danish-born or foreign-born. All analyses were conducted in R statistical software.

Results: While the number of notified TB episodes declined markedly between 2000 and 2024, the proportion of DR-TB remained low but stable. Foreign-born individuals carried a disproportionately high burden of DR-TB compared to those born in Denmark. DR-TB was significantly associated with presumed transmission outside Denmark (adjusted odds ratio (aOR) >3), known contacts with previous TB cases, and residency in asylum centres.

Public health implications: To effectively address the burden of DR-TB in Denmark, several targeted public health actions are recommended. First, enhanced screening and early detection efforts should be prioritised for migrants arriving from high-burden regions, where the prevalence of DR-TB is known to be elevated. Second, strengthening case management and providing tailored treatment support are essential, particularly for individuals residing in asylum centres. Finally, cross-border contact tracing and regional collaboration with other European countries can help reinforce TB surveillance systems and reduce the risk of DR-TB reintroduction through migration and international travel.

Role: Emily wrote the study proposal, study protocol, conducted the data analysis, and finalised a report (see section 4.2, 'Other reports').

3. Teaching and pedagogy

Disease surveillance and outbreak investigation, Copenhagen, Denmark, 2022

Emily was part of the planning team, and she wrote as well as led the epidemiology section of an *E. coli* case study. She delivered a presentation at a workshop (2–4 November 2022) organised by the Danish Technical University (DTU) and SSI on the '10 steps in an outbreak investigation' in a One Health EJP Continuing Professional Development Module: Rapid diagnostics and harmonisation of diagnostic tests. This hybrid lecture was attended by epidemiologists and microbiologists from all over the world. This is a link to the course: https://zenodo.org/records/7674925#.ZHb_ln3P2Uk

4. Communications related to the EPIET/EUPHEM fellowship

4.1. Manuscripts published in peer-reviewed journals

- **White ED**, Cardoso MJ, Ethelberg S, Müller L, Maritschnik S, et al. Widespread European outbreaks of *Salmonella* Enteritidis related to chicken meat from Poland, 2023. Epidemiology & Infection. [Unpublished. Submitted 4 August 2025].

4.2. Other reports

- **White ED**, Müller L. Case study: An outbreak of E. *coli* in Denmark – participant guide
- **White ED**, Müller L. Case study: An outbreak of E. *coli* in Denmark – facilitator guide
- **White ED**. Workshop on the reflection and evaluation of the One Health EJP Continuing Professional Development Module: Rapid diagnostics and harmonisation of diagnostic tests, Copenhagen, Denmark.

4.3. Submitted abstracts

- **White ED**, Nielsen S, Funk T, Litrup E, Torpdahl M, Müller L. A severe outbreak of *Salmonella* Infantis among teenagers in Denmark, 2023. Abstract submitted for the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2023 conference [Declined].
- **White ED**, Schjørring S, Scheutz F, Torpdahl M. The impact of changes in diagnostic methods of Shiga toxin-producing *Escherichia coli* in Denmark, 2022. Abstract submitted for the 11th VTEC International Symposium on Shiga Toxin (Verocytotoxin) Producing *Escherichia coli* Infections [Accepted].
- **White ED**, Gymose P, Nielsen S, Larsen AR, Lyhne-Kjærby A, Sandberg M, Schjørring S, Ethelberg S, Cardoso MJ, Müller L. Multi-country outbreak of *Salmonella* Enteritidis related to chicken meat from Poland in 2023 – the Danish perspective. Abstract submitted for ESCAIDE 2024 [Accepted].

4.4. Conference presentations

- **White ED**, Schjørring S, Scheutz F, and Torpdahl M. The impact of changes in diagnostic methods of Shiga toxin-producing *Escherichia coli* in Denmark, 2022 (poster). Presented at the 11th VTEC International Symposium on Shiga Toxin (Verocytotoxin) Producing *Escherichia coli* Infections; 7 – 10 May 2023; Banff, Canada, Alberta.
- **White ED**, Gymoese P, Nielsen S, Larsen AR, Lyhne-Kjærbye A, Sandberg M, et al. Multi-country outbreak of *Salmonella* Enteritidis related to chicken meat from Poland in 2023 – the Danish perspective (oral). Presented at: ESCAIDE 2024; Stockholm, Sweden.

4.5. Other presentations

- **White ED.** Analysing data from the surveillance system for Shiga-toxin producing *E. coli* cases, in Denmark. Presented at: Project Review Module, 22 August 2023; Lisbon, Portugal.
- **White ED**. The impact of changed diagnostic methods for STEC surveillance in Denmark. Presented at: Nordic Mini Project Review module, 13 March 2023; Copenhagen, Denmark.
- **White ED**, Espenhain L, and Munch PK. Fra signal til opklaring - STEC. Presented at: Workshop about strengthening collaboration between Statens Serum Institut, Danish Patient Safety Authority and the Danish Veterinary and Food Administration, 7 February 2023, Randers, Denmark.

5. EPIET/EUPHEM modules attended

- Introductory Course, 26 September–14 October 2022, Spetses, Greece
- Outbreak Investigation, 5–9 December 2022, Berlin, Germany
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2022, 23–25 November 2022, Stockholm, Sweden
- Qualitative Research – Optional Inject Days, 31 January and 3 February 2023, virtual
- Multivariable Analysis, 22–26 May 2023, Frankfurt, Germany
- Rapid Assessment and Survey Methods, 19–23 June 2023, Stockholm, Sweden
- Project Review Module 2023, 28 August–1 September 2023, Lisbon, Portugal
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2023, 22–24 November 2023, Barcelona, Spain
- Time Series Analysis, 11–15 December 2023, Rome, Italy
- Vaccinology, 4–8 March 2024, virtual
- Writing Abstracts for Scientific Conferences, 14 March 2024, virtual
- Qualitative Research – Elective course, 19 and 22 March 2024, virtual
- Project Review Module 2024, 26–30 August 2024, virtual
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2024, 20–22 November 2024, Stockholm, Sweden
- Leadership and Communication 2025, 1–3 September 2025, Lisbon, Portugal.

6. Other training

- Introduction to Infectious Disease Preparedness micro learning, ECDC, 8 March 2023, online
- Improve your presentation skills, 6 September 2023, SSI, Copenhagen, Denmark, in-person
- Cholera Outbreaks: Emergency Preparedness and Response, WHO, 8 November 2023, online.

7. International assignments

No international assignment during the fellowship.

8. Other activities

- Laboratory visit at SSI, 23 August 2022, Copenhagen, Denmark
- Workshop: Strengthening collaboration across Danish health authorities (SSI, Danish Patient Safety Authority, Danish Veterinary and Food Administration), 7 February 2023, Randers, Denmark, in-person
- Field visit to Danish Crown – Slaughterhouse, 6 February 2023
- Planning Nordic Mini Project Review Module, 13–14 March 2023, Copenhagen, Denmark
- Attendance to weekly internal outbreak meetings, 2022–2025, on-site at SSI, Copenhagen, Denmark
- Attendance to weekly internal EPIET/EUPHEM forum meetings, 2022–2025, on-site at SSI, Copenhagen, Denmark.

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During my fellowship at SSI, I had the pleasure of working with many knowledgeable supervisors and colleagues.

First and foremost, I would like to thank Steen Ethelberg for generously sharing his expertise, advice, and support over the past years. A heartfelt thank you to my co-supervisor and leader, Luise Müller, for guiding me through the dual role of being both an outbreak investigation specialist and a fellow, a challenging balance at times. Your steady support and thoughtful guidance, in both the good times and the more difficult moments, have meant a great deal. Thank you for being a true source of inspiration.

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I would also like to extend my gratitude to my on-site project supervisors, Maria Wessman, Anders Koch, and Louise Hedevang Holm for their trust and for patiently answering my many questions. It has been a privilege not only to deepen my understanding of a 'new' disease area but also to work more closely with each of you. I would like to thank Anders Norman for providing access to tuberculosis laboratory data, and Dorte Bek Folkvardsen for kindly showing me around the laboratory and offering valuable insights into the microbiological aspects of tuberculosis. Your support is greatly appreciated. A special thanks to Guido Benedetti for inspiring me to dive deeper into the technical aspects of R. Your encouragement truly helped me strengthen my skills and confidence in using the software.

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I am truly grateful for the privilege of undertaking this fellowship. A heartfelt thank you to all my co-fellows from the Cohort 2022, thank you for making these years exceptional.

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