FELLOWSHIP REPORT

Summary of work activities

Silvia Funke
Intervention Epidemiology path (EPIET)
Cohort 2014

Background

The ECDC Fellowship Training Programme includes two distinct curricular pathways: Intervention Epidemiology Training (EPIET) and Public Health Microbiology Training (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 are part of the ECDC fellowship programme that provides competency based training and practical experience using the 'learning by doing' approach in acknowledged training sites across the European Union (EU) and European Economic Area (EEA) Member States.

Intervention Epidemiology path (EPIET)

Field epidemiology aims to apply epidemiologic methods in day to day public health field conditions in order to generate new knowledge and scientific evidence for public health decision making. The context is often complex and difficult to control, which challenges study design and interpretation of study results. However, often in Public Health we lack the opportunity to perform controlled trials and we are faced with the need to design observational studies as best as we can. Field epidemiologists use epidemiology as a tool to design, evaluate or improve interventions to protect the health of a population.

The European Programme for Intervention Epidemiology Training (EPIET) was created in 1995. Its purpose is to create a network of highly trained field epidemiologists in the European Union, thereby strengthening the public health epidemiology workforce at Member State and EU/EEA level. Current EPIET alumni are providing expertise in response activities and strengthening capacity for communicable disease surveillance and control inside and beyond the EU. In 2006 EPIET was integrated into the core activities of ECDC.

The objectives of the ECDC Fellowship - EPIET path are:

- To strengthen the surveillance of infectious diseases and other public health issues in Member States and at EU level;
- To develop response capacity for effective field investigation and control at national and community level to meet public health threats;

The views expressed in this publication do not necessarily reflect the views of the European Centre for Disease Prevention and Control (ECDC).

This portfolio does not represent a diploma. Fellows receive a certificate acknowledging the 2-year training and listing the theoretical modules attended. Additionally, if all training objectives have been met, they receive a diploma.

Stockholm, September 2016

- To develop a European network of public health epidemiologists who use standard methods and share common objectives;
- To contribute to the development of the community network for the surveillance and control of communicable diseases.

Fellows develop core competencies in field epidemiology mainly through project or activity work, but also partly through participation in training modules. Outputs are presented in accordance with the EPIET competency domains, as set out in the EPIET scientific guide[1].

Pre-fellowship short biography

Prior to EPIET, Silvia Funke studied pharmacy (University of Marburg, Germany). She obtained her licence as pharmacist in 2005 and additionally received a Postgraduate Certificate in Pharmacy (University of Otago, New Zealand). Silvia Funke obtained a PhD in epidemiology in 2009 (Heidelberg University, Germany) and worked as post-doctoral research fellow for 2.5 years at the German Cancer Research Center in the area of human papillomaviruses (HPV).

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 15.09.2014, Silvia Funke started her EPIET fellowship at the Infectious Disease Epidemiology Unit, Statens Serum Institut (SSI), Copenhagen, Denmark, under the supervision of Steen Ethelberg. This report summarizes the work performed during the fellowship.

Fellowship portfolio

This portfolio presents a summary of all work activities (unless restricted due to confidentiality regulations) conducted by the fellow during the ECDC Fellowship, EPIET path. These activities include various projects, and theoretical training modules.

Projects included epidemiological contributions to public health event detection and investigation (surveillance and outbreaks); applied epidemiology field research; teaching epidemiology; summarising and communicating scientific evidence and activities with a specific epidemiology focus. The outcomes include publications, presentations, posters, reports and teaching materials prepared by the fellow.

This portfolio also includes a reflection from the fellow on the field epidemiology competencies developed during the 2-year training, a reflection from the supervisor on the added value of engaging in the training of the fellow, as well as a reflection by the programme coordinator on the development of the fellow's competencies.

[1] European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2013. Available from: http://ecdc.europa.eu/en/epiet/Documents/Scientific%20guides/EPIET%20Scientific%20Guide_C2016.pdf

Fellowship projects

1. Surveillance

Comparison of diagnostic tests performed at regional hospital laboratories and Statens Serum Institut to diagnose tuberculosis

In Denmark all results of microbiological test performed are automatically updated in a nationwide database called MiBa. Microbiological tests performed at SSI are additionally updated in a second database. The aim of this project was to determine the number and proportion of patients, who had a PCR test for tuberculosis undertaken at regional hospital laboratories, and then underwent culture for Mycobacterium tuberculosis at SSI. Data of both databases were analysed and compared to calculate the amount of diagnostic tests performed. The dataset from 2010 to 2014 included 4,081 PCR tests performed at three different regional hospital laboratories, of which 2,242 had samples submitted from the regional hospital laboratories for culture. These results indicated that laboratory A had a culture rate between 83% and 92%, laboratory B obtained a culture rate of 68%, and laboratory C had a culture rate that declined from 70% in 2011 to 51% in 2013.

Role and outputs: *Co-investigator*

Silvia analysed the surveillance data.

Supervisor: *Kåre Mølbak*

Competencies developed:

Being involved in this project I learned about the personal identity numbers (CPR numbers) recorded in Denmark, which allow linkage between databases. I became aware of the advantages of an automated microbiological database such as MiBa. I also learned about the different diagnostic testing methods for tuberculosis and the organization/structure of microbiological laboratories in Denmark.

Hospital Acquired Infections Database (HAIBA): Refinement of the case definitions for the surveillance of postoperative infections after hip replacement surgery for further validation

The Hospital Acquired Infections Database (HAIBA) is a surveillance system for monitoring four of the most common hospital acquired infections (HAIs) in Denmark. The purpose of HAIBA is to detect and monitor HAIs in Denmark and to improve the evidence base for reducing the incidence of preventable HAIs. HAIBA was launched on 4 March 2015 with data on the incidence of *Clostridium difficile* infections and bacteremia. Data on urinary tract infections were added in autumn 2015. Surveillance of specific postoperative infections is being developed.

A first version of the case definitions for infections after hip replacement were further refined in collaboration with orthopedic surgeons and infection control clinicians. This study described surveillance data on HAIs after hip replacement surgery according to the initial case definition in order to assess areas for improvement and to evaluate the impact that the changes under discussion would have (type and number of biopsies, acute versus programmed operation, length of treatment). This allowed the validation of HAIs after hip replacement against reference databases using the adapted case definition.

Role and outputs: *Co-investigator*

Silvia wrote the protocol for the validation of the case definition, analysed the surveillance data, and wrote a report (17).

Supervisor: *Sophie Gubbels*

Competencies developed:

Being involved in this surveillance project I learned how important a precise case definition is for the validation of a surveillance system. I learned to analyse extensive datasets and could expand my knowledge on statistical programming. I also learned about the importance of descriptive analyses to understand the nature of surveillance data. I became aware of how important communication across different disciplines (epidemiologist, microbiologists, physicians) is to set up and to validate a surveillance system.

MSF mission: Surveillance after the Ebola outbreak in Tonkolili district, Sierra Leone

See mission section

2. Outbreak investigations

A point source Clostridium perfringens outbreak related to food delivered by a catering company in Copenhagen, November 2014

Background:
On 14 November 2014, a local caterer informed us about an ongoing gastroenteritis outbreak among employees of companies supplied by the caterer. We investigated the outbreak to identify the source of infection and to prevent further spread.

Methods:
We conducted a cohort study using an electronic questionnaire among employees at companies receiving food from the catering company. For the analysis, we defined cases as persons who became ill with either diarrhoea, vomiting, stomach pain and/or nausea between 12 am on 13/11 and 12 pm on 14/11. We calculated relative risks (RR) with 95% confidence intervals (CI) using univariate analysis. Stool specimens of symptomatic cases and two food items were tested for common bacterial and viral agents of gastroenteritis.

Results:
The study population consisted of 690 persons from 69 different companies, of whom 382 were cases (attack rate=55.4%). Eighty-two percent of the cases had onset of symptoms between 4 pm on 13/11 and 3 am on 14/11. Food consumption on 13/11 was significantly associated with illness (RR=9.8, 95% CI 3.3-29.4). Persons who ate a turkey dish were more likely to develop symptoms (RR=19.5, 95% CI 7.4-50.9). No other food items were associated with illness. The leftover turkey dish tested positive for Clostridium perfringens (>106 CFU/g). In addition, 11 out of 15 cases tested positive for *Clostridium perfringens*.

Conclusion:
Our epidemiological investigation suggested that the consumption of the turkey dish caused the outbreak. Based on the microbiological analyses we identified *Clostridium perfringens* as the causative agent. Communicating and reinforcing guidelines for food handling, including cooling procedures, to catering companies would help to prevent similar outbreaks with spore forming, toxin-producing bacteria.

Role and outputs: *Principal investigator*

Silvia collected, cleaned and analysed the data. She wrote a report (15) and presented a poster (2).

Supervisors: *Steen Ethelberg*

Competencies developed:

Being involved in this outbreak investigation I learned how to perform all the steps of an outbreak investigation. I learned about the concepts of a cohort study in an outbreak setting and how important data cleaning is to include the data of the defined cohort only. I also learned that even a well-formulated case-definition might change during the course of the outbreak. I became aware of the importance of the cooperation between epidemiologists and microbiologists to identify the source of the outbreak.

A Campylobacter outbreak related to food delivered by a catering company in Copenhagen, May 2015

Background:
On 28 May 2015, the Veterinary and Food Administration informed us about an outbreak of gastroenteritis among employees of companies supplied by a catering company in Copenhagen. We aimed at determining the extent of the outbreak and identifying its source.

Methods:
We conducted a cohort study, using a two-step online questionnaire approach, among all employees in all 27 companies receiving food from the caterer. The first questionnaire focused on onset of stomach problems, symptoms, duration of illness and date of food consumption between 18 and 22 May to identify the most probable days of exposure. The second questionnaire focused on the food items consumed on the dates identified.

Results:
We identified 110 cases with the first questionnaire and 93 cases with the second questionnaire, respectively. Statistical analysis showed a significant association between illness and the consumption of food on 19 May (RR=1.90, 95%CI 1.1-3.3) and a strong significant association between illness and the consumption of food on 20 May (RR=4.1, 95%CI 1.8-9.4). Multivariable logistic regression showed a statistically significant association between consumption of green salad on 20.05. and illness (OR 2.3, 95% CI:1.2-4.5). Laboratory analyses showed *Campylobacter* positive tests for 6 persons (3 culture, 3 PCR).

Conclusion:
Our epidemiological investigation suggested that the consumption of the green salad caused the outbreak. Based on the microbiological analyses we identified *Campylobacter* as the causative agent. The kitchen inspection did not show any noticeable procedures. However, cross-contamination of the salad by another food item is suspected by the Veterinary and Food Administration.

Role and outputs: *Principal investigator*

Silvia developed the questionnaire. She collected, cleaned and analysed the data and wrote a report (16).

Supervisors: *Steen Ethelberg*

Competencies developed:
Being involved in this outbreak investigation I learned how to develop and use an online questionnaire. I learned about the importance of designing an appropriate and effective questionnaire. I also became aware of the importance to communicate and train food handling procedures frequently. Conducting this investigation allowed me to apply the knowledge I gained through the EPIET outbreak module.

3. Applied epidemiology research

Salmonella Dublin patients in Denmark and their distance to cattle farms

Background:
The Salmonella serotype Dublin is specifically adapted to cattle but may infect humans leading to severe disease. We described human S. Dublin cases and investigated a potential spatial relation between their addresses and cattle farms in Denmark.

Methods:
We extracted S. Dublin patient surveillance data, 2000-2014, and performed descriptive analyses. We geocoded residential and cattle farm addresses and mapped their incidence by region, province and municipality. We used linear correlation and spatial autocorrelation analysis at the municipality level and calculated the direct network distance from the nearest farm to the residential address of cases and 20,000 randomly selected citizens representing the background population.

Results:
We identified 484 S. Dublin cases, 57% were male, median age 65 years. Seven patients (1%) acquired their infection abroad. The 30 days all-cause mortality was 13%. Overall, cumulative incidence was 8.0 per 100,000 inhabitants. Cattle farms were located predominantly in the western part of the country. Neither visual inspection nor correlation analysis indicated a relationship between municipalities with high incidences of human cases and cattle farms. Global Moran's Index analysis showed municipalities with high incidence of cases to be randomly distributed. We found equal direct network distances between cattle farms and both addresses of S. Dublin cases and the background population.

Conclusion:
We found S. Dublin infections in Denmark to affect the elderly, be serious and acquired domestically. Our findings indicate that the risk of infection with S. Dublin in Denmark is independent of living in the proximity to cattle farms.

Role and outputs: *Principal investigator*

Silvia analysed the data. She presented a poster (3) and published a manuscript in a peer-reviewed journal (1).

Supervisor: *Steen Ethelberg*

Competencies developed:
Being involved in this research project I became aware of the variety of unique databases in Denmark and the research opportunities that arise by linking databases. I learned how to generate maps using different types of

software and how to conduct geographical analyses. I also learned about the one health approach by investigating the association between infections in animals and humans. This project also provided me to gain confidence in scientific writing and delivering presentations.

Pertussis vaccination in Europe: Assessing the vaccine effectiveness by vaccine product and birth cohort using the screening method

Background:
Within Europe various pertussis vaccination schedules are applied using a variety of different vaccine products. Previous studies have shown that vaccine effectiveness for pertussis varied among different products and decreased with time since last vaccination. We aimed to assess vaccine effectiveness by birth cohort and vaccine product in Europe.

Methods:
We investigated countries able to report pertussis vaccination coverage stratified by birth cohort and vaccine product with a survey conducted in 34 European countries. We calculated vaccine effectiveness by country stratified by birth cohort, vaccine product, and sex for each vaccine dose using the screening method.

Results:
Five countries (Denmark, Iceland, Malta, the Netherlands and Norway) were able to provide the data we were seeking. We included 4,717 cases (Denmark: 689; Iceland: 25; Malta: 0; Netherlands: 3,055; Norway: 948) from 29 birth cohorts in our analysis. The number of included birth cohorts ranged from one (Malta) to twelve (Denmark). Vaccination coverage ranged from 77% in Denmark (dose 3; 2014) to 100% in Malta (dose 1; 2011). Vaccine effectiveness was 100% for both sexes in Netherlands (dose 1; 2005-2008), Norway (partially vaccinated; 2008) and Malta, where no case was reported for the specific birth cohort. Norway also showed lowest vaccine effectiveness with 52% (fully vaccinated; 2003). Vaccine effectiveness did not differ by product used.

Conclusion:
Our study showed that all vaccine products used were highly effective against pertussis. We showed that routinely collected data on pertussis cases and vaccination coverage in Europe can be used to assess vaccine effectiveness by birth cohort and vaccine product. However, variation in data reporting and different vaccination schedules hinder measurement of pertussis vaccination effectiveness across all European countries.

Role and outputs: *Co-investigator*

Silvia wrote the protocol and collected, cleaned, and analysed the data. She co-authored a technical report (19).

Supervisor: *Palle Valentiner-Branth*

Competencies developed:

This project gave me the opportunity to learn how to conduct a vaccine effectiveness study. Being involved I learned about both, the variety of pertussis surveillance systems and the variety of pertussis vaccination schedules across Europe. I became aware how difficult it is to collect data from different European countries and how challenging the data analysis can be due to different data quality. I learned about new statistical methods, such as the screening method, and how to write a technical report for ECDC.

4. Communication

Publications in peer reviewed journals

1 publication (1)

Conference presentations

2 poster presentations at ESCAIDE 2015 (2,3) and 1 poster presentation at ESCAIDE 2016 (4)

Other presentations

4 oral presentations at the PAE (German FETP) meeting (5-8)

2 oral presentations at the HAIBA Følgegruppe (Expert Group) Meeting at Statens Serum Institut (9,10)

1 oral presentation at the EPIET Outbreak Module (11)

1 oral presentation at the IMPHM Module (12)

1 oral presentation at the Journal Club meeting at Statens Serum Institut (13)

1 oral presentation at the Medical doctors in microbiology training week a Statens Serum Institut (14)

Reports

2 outbreak reports (15, 16), 1 surveillance report (17), 1 mission report (18), co-author of 1 technical report (19) and 1 internal MSF report (20)

5. Teaching activities

Organised Nordic Mini Project Review 2015, Copenhagen (13-14 April 2015)

We arranged a two-day workshop at SSI for the EPIET and EUPHEM fellows from the Nordic countries, including Denmark, Sweden, Norway, Finland, and Latvia, to present their currently ongoing projects. The fellows obtained feedback and advice on their project design, strategy and/or analysis from the other fellows and facilitators. Organising the workshop included development of the schedule, inviting local (SSI) and external (Nordic countries) facilitators as well as other logistical tasks. In total, 14 fellows and 21 facilitators participated.

Role and outputs: *Principal Organiser*

Silvia developed the schedule and the meeting guide and evaluated the workshop together with the other EPIET/EUPHEM fellows based at SSI. She invited all fellows and facilitators.

Educational outcome:
Being involved I learned how to set up and organize a two-day workshop. I learned how to assign appropriate facilitators to fellows´ presentations. I also learned how to evaluate a scientific meeting.

MSF mission: Training of national staff on key concepts of epidemiology, Tonkolili district, Sierra Leone

See mission section

Introduction to Infectious Disease Epidemiology

We organized a course for MPH students from the Danish Institute for Study Abroad (DIS) which is held biannually. The course includes a presentation about the Danish Healthcare System and the function of SSI in disease surveillance and outbreak investigations.

Role and outputs: *Preparation and delivery of presentation, 10.09.2015 / 11.02.2016 (together with EPIET fellows of cohort 2013/2015)*

Educational outcome:
Being involved in this teaching allowed me to learn about the surveillance systems in Denmark. I learned how to prepare and deliver material for a course. I also learned how to adapt a scientific presentation to the audience of foreign public health students.

Planning PhD course on Infectious Disease Epidemiology

We planned a 3-day course on infectious disease epidemiology for PhD students at the University of Copenhagen (delivered in October 2016). The course included lectures on the basic concepts of transmission, surveillance and outbreak investigations. It also included practical sessions (case studies).

Role and outputs: *Planning the schedule together with other EPIET/EUPHEM fellows of cohort 2014/ 2015*

Supervisor: *Kåre Mølbak*

Educational outcome:
Being involved I learned how to plan a three-day course on infectious disease epidemiology and how to decide on the topics to be delivered.

6. Other activities:

International mission with MSF: Strengthening the surveillance system after the Ebola outbreak in Tonkolili district, Sierra Leone

1) Strengthening the surveillance by improving the quantity and quality of IDSR reports from peripheral health units

- Assessing peripheral health units in the district, mainly in Kholifa Rowalla chiefdom
- On the spot training of staff in peripheral health units in the district ion IDSR surveillance with special attention to case definitions of eight key diseases plus maternal and under five death (Ebola virus disease, measles, malaria, diarrhoea with severe dehydration in children under 5 years of age, severe pneumonia, cholera, acute flaccid paralysis, neonatal tetanus)

2) Dashboard tool

Background:
As part of strengthening surveillance of infectious diseases following the 2014-15 Ebola outbreak, the District Health Management Team (DHMT) in Tonkolili District, Sierra Leone, weekly collated paper-based surveillance data from Peripheral Health Units (PHU). As this team lacked tools to analyse the data and produce reports, we developed an open source interactive dashboard software to allow real time data analysis by time (week, year), place (chiefdom, PHU) and person (<5, >5 years). We piloted the tool to assess feasibility, initial acceptability and usefulness.

Methods:
We delivered training to the DHMT and practical exercises covering three main areas: checking reporting completeness, weekly data analysis by time/place/person and export of figures and maps. The trained DHMT staff completed an anonymous questionnaire to collect information on their perceptions on ease of use of the tool and its appropriateness for surveillance needs.

Results:
All eight trained DHMT staff reported that the tool was appropriate for their needs, seven considered it easy to use and six felt confident using it by themselves. All participants stated that practical exercises allowed them to practice data analysis and discover other potential uses of the tool such as detection of outbreaks, planning interventions and quality checking following data entry.

Conclusion:
The pilot indicated that the dashboard tool was easy to use, acceptable and useful, suggesting that it could support the DHMT on core surveillance activities and planning public health responses. We recommend that the use of the tool be monitored over time to assess its usefulness under real field conditions.

3) Supporting the Ministry of Health with organization of polio vaccination campaign (National Immunization Day)

- Supervision of vaccination campaign
- Ensuring sufficient cold chain

4) Teaching of MSF national staff including on the job training and introduction to key concepts of epidemiology (Outbreaks, surveillance systems, case studies)

5) Supporting finalization of a **map of the peripheral health units** in the district

Role and outputs: *Field epidemiologist*

Silvia's tasks encompassed the assessment of PHUs and training on the IDSR system in the PHUs and at the district Ministry of Health. She introduced the dashboard to the local Ministry of Health and other stakeholder. Silvia trained national staff including one community health officer and a data manager. She supported the finalization of the map of the district and supported the organization of the polio vaccination campaign. Silvia wrote an end-of-mission report (18), contributed to an internal MSF report (20), submitted an abstract and presented a poster on the dashboard tool (4).

Supervisor: *Grazia Caleo*

Competencies developed:

This project gave me the opportunity to join an international mission with MSF. Being involved allowed me to apply my field epidemiology skills in a completely different context and to understand and learn "real field epi". I learned how an Integrated Disease Surveillance and Response System works. I also became aware how crucial it is to train public health staff both on the district level and in very remote health units to respond timely and efficiently to public health emergencies. I had the chance to communicate with different stakeholders and to work in an international team.

7. EPIET/EUPHEM modules attended

1. Introductory Course in Spetses, Greece (29.9.-17.10.2014)
2. ESCAIDE 2014, Stockholm (05.-07.11.2014)
3. Outbreak Module, Berlin (08.-12.12.2014)
4. Initial Management in Public Health Microbiology Module, Stockholm (09.-13.02.2015)
5. Multivariable Analysis Module, Vienna (23.-27.03.2015)
6. Project Review Module, Lisbon (31.08-04.09.2015)
7. ESCAIDE 2015, Stockholm (11.-13.11.2015)
8. Time-Series Analysis Module, Bilthoven (23.-27.11.2015)
9. Vaccinology Module, Paris (16.-20.05.2016)
10. Rapid assessment & Survey Methods Module, Athens (20.-25.06.2016)
11. Project Review Module, Lisbon (22.-26.08.2016)

Other courses attended:

1. Nordic Mini Project Review, Statens Serum Institut, Copenhagen (13.-14.04.2015)
2. Outbreak Anthropology for Epidemiologists Workshop, London (18.-19.05.2015)
3. Weekly EPIET/EUPHEM forum and journal club at Statens Serum Institut
4. Weekly PAE (German FETP) meeting at Robert Koch-Institut (by telephone conference)

Supervisor's conclusions

During the two-year fellowship at the SSI in Copenhagen, Silvia Funke has been part of the staff at the Department of Infectious Disease Epidemiology where she was placed in the Unit of Zoonotic and Food- and Waterborne Diseases. As such, Silvia has taken part in the day-to-day work at the department and in the unit. Additionally Silvia has been involved in a variety of public health projects as described above and also completed an international mission to Sierra Leone towards the end of the large West African Ebola outbreak. The departmental projects have been of different types, involving a number of different diseases and methods, including working with large datasets from Danish registers. Silvia has worked dutifully on all projects with a good sense of driving the projects forward while also being particular about scientific or technical details. She has worked very well with her colleagues and the group of other EPIET and EUPHEM fellows based at the SSI. Silvia has clearly developed a lot during her fellowship, both scientifically and on a personal level, to the benefit of herself, her colleagues and the department. She adapted well to the Danish non-hierarchical work culture and has increasingly thrived professionally. Likewise, from the perspective of the host institution, it has been a pleasure to have an enthusiastic additional colleague to strengthen the work of the department and also to watch her development in fulfilment of learning objectives. Silvia has been a very valuable asset and will be missed as a good colleague at the department.

Coordinator's conclusions

Silvia has shown a great capacity of adapting to work in different teams, as shown by her mission in Sierra Leone. She had to work close to different stakeholders and largely increased her competencies on Disease Surveillance and Response. Besides, through her involvement in outbreak investigations Silvia has developed her data management skills and particularly her writing and communications skills. The project on Pertussis vaccination in Europe allowed her to have a better understanding of the different functioning of surveillance systems in Europe and particularly she learnt new methodologies and developed her analytical skills.
All this makes Silvia a good field epidemiologist, able to carry on any field assignment with the guaranty of its completion.

Personal conclusions of fellow

The EPIET programme has been a unique opportunity to gain knowledge and experience in infectious disease epidemiology. The fellowship allowed me to work on numerous very different public health projects including register-based approaches in Denmark, surveillance system data from across Europe and a mission in Sierra Leone. It also allowed me to conduct outbreak investigations and to gain confidence in scientific writing and delivering presentations. The different training modules allowed me to apply the knowledge gained in my national and international projects in a learning-by-doing manner. The programme also provided a unique network of public health specialists including epidemiologists and microbiologists. Thus, coming from academia, EPIET gave me the great opportunity of becoming a field epidemiologist.

Acknowledgements

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