



FELLOWSHIP REPORT

Summary of work activities

Lara Ricotta

Intervention Epidemiology path (EPIET)

Cohort 2015

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;

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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.

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- To develop response capacity for effective field investigation and control at national and community level to meet public health threats;
- 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 guide¹.

Pre-fellowship short biography

Prior to EPIET, Lara Ricotta completed her MDPH (Medical Doctor Specialist in Public Health, Hygiene and Preventive Medicine) at the University of Bologna, Italy. During the five years of her medical specialization, she trained in the Epidemiology of Infectious Diseases department of the National Health Institute (ISS) in Italy and was member of a National Task Force of experts nominated by the Italian Ministry of Health to investigate the HAV outbreak connected to frozen berries, in Italy in 2013-14. Before and during specialty training, Lara worked in the infectious diseases control department at Rizzoli Orthopaedic Hospital and Research Institute in Bologna for 3 years.

Fellowship assignment: Intervention Epidemiology path (EPIET)

From September 2015, Lara Ricotta was assigned to the Department of Infectious Diseases Epidemiology at Statens Serum Institut (SSI), Copenhagen, Denmark. She was placed in the vaccine preventable diseases (VPD) team under the supervision of Palle Valentiner-Branth and Kåre Mølbak. This report summarizes the work performed during her 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.

Fellowship projects

1. Surveillance

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_C2015.pdf

Title: *Validation of an electronic nationwide surveillance system for peri-prosthetic joint infections following total hip arthroplasty in Denmark.*

The sensitivity and specificity of the case definition of peri-prosthetic joint infections (PJI) in hospital acquired infections database (HAIBA) was calculated via a comparison analysis among two different algorithm to collect PJI. We reviewed the literature on surgical site infections (SSI) for hip arthroplasty in order to address the HAIBA case definition. Data in HAIBA were compared with clinical data on surgical site infection (SSI) following hip arthroplasty using discharge data from 8 hospitals in Denmark (Lundbeck Center for fast-track hip arthroplasty database). We identified the number of infections that both databases had in common, and the discrepant cases were what does the project add and investigated. The results from the database comparison were presented to the Haiba working group and at the Lundbeck Foundation Center at Rigshospitalet the 14th of December 2015. The results were part of the broader validation project on PJI case definition, and were presented at ESCAIDE 2016 conference by the SSI group.

Role and outputs: *main- investigator.*

Lara analysed the data, reviewed the literature on the SSI after hip surgery and provided evidences for the working group discussion on the algorithm for the case definition and the microbiological criteria to use to classify the SSI. Lara wrote a final report on the project (1).

Supervisor(s): *Sophie Gubbels, Department of Infectious Diseases Epidemiology, Statens Serum Institut.*

Title: *Real time and semi-automated surveillance of influenza cases in intensive care units, during the influenza season 2015-2016.*

The surveillance system for influenza ICU cases was put in place for the first time during flu season 2015-16 (week 37 2015 to week 26 2016). Weekly reports were produced for the 5 regions in Denmark, that described cases by demographic characteristics, flu serotypes circulation and distribution, patients' risk factors and vital status. At the end of the flu season, an annual report was prepared. While in operation, I improved the algorithm of the surveillance system including the demographic information for influenza B cases by subtypes. I provided suggestions to improve the real-time computer algorithm behind the surveillance system. The surveillance system has been extended to all hospitalized influenza cases for the season 2016-17.

Role and outputs: *Co-investigator.*

Lara operated the automated surveillance and produced the weekly report for the regions and for the Epi-NYT, published on the SSI website. Lara contributed to the lead author for the annual report for the season 2015-16 (2).

Supervisor: *Tyra Grove Krause, Department of Infectious Diseases Epidemiology, Statens Serum Institut.*

Competencies developed:

I learnt to use statistical software to analyze data independently. In particular, I learnt how important the civil registration number (CPR) is in Denmark, since it provides immediate individual data linkage for epidemiological research. I learned about the existence of the Lundbeck database in Denmark. This project gave me the chance to further my existing knowledge on hospital acquired infections (HAI), in a different context with different tools and capacities. This project enabled me to learn how to implement a monitoring system for HAI, individual health and health care burden. I learned about the different databases used to monitor influenza ICU in Denmark and the health system network and responsibilities.

2. Outbreak investigations

Title: Gastroenteritis outbreak connected to a catering company in Copenhagen, June 2016.

Background

An outbreak of gastroenteritis was reported to the Food Safety Authority Agency in Copenhagen region (FSA-CPH) 9th of June 2016. Thirty-eight company canteens in the greater Copenhagen area were involved. A field investigation, including the inspection of the catering company providing food to the company canteens, was undertaken by the FSA-CPH and the Statens Serum Institut (SSI) outbreak team.

Methods

Cases were defined as employees of any of the implicated companies who ate lunch at the work canteen where food was supplied by the catering company, between the 6th and 10th of June 2016 (week 23), and reported having diarrhea (defined as: three or more loose stools in 24 hours) from the 7th to the 17th of June 2016. An electronic questionnaire was sent to all of the employees to investigate the food exposures associated with the disease. Lara conducted a cohort study among the employees who reported eating in the canteens during week 23: risk ratio (RR) and 95% confidence intervals (95%CI) were calculated using conditional logistic regression. Stool samples were collected from cases and submitted to XX laboratory for testing.

Results

Among 393 respondents, 103 cases were identified. The most reported symptoms were diarrhea (100%) followed by abdominal pain (93%). The highest risk ratio (RR) was associated with spicy melon salad [RR of 2.63 (95% CI [1.89-3.64]; P: 0.000)], followed by curry fried cauliflower salad [RR 2.33 (95% CI [1.60-3.38]; P: 0.000)]. Overall, mixed salads served on Wednesday showed a higher risk of disease transmission. The microbiological investigation found *Campylobacter jejuni* (ST48) in 19 of the 25 patient stool samples. A leftover batch of the duck meat was tested and while campylobacter was detected, whole genome sequencing (WGS) did not cluster with patient isolates.

Conclusions

Employees who ate in the work canteen on Wednesday 8th of June were more likely to become ill compared to the people that had eaten during the other days of the week 23. The main hypothesis of the outbreak was cross-contamination with duck meat and vegetables (mixed salads) during food handling.

No leftover salads were available for testing. In order to prevent the spread of the disease, awareness was raised among employees informing them about the outbreak, and recommending hand washing after using toilets and before handling food. The Danish Food Authority Agency levied a fine of on the catering company.

Role and outputs: *Lara was a main-investigator.*

Lara was responsible for drafting the case definition, creating and managing the line list of cases, developing the survey tool, analyzing survey response data, test the hypothesis, presenting results to the outbreak team meeting, and writing the outbreak report (3).

Supervisor(s): *Steen Ethelberg, Infectious Diseases Epidemiology Department, Statens Serum Institut*

Title: *Norovirus outbreak connected to a wedding lunch buffet in Copenhagen, January 2017.*

Background

On the 15th of January 2017, an outbreak of gastroenteritis among guests at a wedding in Copenhagen was notified to the Danish Food Authority Agency (DFA). The DFA and the Statens Serum Institut (SSI) convened an outbreak team to identify the source of infection and to prevent further spread.

Method

The outbreak team undertook a restaurant inspection at the venue where the wedding lunch was served. Lara conducted a retrospective cohort study among the 51 participants of the wedding lunch using an electronic questionnaire. For the analysis, we defined cases as a person who attended the wedding lunch and suffered at least two of the following symptoms from 00.00 on 14 January to 18.00 on 16 January: diarrhea (≥ 3 loose stool in 24 hours) and/or vomiting; and/or at least two of these symptoms: stomach ache, abdominal pain, muscles pain, nausea and fever. The relative risk (RR) of disease was calculated, with 95% confidence intervals (CI). Stool specimens of five cases were tested for common bacterial and viral agents of gastroenteritis.

Results

In total 30/51 people answered the electronic questionnaire (58% response rate); of these, 10 met the case definition (attack rate 33%). No restaurant personnel reported illness in the days preceding the outbreak. Most of the cases reported abdominal pain (8/10), diarrhea (8/10) and nausea (8/10). None of the 28 food and drink exposures queried were significantly associated with the illness ($p > 0.05$ and 95% CI including 1). Of the five stool samples analyzed at SSI using real-time PCR, three were positive for Norovirus and were the same virus strain, GII.P16-GII.2. No food leftovers were available for testing.

Conclusions

No statistically significant association was demonstrated between any food or drinks served and illness among attendees. Norovirus was isolated from three guests stool samples and genotyping showed they were the same strain GII.P16-GII.2, suggesting a common exposure. The Food Authority advised the café managers to report suspicion of illness among their customers in future, and recommended correct hand and environmental hygiene, in the toilet and kitchen.

Role and outputs: As the lead investigator, Lara developed a questionnaire for distribution to wedding guests, and conducted the statistical analysis for the cohort study. Lara wrote the outbreak report for the DFA and SSI (4).

Supervisors: Steen Ethelberg, Infectious Diseases Epidemiology Department, Statens Serum Institut.

Competencies developed:

I learnt how to conduct a cohort study to test a hypothesis on the source of the outbreak. I had the opportunity to learn about performing a site inspection and sampling food for testing. I learned to communicate results among colleagues during the outbreak investigation team meeting. I performed the univariate and multivariate analysis using Stata software. I can now independently lead an outbreak investigation, including the site inspection, drafting the questionnaire and analyzing the data for an analytical study, as well as, interpreting results and communicating to stakeholders in the investigation, to the public and health authorities.

3. Applied epidemiology research

Title: *Estimating vaccine effectiveness for a multi-dose vaccination program: comparison of methods to assess pertussis vaccine effectiveness in Denmark, 2000-2014.*

Introduction

While pertussis mortality and morbidity has decreased in Denmark since the introduction of vaccination, outbreaks continue to occur, with the highest burden among infants under one year of age, and an increase in the incidence in adolescents and young adults. Since 1997, acellular pertussis vaccine is delivered as primary series (PS) of three doses at 3, 5 and 12 months, with a pre-school booster at 5 years. In Denmark, pertussis surveillance is laboratory based and the availability of individual data from population registries allows comparison of vaccine effectiveness estimates using the screening method, with those obtained from a cohort study design. Estimating vaccine effectiveness (VE) of multi-dose vaccines poses methodological challenges in dealing with partially vaccinated cases. We estimated VE for children receiving PS versus unvaccinated, and for those receiving booster versus no booster, using both screening method (SM) and cohort design (CD).

Method

Using the individually linked data we estimated PS VE by annual birth cohort from 2000 to 2014, and for the booster from 2000 to 2010. To permit SM VE calculation of PS versus unvaccinated, we mathematically excluded partially vaccinated children from the estimated proportion of population vaccinated (PPV). For the CD, we estimated VE as cases per time-at-risk, using Poisson regression.

Results

From 2000 to 2015, 3621 confirmed pertussis cases were reported among 1,020,900 children. The median VE for PS was 89.1% (range 63.9%-99.7%) using SM, versus 77.2% (range 38.2%-96.2%) using CD. For the booster, SM median VE was 94.0% (range 88.7%-98.2%), and 57.2% (range 50.2%-69.7%) using CD. Median difference between SM and CD PS VE was 13.1 percentage points (pp) and for booster 35.6 pp

Conclusions

This study confirms the high VE of the Danish acellular pertussis vaccine. However, VE estimates are higher using SM than CD. CD incorporates the dynamics of time-at-risk, yielding more valid VE estimates, and countries using the SM should be aware of the risk of overestimation. When individual data are collected, we recommend using CD for more reliable VE estimate.

Role and outputs: *Lara was the lead investigator of this project.*

She wrote the project protocol and performed data analysis. She developed the comparison between study designs, in order to understand further how better estimate the vaccine effectiveness in different contexts and with different data availability. She submitted abstracts to TEPHINET 2017 and ESCAIDE 2017. She also submitted the abstract at Escmid-vaccine, Eu-global infectious diseases conference and to ISV conference. Lara drafted the manuscript to submit to a peer-reviewed journal (5).

Supervisor(s): *Kåre Mølbak, Jens Nielsen and Palle Valentiner-Branth, Infectious Diseases Epidemiology Department, Statens Serum Institut.*

Competencies developed:

As the main investigator of this project, I learnt how to work in a team, to bring together different experts and work to address the research question as rigorously as possible. It was important for me to understand the context where I was working and to use its advantages: the unique data tools and population registries available in Denmark for research. These resources, and the collaboration with very experienced colleagues, made it possible to complete this project.

Title: *Burden of influenza in older adults in Denmark, 2010 – 2015.*

Background

WHO recommends influenza immunization of people ≥ 65 years old as well as in clinical risk groups to reduce severe outcomes of influenza. However, because of a change towards a more healthy senior population, it is relevant to reconsider the recommended age of 65 years. To inform this discussion, we describe the age distribution of patients ≥ 50 years hospitalized with influenza in Denmark, 2010/11-2015/16.

Methods

We defined cases as ≥ 50 years old patients with a positive influenza test in the National Microbiology Database, whose sample was taken during or within 4 days before hospitalization, as recorded in the National Patients Register. Comorbidity was present if the case had been hospitalized within the previous 5 years with a chronic risk condition, according to National Guidelines. We obtained vaccination status from the Danish Vaccination Register.

Results

Between years 2010-2016, 3182 cases were recorded (mean annual incidence (MAI) 3.3/10,000 population). In total 1333 were 50-64 years (MAI 2/10,000) and 1849 were ≥ 65 years (MAI 3.1/10,000). In the 3 seasons dominated by influenza A (H1N1) and B, the MAI in 50-64 years cases was 1.6/10,000 and in ≥ 65 years 1.4/10,000; whereas in the 3 seasons dominated by influenza A(H3N2) the incidence was lower in 50-64 years (MAI 2.6/10,000) than in ≥ 65 years (4.8/10,000). In total 35% (473/1333) of cases

aged 50-64 years were unvaccinated and without comorbidities, and is therefore not included in the current vaccine recommendation.

Conclusion

This analysis suggests that there is a considerable burden of influenza hospitalizations in healthy individuals 50-64 years of age and do not provide evidence to raise the age-threshold of influenza immunization. We propose to investigate the cost effectiveness of offering vaccination to healthy individuals ≥ 50 years old.

Role and outputs: Lara was the main investigator; she wrote the study protocol (22) and conducted the descriptive analysis. She used Stata to analyse the data and she wrote a report at the end of the analysis.

Supervisors: *Kåre Mølbaek and Tyra Grove Krause, Infectious Diseases Epidemiology Department, Statens Serum Institut.*

Competencies developed:

Lara learnt to write a study design and to use big databases for analysis. She learnt to present results to the team. She had the chance to investigate and learn how many factors and level of investigation are necessary to consider for evaluating disease burden.

4. Communication

Manuscripts submitted to peer reviewed journals (in review process)

One manuscript submitted to a peer reviewed journal (5).

Conference presentations

One oral presentation at the Global-EU Infectious Diseases Conference, Paris 7th-9th of Sept 2017 (8).

One poster at ESCAIDE 2016 as co-author (9)

Other presentations

- One oral presentation at the Lundbeck foundation group meeting within the HAIBA expert group (Følgegruppe) at the Rigshospitalet on the 14th of December 2015, Copenhagen (10).
- One oral presentation at the Regional Food Safety Agency in Copenhagen, within the task force for the outbreak investigation (11).
- Three oral presentations for DIS International Public Health Master students (12) (13).
- One oral presentation at the Journal Club at infectious diseases department at SSI on 10 steps of HAV outbreak investigation in Italy 2013-14 (14).
- One oral presentation at the EPIET Outbreak Module on HAV outbreak in Italy 2013-14 (15).
- One oral presentation at the Epiet/Euphem weekly forum at infectious diseases department at SSI:
- Escaide 2015 highlights (16).

- One oral presentation at the Epiet/Euphem weekly forum at infectious diseases department at SSI: Escaide 2016 highlights (17).
- One oral presentation at the Monday meeting at Infectious Diseases Epidemiology Department at SSI: Escaide 2016 highlights (17).
- One oral presentation at the Chafea-BTSF training course: lesson learnt from HAV outbreak investigation in Italy 2013-14 (18).
- One oral presentation at the infectious diseases department forum at SSI.V vaccine effectiveness: pertussis in Denmark 2000-14 (19).
- One oral presentation at the Epiet/Euphem weekly forum at the infectious diseases department at SSI on trend of pertussis in Denmark, 2000-15 (20).
- One oral presentation at the EPIET Vaccinology Module: from estimating vaccine effectiveness of a multi-dose vaccine schedule to a comparison of methods (21).

Reports

Two outbreak investigations (3, 4), two surveillance projects (1, 2), two teaching assignments (6) (7).

5. Teaching activities

Title: *Introduction to epidemiology of Infectious diseases for PhD Students in Public Health research area, 26th to 28th of October 2016, Statens Serum Institut and University of Copenhagen.*

Upon request from the University of Copenhagen, the EPIET and EUPHEM fellows from cohort 2015/16 at SSI organised, prepared materials for lessons, lectured and facilitated small group case studies for a 3 day PhD-level training course. The aim of the training assignment was to develop and deploy learning tools according to pedagogical techniques suitable for adult learners. In total, 25 PhD students in Public Health, Medicine and/or Epidemiology, participated. The course introduced the application of epidemiology to the field of infectious diseases. Specific topics addressed included current global challenges for communicable diseases, what makes a good surveillance system, and how surveillance data can be used as information for action, how outbreaks of communicable diseases are identified and investigated. To ensure active participation from learners, we organised 3 hours work groups for the case studies. Moreover, students were encouraged to raise questions during and after the lessons. The course evaluation was conducted using an electronic questionnaire. The course had very positive feedback, and the University of Copenhagen requested a second course in fall 2017. The colleagues involved in the future course preparation will benefit from our program and materials.

Supervisor(s): *Kåre Mølbak, Infectious Diseases Epidemiology Department, Statens Serum Institut.*

Role and output: Lara was part of the team organising the module. She organised the training, prepared lesson materials, lectured and facilitated during the case studies, together with the other cohort 2015/16 fellows at SSI. Lara wrote a report for the course evaluation (6).

Title: *Introduction to public health surveillance in Denmark and in Europe, to MPH international students.*

Twice per year during the two-year fellowship, Lara has been in charge of organising and lecturing in an introductory course on infectious diseases epidemiology and public health surveillance in Denmark, for international master students studying in Scandinavian countries. The exchange program is organised by the Danish Institute for Study Abroad (DIS). Lara planned and taught a broader lesson than the previous years, introducing the students to the European public health network of professionals and institutions, and showing the link between national and European surveillance systems. The DIS Director appreciated the wider focus on EU public health surveillance, and the presentation of European Centre of Disease Control and Prevention (ECDC) to the students. She then organised the supplementary visits for the students at SSI including also a wider focus on an original and relevant project managed by colleagues at SSI, and included a visit to the Danish Biobank, situated at SSI. The students had the chance to get to know and understand the unique reality of the Danish health care system, and the perspective and the importance of innovative research activities at SSI.

Role and outputs: Lara led four master students' lessons in the two years. She improved collaboration with DIS introducing two extra yearly lessons held at SSI. She was the main organiser, and together with fellows and colleagues, she prepared materials and lectured. The DIS students and teacher responsible for the students learning program gave positive feedback; they contacted Lara to ask to continue the lessons next year, so she will hand over to SSI colleagues and the next EPIET fellow. Lara wrote a report on the lessons evaluation (7).

Supervisor: *Kåre Mølbak, Infectious Diseases Epidemiology Department, Statens Serum Institut.*

Educational outcome:

I learned to work in a team with different professionals and levels of expertise, for the benefit of my own knowledge. I also learnt how to plan, target the material for the audience for a three-day course on infectious disease epidemiology and to independently lead a lesson. Preparing the materials for the lessons and taking an active part in my colleagues' lessons, allowed me to deepen my knowledge on the topics covered. Teaching the master students produced a positive outcome from organising and delivering lessons, since I was asked to host the students two more times per year. The new lessons were positively received and the DIS asked to continue them for the next year. I gained confidence and improved my presentation skills.

6. Other activities

Trainings attended

- Preparation for primary departure course - MSF, Bonn 31st March to 5th April 2016.
Content: intensive and basic training on every aspect of life (focus on safety and security) as a MSF worker in the field.
- Better Training Safer Food, Chafea, Rome 10th - 14th of October 2016.
Content: food and water borne outbreak investigation at EU and International level. Main aspects and priorities for the EU Member States.

International conferences attended

- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 11-13 November 2015, Stockholm, Sweden
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 28-30 November 2016, Stockholm, Sweden
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 06-08 November 2017, Stockholm, Sweden
- Global EU Infectious Diseases Conference in Paris, 07 - 09 September 2017.

Other research projects

- Burden of influenza in older adults in Denmark, 2010-15. Research project.
- Trends in pertussis in Denmark over the last 15 years using available national laboratory surveillance data. Research project.

Other activities

- Weekly EPIET/EUPHEM forum and journal club at Statens Serum Institut
- Weekly infectious diseases department meeting presentations at Statens Serum Institut
- 2 days visiting the emergency WHO EU-regional office. January the 22nd and September the 7th, 2017.

7. EPIET/EUPHEM modules attended

1. EPIET/EUPHEM Introductory Course, 28/09/2015 to 13/10/2015, Spetses, Greece.
2. EPIET/EUPHEM Outbreak module, 07/12/2014 to 11/12/2014, Berlin, Germany.
3. EPIET/EUPHEM Multivariate analysis module, 14/03/2016 to 18/03/2016, Vienna, Austria.
4. EPIET Rapid Assessment in complex emergency Situations, 20/06/2016 to 25/06/2016, Athens, Greece.
5. EPIET/EUPHEM Project review, 22/08/2016 to 26/08/2016, Lisbon, Portugal.
6. EPIET Time series analysis module, 07/11/2016 to 11/11/2016, Bucharest, Romania.
7. EPIET Vaccinology module, 12/06/2017 to 16/06/2017, Stockholm, Sweden.
8. EPIET/EUPHEM Project review, 28/08/2017 to 01/09/2017, Lisbon, Portugal.

8. International mission(s)

In response to the request for assistance in the Yellow fever vaccination campaign in Angola from GOARN in March 2016, I successfully participated the selection process for fellows. Due to concomitant involvement in the investigation of an outbreak in Copenhagen, the mission deployment was postponed for further support if needed.

Supervisor's conclusions

It has been a pleasure to host Lara Ricotta for the fellowship. We have been working closely together on the projects, and I am certain that the entire team benefited from the hard work of Lara. The nationwide surveillance system for peri-prosthetic joint infections following total hip arthroplasty is now functioning as a daily routine. The system has been well received by the hospitals, and we plan to launch a similar system for knee replacement surgery in the fall of 2017. Clearly, the work of Lara was of importance in this respect. However, the activity that stands out as her most significant contribution was the project on methods to determine effectiveness of pertussis vaccination. The project can be characterised as a journey with iterations of reformulations of the scientific question. Lara became acquainted with many epidemiological methods – all aimed to determine vaccine effectiveness. We learned that well-established methodologies have their limitations, which obvious questions related to a multi-dose vaccine schedule was more or less ignored in the existing literature, and that it is important to continue to ask critical questions.

Lara has also been very active in training and teaching activities, including the welcoming of new students and maintaining the EPIET/EUPHEM environment at the institute. She was part of organization a course in Infectious Disease Epidemiology. This course was well-received and we plan to repeat it. The course represent another lasting outcome of the fellowship.

Coordinator's conclusions

Lara entered the fellowship with well-developed skills as a public health physician, and has made significant contributions to improving surveillance of hospital acquired infections in Denmark. She has shown tremendous enthusiasm for expanding her own knowledge and abilities by taking on challenging epidemiological issues in diverse disease areas. She has applied herself to strengthening her analytical capacity as an epidemiologist through a comparison of methods to estimate vaccine effectiveness of a multi-dose childhood vaccine. Her supervisors have been extremely supportive of her learning, and she has had access to personal expertise as well as outstanding data sources in her training site. Lara has shown a real commitment to training and to the collegial spirit of the fellowship, and I wish her continued success in her future career in public health.

Personal conclusions of fellow

The programme was a unique opportunity to deepen my knowledge and experience in infectious disease epidemiology. The EPIET fellowship gave me the opportunity to work with very experienced and inspirational colleagues, researchers at the site, coordinators, supervisors and fellows. It allowed me to work on different public health projects; in particular, I had the unique chance to work with the population registers available in Denmark, source of individual data for epidemiology research.

I could also conduct outbreak investigations and to gain confidence in scientific writing and delivering presentations. I highly appreciated the training modules that allowed me to apply the knowledge gained in my national and international projects in a learning-by-doing manner. The programme is not just a work experience is also an international network of public health specialists. The network strengthen collaborations between people and so countries, with the aim to enhance international surveillance and response. I am very glad to have had the chance to benefit from the programme.

Acknowledgements

I would like to thank Dr Kåre Mølbak, Dr Steen Ethelberg, Dr Palle Valentiner-Branth, Tyra Grove Kraus, Peter Andersen, Sophie Gubbels and all the Infectious Disease Epidemiology Department at Statens Serum Institut for giving me the opportunity to work on relevant projects, participate scientific discussions and giving me guidance for my fellowship. The work environment at SSI is excellent and motivational.

Thank you to my partner for supporting me during the fellowship. I would also like to thank Lisa Hansen for supporting my development as a field epidemiologist throughout the last two years. A special thanks to the entire EPIET programme. I am very grateful about all the opportunities, trainings, courses and meetings attended during the fellowship. Finally, a big thank you to all my co-fellows in Copenhagen and to my cohort, cohort 2015, a unique and fantastic colleagues' network and friends, you made the last two years such a valuable and unforgettable time.

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