

Summary of work activities

Léa Franconeri
European Programme for Intervention Epidemiology Training
(EPIET), 2021 cohort

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.

Both curriculum paths provide training and practical experience using the 'learning by doing' approach at acknowledged training sites across European Union (EU) and European Economic Area (EEA) countries.

According to Articles 5 and 9 of ECDC's founding regulation (EC No 851/2004), 'the Centre shall, encourage cooperation between expert and reference laboratories, foster the development of sufficient capacity within the community for the diagnosis, detection, identification and characterisation of infectious agents which may threaten public health' and 'as appropriate, support and coordinate training programmes in order to assist Member States and the Commission to have sufficient numbers of trained specialists, in particular in epidemiological surveillance and field investigations, and to have a capability to define health measures to control disease outbreaks'.

Moreover, Article 47 of the Lisbon Treaty states that 'Member States shall, within the framework of a joint programme, encourage the exchange of young workers.' Therefore, ECDC initiated the two-year EUPHEM training programme in 2008. EUPHEM is closely linked to the European Programme for Intervention Epidemiology Training (EPIET). Both EUPHEM and EPIET are considered 'specialist pathways' of the two-year ECDC fellowship programme for applied disease prevention and control.

This final report describes the output of the Fellow Léa Franconeri and the competencies she 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

Léa Franconeri began her academic career in 2009 studying pharmaceutical sciences at the University of Aix-Marseille. She became an intern at the public hospitals in Paris, where she was placed at Santé Publique France (SpF) in the infectious diseases department in 2019. There, she worked on research into vaccine-preventable diseases (measles), investigations into food- and waterborne epidemics, and response and preparedness for COVID-19. After devoting a year to pharmacology research, she obtained a master's degree in integrated preclinical and clinical pharmacology and her doctorate in pharmacy, on the characterisation of non-toxicogenic strains of *C. difficile* and their effect in vivo. In 2020 and 2021, she worked consecutively in the epidemiological intelligence unit of the European Centre for Disease Prevention and Control (Solna, Sweden), in the medical affairs department of MSD vaccines (Lyon, France) and in the COVID-19 variant expertise team at SpF. In September 2021, she moved to Oslo, Norway, to start her EPIET fellowship at the NIPH.

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 core competencies, as set out in the ECDC Fellowship Manual¹.

1. Epidemiological investigations

1.1. Outbreak investigations

Outbreak of gastroenteritis in Oslo, Norway, 2021

Supervisors: Heidi Lange

Category: Food and waterborne diseases

On 11 October 2021, the Norwegian Food Safety Authority (NFSA) notified the Norwegian Institute of Public Health (NIPH) of an outbreak of gastroenteritis among 30 people having a dinner party in a restaurant in Oslo. In collaboration with the local FSA, we initiated an outbreak investigation to find the source and the mode of transmission in order to implement control measures and reinforce existing guidelines. We carried out a retrospective cohort study among the participants using a standardised questionnaire that included questions regarding symptoms and the different food items that were served at the dinner.

Of the 30 guests, 25 (83%) answered the questionnaire and 21 met the case definition: having diarrhoea or at least two other symptoms (vomiting, stomach pain, blood in stool, fever, nausea) within three days after eating at the restaurant for the event. Stool sampling was performed on four cases and two were positive for norovirus. No food items were significantly associated with illness. However, pannacotta and fresh salad leaves had higher relative risks (RR for both: 2.75; confidence interval (CI): 0.55–13.69) and are products that have been responsible for causing norovirus outbreaks in the past. No leftovers were available for testing. No kitchen staff reported any symptoms and no lack of hygiene practices was noticed.

For the people experiencing GI symptoms, the NIPH recommended that they self-identify as sick, isolate and not prepare or handle food. This was particularly important for kitchen staff, and the NIPH reaffirmed the need to have good hand and surface hygiene practices, in food preparation or production.

Role: Co-investigator. The fellow worked under the supervision of Dr Heidi Lange, veterinarian, and the senior advisor from the Outbreak Investigation Department who led the outbreak investigation. Based on responses to the questionnaires, the fellow performed the descriptive and analytical analyses of the outbreak with R software, participated in the meetings, took notes, wrote the outbreak report and formulated the recommendations.

Outbreak of Yersinia enterocolitica O:3, ST18 in Norway

Supervisors: Lin Cathrine T Brandal, Heidi Lange

Category: Food- and waterborne diseases

On 2 February 2022, an outbreak of gastroenteritis in a boarding school was reported to the Norwegian Institute for Public Health (NIPH) by a municipality doctor in Agder. An investigation was initiated to describe the outbreak, find the source and prevent new cases, in collaboration with the municipality doctor and local food safety authority.

¹ 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>

Cases at the boarding school fell ill between 22 and 30 January 2022 and a cohort survey was launched at the boarding school. Of the 80 people involved, 62 answered the survey and 33 met the case definition (diarrhoea or two of the following symptoms: abdominal pain, headache, nausea, fever, vomiting, blood in stools or joint pain). A national questionnaire was launched to find cases outside the cohort and environmental investigations were carried out at the boarding school restaurant and at a local pickle producer.

In total, 37 cases of gastroenteritis were identified in this outbreak. There were 33 cases associated with the boarding school in Agder and 4 with no direct link to the school who were living in Agder (1) or in Vestfold and Telemark (3). These four cases fell ill between 5 January and 4 February 2022. Overall, thirteen cases tested positive and all carried the outbreak strain (*Yersinia enterocolitica* O:3 with sequence type 18), which was detected using whole genome sequencing. The univariate analysis based on the cohort survey identified five food items that were most likely to have made the cases sick. A pasta salad with bacon (RR: 2.11; CI: 1.14–3.90; p: 0.006) was considered the most likely vehicle, even though a pork goulash could not be excluded (RR: 2.14; CI: 1.06–4.34; p: 0.011). However, the bacon was unlikely to be responsible for this outbreak, as it was pre-cooked and frozen. According to the national questionnaire results, consumption of pickled pork was suspected to raise the risk of infection. Tracing back the pork meat used in the goulash and the pickled pork showed that they originated from the same slaughterhouse, but no residues were available. Nonetheless, pork meat from a sister slaughterhouse and from the same batch as used in the goulash was tested and found positive for the outbreak strain.

On behalf of the NIPH, we declared that *Yersinia* might be present in pork products and that good production and kitchen hygiene practices are essential when handling pork meat.

Role: Co-investigator. The fellow worked under the supervision of Lin Brandal and Heidi Lange, who led the outbreak investigation. Based on responses to the trawling questionnaires, the fellow performed descriptive and analytical analyses of the outbreak with R software. She also participated in the meetings, took notes, wrote the outbreak report and formulated recommendations for outbreak prevention and control.

Outbreak of Salmonella Agona, multi-country, 2022

Supervisors: Heidi Lange, Lin Cathrine T Brandal

Category: Food- and waterborne diseases

Mid November 2022, the Haukeland University Hospital notified the Norwegian Institute of Public Health (NIPH) of three cases of *Salmonella Agona*. On 28 November 2022, NIPH declared a national *S. Agona* outbreak and initiated an investigation. The outbreak response group at the NIPH coordinated the investigation in collaboration with the municipal doctors, the Norwegian Food Safety Authority (NFSA) and the Norwegian Veterinary Institute (NVI), to identify the source of infection and prevent future cases. Trawling interviews, collection of purchase receipts, microbiological analysis, product tracing and a retrospective matched case-control study were conducted.

There were 87 confirmed *S. Agona* (Sequence Type 13 and Cluster Type 15744) cases reported in Norway. Sweden (n = 35), the United Kingdom (n = 14) and the Netherlands (n = 6) also reported cases with the *S. Agona* outbreak strain (ST13 and CT 15744). From the trawling interviews, cucumbers, tomatoes, salad leaves, minced meat, chocolate and nuts were the most suspected food items. The case-control study focused on these items and could not identify a vehicle of infection, but minced meat was excluded as a possible vehicle. Most of the cases and controls were exposed to cucumbers and analytical evidence was difficult to obtain. Due to the variety of products, tomatoes, salad leaves, chocolate and nuts were weakened as suspects. Based on cash receipts, the NFSA examined the distribution lines of tomatoes, salad leaves and cucumbers. Cucumbers originating from one Spanish producer was consistent with the distribution and exposure details of the cases. However, no residues were available for testing. In addition, environmental and cucumber samples tested afterwards at the packhouse were negative.

Cucumbers from Spain were a possible vehicle of infection in this outbreak. Measures such as increased sampling of cucumbers at the packhouse and by the Norwegian importer were taken. The NIPH and NFSA stressed that special attention should be paid to imported fresh fruits and vegetables to prevent future outbreaks of salmonellosis, reminding the public to rinse, wash and dry fruit and vegetables before eating.

Role: Lead investigator. The fellow was involved in the outbreak investigation since the first notification. She contributed to building the case definition and the study design, and also developed the questionnaire for the case-control study, led the control selection and randomisation, and performed the descriptive and analytical analyses of the outbreak with R software. She also participated and took the lead in some of the meetings, wrote the outbreak report, formulated the recommendations and disseminated the results intra-institutionally and to the NFSA.

Educational outcome

Léa learned how to detect an outbreak and implement the stages of an outbreak investigation taught during the introductory courses and epidemic investigation modules. She has applied the theoretical knowledge she acquired on the study designs used in epidemic investigations (retrospective cohort, case-control), as well as on the descriptive and analytical analyses of epidemiological or microbiological data during an outbreak (univariate analyses, but also conditional logistic regression).

She has learned how to work effectively within the given time constraints and to communicate the results of the investigation to the stakeholders involved (whether within the NIPH, an external institution or the general public). With this experience, she will be able to use her skills and expertise in epidemic management in other future situations.

1.2. Surveillance

Evaluation of the surveillance system for Clostridioides difficile infection in Norway, 2019–2021

Supervisors: Thale Berg, Hanne Merete Eriksen-Volle, Kirsten Gravningen

Clostridioides difficile is a major enteropathogen and *C. difficile* infection (CDI) incidence has been increasing in both hospitals and communities worldwide. In Norway, CDI has been notifiable and reported in the Norwegian Surveillance System for Communicable Disease (MSIS) with fully identifiable data since 2019. The triggers for the evaluation of the CDI surveillance system were a need for an initial evaluation and an assessment of the data quality. The objectives were: i) to conduct a descriptive analysis of the CDI surveillance system and epidemiology; ii) to evaluate the system, identifying its strengths and weaknesses (via completeness, usefulness, operation, technical performance and intrinsic data quality); and iii) to make recommendations to improve the achievement of the system objectives.

MSIS data from 2019 to 2021 were extracted and analysed to perform a descriptive overview and to compute completeness on pre-selected variables, with a pre-defined threshold of acceptance. A survey was conducted among users and participants of the system (i.e. infection and prevention teams and laboratories, respectively) to evaluate usefulness, technical performance, data quality and the achievement of pre-defined objectives.

There were 8 424 CDI cases reported to MSIS over the study period. Low completeness was found for the toxin and genotype variables reported by the laboratories and symptoms and clinical reporting variables reported by clinicians. The survey results highlighted that the pre-listed objectives of the system were not met, even though the evaluation of technical performance was positive. Furthermore, the objectives of the system should have been defined before the system was set up. We recommended actions to improve the achievement of objectives, such as: develop guidelines for reporting practices; support the national reference laboratory (NRL) work on testing strategy harmonisation, laboratory diagnosis methods and NLK codes; support the NRL to increase the amount of sequencing performed; and assess the possibility of improving data quality by including healthcare-associated or antibiotic-associated CDI data and improving the notification form accordingly. Lastly, we reiterated the importance of defining objectives before setting up a disease surveillance system.

Role: Under the guidance of her project supervisors, the fellow extracted, cleaned and analyzed the data from MSIS using R software. She also conducted a descriptive analysis of the epidemiological situation for CDI in Norway, producing outputs such as epidemiological curves and maps. She was able to interpret technical guidance documents for the evaluation of disease surveillance systems and to choose a protocol based on the attributes to be evaluated and the defined objectives for the CDI surveillance system. The fellow also developed questionnaires and electronic surveys targeting different groups of respondents, coordinated and took the lead during meetings and wrote the evaluation report.

Epidemiological trends of Scabies in Norway, multi-country study, 2019–2022

Supervisor: Hege Salvesen Blix

Scabies is a neglected disease worldwide, putting burden and stigma on patients. The disease requires comprehensive management, including treatment of close contacts and implementation of hygienic measures. Between 2013 and 2018, an increase in scabies incidence was reported in several European countries, including Norway, where consultations and sales of scabies treatments were reported to have increased almost threefold. Those aged 15–29 years were particularly affected. Belgium, the Netherlands and Norway all experienced a rise in scabies infections and launched a partnership to investigate and formulate hypotheses to explain this increase. We aimed to describe the epidemiological situation of scabies in Norway from 2019 to 2022, identify risk groups for scabies infection, compare the situation and treatment guidelines between two periods in Norway (2006–2019 and after 2019) and between the partnering countries and formulate hypotheses about the potential impact of public health measures on scabies epidemiology. The Norwegian Drug Wholesales Statistics database, the Norwegian

prescription database and the patient register were extracted and analysed for the study period. We found that scabies infestations seemed to have decreased in Norway since 2020, despite the documented increase from 2013 to 2018. In addition, the description of treatment sales and prescriptions showed the reduction in permethrin consumption in favour of benzyl benzoate and ivermectin tablets. These trends could partly be explained by the implementation of public health policies, such as the reimbursement of ivermectin tablets or the improvement of the guidelines for topical treatments, following the assignment given by the Ministry of Health in 2020 to map the scabies situation and improve scabies control. However, there are still several factors to be explored that could lead to an increase in scabies cases. Continued collaborative work between European countries should also be supported.

Role: The fellow used data extracted from various registers and cleaned and analysed the data using R software. She also conducted a descriptive analysis of the epidemiological situation of scabies and its treatment in Norway. She produced results such as graphs and tables and wrote a report. She learned how to manage a non-reportable disease and its surveillance in Norway, and how to integrate different sources of information. Lastly, she participated in multi-country scabies meetings with the Netherlands and Belgium, presented an overview of the scabies situation in Norway and was actively involved in discussing and comparing scabies treatment guidelines between countries.

Educational outcome

Léa has had the opportunity to take part in various surveillance projects and to familiarise herself with the different national health registers used in Norway, which enable diseases and their treatments to be monitored. She has benefited from the ECDC module on data management, which is useful for mastering these databases, as well as the project review modules, which have enabled peers to give the fellow their opinions, particularly on the project 'Evaluation of the surveillance system for *Clostridioides difficile* infection in Norway, 2019–2021'. She also gained experience in the specific area of conducting evaluations of disease surveillance systems. Finally, she wrote reports and learned how to communicate the results of her surveillance projects at an international conference.

2. Applied public health research

Clinical outcomes of antimicrobial resistance in cancer patients: a systematic review of multivariable models

Supervisors: Oliver Kacelnik, Anders Skyrud Danielsen

Infections are major causes of disease in cancer patients and prevent cancer care success. The global rise of antimicrobial resistance threatens to make these obstacles greater and hinder the progress in cancer care. To prevent and handle such infections, better models of clinical outcomes building on current knowledge are needed. A systematic review (PROSPERO registration: CRD42021282769) was conducted, aiming to review multivariable models of resistant infections/colonisations, their corresponding mortality, the investigated risk factors and the methodology used. Two broad searches of antimicrobial resistance in cancer patients were performed, using terms associated with antimicrobial resistance, in more than three major databases. Primary observational studies in English from January 2015 to November 2021 on human cancer patients that modelled infection/colonisation or mortality associated with antimicrobial resistance in a multivariable model were included. Data on the study populations, malignancies, risk factors, microbial aetiology and methods for variable selection were extracted and the risk of bias was assessed using the NHLBI Study Quality Assessment Tool. We obtained 27 151 records and included 144 studies after screening. Mortality was the most common outcome studied (47%), with 45% of studies focusing on haemato-oncology and 27% studying several bacteria or fungi. Studies included a median of 200 patients and 46 events. P-value-based variable selection was used by 72% of the studies. Also, studies included a median of seven variables in the final model, which yielded a median of seven events per variable. Overall, the approaches to studying this topic were found very heterogeneous. Methodological choices and very diverse models made it difficult to draw statistical inferences and summarise what risk factors were clinically relevant. It is necessary to develop and adhere to more standardised protocols that build on existing literature to prevent the rise of antimicrobial resistance and its outcomes in populations at risk like cancer patients.

Role: The fellow participated in writing the research protocol, learned how to register it as an international systematic review protocol on PROSPERO, conducted the assessment of the risk of bias, wrote the summary of findings table, discussed and contributed to writing a manuscript published in an international scientific peer-reviewed journal, and participated in answering to the reviewers comments.

Experiences with regular testing of students for SARS-CoV-2 in primary and secondary schools: results from a cross-sectional study in two Norwegian counties, autumn 2021

Supervisors: Umaer Naseer, Emily MacDonald

To allow for normal school attendance during the COVID-19 pandemic, regular testing of students was introduced in autumn 2021 in Norway to manage COVID-19 transmission. A cross-sectional survey was conducted by the Norwegian Institute of Public Health (NIPH) between October and November 2021, in two Norwegian counties, to explore experiences of implementation, compliance, satisfaction, difficulties, concerns and confidence in regular testing, as well as quality of teaching and school attendance. Five stakeholder groups were invited to participate: contact tracing teams; school administrators and employees in primary, lower secondary, and upper secondary school; students in upper secondary school and parents of primary and lower secondary students. Bivariate analyses and descriptive analyses were performed for the different groups. Overall, 4 565 participants were included in the study. The school attendance increased for most of the students in primary and lower secondary schools and students across all school levels reported high testing compliance and satisfaction after the implementation of regular testing. Compliance was significantly associated with an increasing number of weekly tests across all school levels up to two weekly tests. Contact tracing teams were less satisfied with the cooperation with the educational authorities compared to the school employees. Higher educational level of parents was significantly associated with decreased concern for their children getting infected at school after regular testing implementation. Concerned parents were more likely to keep children at home from school, to protect all household members from becoming infected. Lack of time and communication were reported as challenging factors to implementation.

Compliance, satisfaction and confidence in regular testing of COVID-19 were high among stakeholders. An acceptable testing regime for a future regular testing implementation would be a home-based, bi-weekly test. Increased awareness of the importance of school attendance and safety of regular testing, along with good communication and role clarification should be prioritised for stakeholders involved in regular testing.

Role: The fellow conducted descriptive and bivariate analysis of the survey results. She also took the lead for setting up and coordinating meetings, wrote a manuscript accepted for publication in an international scientific peer-reviewed journal and answered the reviewers' comments.

Educational outcome

During the fellowship, Léa gained experience in preparing research protocols and planning the stages of a research project, as well as in specific methodologies, such as the methodology used to conduct systematic literature reviews. She has also considerably improved her skills in data collection and management. When the studies were submitted to an international peer-reviewed scientific journal, she also took advantage of the submission procedure to improve her writing and the way in which she scientifically discussed the results of her work with the reviewers.

3. Teaching and pedagogy

Nordic Mini Project Review Module (NMPRM), 2022

The fellow helped organise the NMPRM organised by the Norwegian Institute of Public Health (NIPH) in March 2022 in Oslo, along with the other fellows, Jeanette Stålcrautz, Andreas Rohringer, Ragnhild Tønnessen and coordinator Ettore Amato. The aim of the module was to give the fellows the opportunity to present their projects and receive feedback from the Nordic public health network. The audience was made up of fellows from the 2020 and 2021 cohorts, as well as facilitators and experts working in the Nordic countries. The fellow was involved in the planning and organisation of the meeting, which took the form of a two-day hybrid meeting. She was also involved in the evaluation after the meeting and participated in drafting a reflection paper with her colleagues. During the NMPRM, she gave a presentation on one of her surveillance projects.

Ghana Field Epidemiology and Laboratory Training Programme (GELTP) Exchange Programme

The fellow participated in training delivered as part of the exchange programme with the Ghana Field Epidemiology and Laboratory Training Programme (GELTP) hosted by the Norwegian Institute of Public Health (NIPH) between October and November 2022 in Oslo. The programme was set up by NIPH in partnership with the University of Ghana and its aim was to provide skills and knowledge applicable to epidemic management and response in Norway, Ghana and sub-Saharan Africa, by hosting a four-week, full-time, in-house training programme. The audience consisted of EPIET and EUPHEM fellows from the 2022 cohort, NIPH staff and GELTP fellows. More

specifically, the fellow gave a lecture on surveillance systems and their evaluation, in Norway, during a hybrid session that took place during the first week of the in-house training.

Educational outcome

Léa really benefited from the lectures and training sessions she gave during her fellowship. From a communication point of view, they allowed her to practise explaining her projects in a way that was pedagogical and comprehensible for each specific audience and the feedback she received from the experts or fellows who were part of the audience helped her improve the quality of her work.

4. Communication

4.1 Publications related to the EPIET fellowship

4.1.1 Manuscripts published in peer-reviewed journals

Danielsen A, Franconeri L, Page S, Myhre A, Tornes R, Kacelnik O, et al. Clinical outcomes of antimicrobial resistance in cancer patients: a systematic review of multivariable models. *BMC Infect Dis.* 2023;23:247. Available at: <https://doi.org/10.1186/s12879-023-08182-3>

Franconeri L, Stebbings S, Heradstveit P, Johansen M, Løken R, MacDonald E, et al. Experiences with regular testing of students for SARS-CoV-2 in primary and secondary schools: results from a cross-sectional study in two Norwegian counties, autumn 2021. *BMC Public Health.* 2023;23:1548. Available at: <https://doi.org/10.1186/s12889-023-16452-7>

8.1.2 Other reports

Franconeri L, Lange H, Jami N, Tanderø L, Helleve A. Acute gastroenteritis outbreak in a restaurant in Oslo municipality, Norway, September 2021, internal report.

Franconeri L, Brandal LT. Outbreak of *Yersinia enterocolitica* O:3, ST18, Norway, January 2022, internal report.

Franconeri L, Brandal LT, Lange H, Falk M, Veneti L, Macdonald E. Outbreak of *Salmonella* Agona, Norway, November-February 2022, internal report.

Franconeri L, Løvlie A, Sare M, Molvik M, Øgle M, Konsmo K, et al. Evaluation of the surveillance system for *Clostridioides difficile* infection in Norway from 2019 to 2021, internal report.

4.2 Conference presentations

Franconeri L, Kacelnik O, Gravningen K, Øgle M, Løvlie A, Eriksen-Volle HM. *Clostridioides difficile* infection surveillance system in Norway: evaluation of the data completeness, 2019-2021. In ESCAIDE 2022, Stockholm. 24 November 2022. Poster presentation.

4.3 Other presentations

1. Systematic Review method, 22/10/2021, EPIET/EUPHEM FHI meeting, Oslo, Norway
2. Gastroenteritis outbreak investigation, 27/10/2021, EPIET/EUPHEM FHI meeting, Oslo, Norway
3. *S. Agona* outbreak investigation, 12/01/2023, EPIET/EUPHEM FHI meeting, Oslo, Norway
4. *Clostridioides difficile* infection surveillance system in Norway: evaluation of the data completeness, 2019–2021, 29/08/2022, Project Review Module, Lisbon, Portugal
5. Surveillance systems and their evaluation in Norway, 19/10/2022, Ghana Field Epidemiology and Laboratory Training Program (GELTP) Exchange Program, Oslo, Norway
6. *C. difficile* completeness and early results from the surveys linked to users and participants of the surveillance system, 19/01/2023, internal weekly meeting, NIPH, Oslo, Norway
7. Investigation of a *Salmonella agona* national outbreak: a case-control study, Norway, November 2022, 13/03/2023, Nordic Mini Project Review Module (NMPRM) 2023, Copenhagen, Denmark
8. Wrap-up Deployment GOARN, 29/05/2023, Section meeting, Oslo Norway
9. Wrap-up Deployment GOARN, 01/06/2023, EPIET/EUPHEM FHI meeting, Oslo, Norway

5. EPIET/EUPHEM modules attended

1. EUPHEM/EPIET Virtual Introductory Course, 20/09/2021–08/10/2021, Virtual
2. Inject day: Phylogeny, 20/10/2021, Virtual
3. Inject days: Operational Research, 27/10/2021–28/10/2021, Virtual
4. Inject days: Data Collection and Management, 10/11/2021–11/11/2021, Virtual
5. Outbreak investigation Module, 06/12/2021–10/12/2021, Virtual
6. Biorisk and quality management Inject days, 17/01/2022–18/01/2022, Virtual
7. Multivariate analyses module, 14/03/2022–18/03/2022, Virtual
8. Project review activity, 20/04/2022–22/04/2022, Spetses, Greece
9. Introductory Course Part II, 25/04/2022–29/04/2022, Spetses, Greece
10. Rapid assessment survey module, 06/06/2022–10/06/2022, Stockholm, Sweden
11. Project review module, 29/08/2022–02/09/2022, Lisbon, Portugal
12. Time Series Analyses module, 07/11/2022–11/11/2022, Bilthoven, Netherlands
13. Inject days: Qualitative studies, 31/01/2023–03/02/2023, Virtual
14. Vaccinology module, 13/02/2023–17/03/2023, Virtual
15. Project Review Module, 28/08/2023–01/09/2023, Lisbon, Portugal

6. Other training

1. Nordic Mini Project Review Module 2022, 07/03/2022–08/03/2022, Oslo, Norway
2. ESCAIDE, 16/11/2021–19/11/2021, Virtual
3. ESCAIDE, 23/11/2022–25/11/2022, Stockholm, Sweden
4. Nordic Mini Project Review Module 2023, 13/03/2022–15/03/2022, Copenhagen, Denmark
5. United Nations Human rights responsibilities, 21/02/2023, Virtual
6. World Health Organization, Prevention of sexual exploitation and abuse, 24/02/2023, Virtual
7. United Nations BSAFE, 01/06/2022, Virtual
8. World Health Organization, United to Respect: Preventing sexual harassment and other prohibited conduct, 20/02/2023, Virtual

7. Missions

Nairobi, Kenya, 20 March–29 May 2023

Léa was deployed for eight weeks to support the routine activities of the Health Information Management (HIM) team of the Incident Management Support Team (IMST) in Nairobi and, remotely, the disease surveillance activities within the Somalia IMST. The deployment was based at the WHO emergency hub in Nairobi. More specifically, the fellow worked closely with the Somali drought response team, helping with regular data collection and analysis, and produced outputs to guide the response for disease outbreaks, focusing on cholera and measles outbreaks. She also supported the GHoA IMST health information management team through regular data collection and analysis on disease outbreaks and updated different documents helpful for coordination and response (briefing notes, situation report).

8. Other activities

Epidemic Intelligence

Supervisor: Emily MacDonald (Senior Advisor, Department of Infection Control and Preparedness, NIPH)

Role: Léa was involved in the epidemic intelligence roster operated by the Norwegian Institute of Public Health (NIPH) during her fellowship. The roster aims to monitor and report any notifications on outbreaks or events received through one dedicated mailbox. In essence, this is the epidemic intelligence system operated by the NIPH, where alerts from the Norwegian outbreak reporting system (VESUV), the international surveillance network

communication (EWRS/IHR) or media surveillance are handled and distributed to relevant employees of the Institute (the people responsible for each disease). The fellow completed this duty by helping to draft the weekly reports on epidemics that were to be presented at the epidemiological intelligence meetings.

Acknowledgements

I would first like to thank my supervisors and co-supervisors, Hanne-Merete Eriksen-Volle, Thale Cathrine Berg and Kirsten Gravningen, who always paid particular attention to the projects I was working on and gave me all their support and experience in public health. I also send a warm thank you to my frontline coordinators Katie Palmer and Zaida Ortiz, who were so helpful and competent in every aspect of the fellowship.

I would like to thank the institute's antimicrobial resistance team for their wonderful welcome to the unit and their great professionalism, especially Nina, Petter, Mari, Miriam, Bjørn and my favourite PhD candidate, Anders Danielsen. It was a real pleasure working with you.

My warmest thanks also go to the epidemic control team, where I gained so much experience and had some of the most exciting and fun times of my fellowship: Emily MacDonald, Umaer Nasser, Heidi Lange, Lin Brandal, Monica Falk, Liz Ødeskaug and Petter Heradstveit.

I would like to add that I am very grateful to have been in the company of Ettore Amato, who coordinated the EPIET/EUPHEM fellows and did his best to make us feel welcome in Norway, both inside and outside the institute. A very special thanks too to Trude Lyngstad and Astrid Løvlie for all their friendly tips and knowledge (and sometimes the amazing outdoor sessions!).

My warmest greetings to my friends and co-fellows in the NIPH, from both cohort 2020 and cohort 2022: Andreas Rohringer, Jeanette Stålcrantz, Ragnhild Tønnessen, Beatriz Valcarcel, Arne Taxt, Joao Pires and Melanie Stecher! I have so much enjoyed your company both in the office and during the weekends and would like to thank you for all your advice and feedback over the last two years.

I would also like to send my best wishes to Valeska Laisnez and her expertise on scabies; to Camille Jacqueline and Alba Mendez, with whom I shared my deployment, which brought us much closer together; and also to Tobias Homan and Joaquin Baruch, whom I was lucky enough to meet and with whom I hope to collaborate again. I would also like to thank Anine Kongelf for her wonderful welcome. Finally, I would like to express my gratitude to the entire 2021 cohort, whom I have got to know better and better over the course of the fellowship and the year, and whose paths will continue to cross, much to my delight.