



FELLOWSHIP REPORT

Summary of work activities

Robert Whittaker

Intervention Epidemiology path (EPIET)

Cohort 2018

Background

The European Centre for Disease Prevention and Control (ECDC) Fellowship Training Programme 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.

The 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.

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;
- To develop a European network of public health epidemiologists who use standard methods and share common objectives;

The views expressed in this publication do not necessarily reflect the views of the 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, July 2017

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- 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

Rob completed a bachelor's in biomedical science and a postgraduate diploma in public health at the University of Otago, Dunedin, New Zealand. He spent several years working at the ECDC in Stockholm, Sweden, focusing predominantly on the surveillance of vaccine preventable diseases, and completed a Masters in Global Health at the Karolinska Institute. Rob gained further experience as a research facilitator at the University of Southampton, England, as an intern in influenza surveillance at WHO, Geneva, and as an epidemiologist deployed with the WHO Global Outbreak Alert and Response Network to Guinea during the Ebola outbreak in 2015.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 11 September 2018, Robert Whittaker started his EPIET fellowship at the Norwegian Institute of Public Health (FHI), Oslo, Norway, under the supervision of Hilde Kløvstad. 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.

Fellowship projects

1. Surveillance

Title: Monitoring progress towards the first UNAIDS 90-90-90 target in key populations living with HIV in Norway

In line with the first of the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 goals, Norway aims for at least 90% of all people living with HIV (PLHIV) to know their HIV-status by 2020. Norway is a low HIV prevalence country with a longstanding surveillance system. Diagnoses have declined in recent years, driven by decreases among both Norwegian-born men who have sex with men (MSM), and heterosexual migrants who acquired HIV before migration to Norway. However, no robust, recent estimates of the total number of PLHIV and undiagnosed fraction had been calculated for Norway. We estimated the number of PLHIV and undiagnosed fraction among HIV-1-positive ≥15-year-olds in Norway in 2018, overall and in key subpopulations, using both the ECDC HIV modelling tool (with and without a proxy for CD4 count based on Danish surveillance data) and Spectrum AIDS Impact Model.

Estimates of the overall number of PLHIV using different approaches aligned at approximately 5,000. The number undiagnosed decreased continuously from 2007. The proportion undiagnosed excluding the CD4 proxy was 7.1%, and 10.2% including the proxy. This difference was driven by heterosexual migrants. For Norwegian-born MSM, migrant MSM and Norwegian-born heterosexuals, estimates with and without the CD4 proxy were similar. In these subpopulations, the number of new infections was <30 in 2018, and the number undiagnosed decreased in recent

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

years. Norwegian-born MSM had the lowest number of undiagnosed infections (n=45) and undiagnosed fraction (3.6%).

Results allow cautious confidence in concluding that Norway has achieved the first UNAIDS 90-90-90 target, and clearly highlight the success of prevention strategies among MSM. Estimates for subpopulations strongly influenced by migration remain less clear, and future modelling should appropriately account for all-cause mortality and out-migration, and adjust for time of in-migration.

Role and outputs: *Principal investigator*

Rob wrote the protocol, prepared and analysed surveillance data with the ECDC HIV modelling tool and Spectrum, facilitated collaboration between UNAIDS, ECDC, Statens Serum Institut and FHI, and presented results to external stakeholders. As the ECDC HIV modelling tool used Danish CD4 count data, Rob conducted a similar analysis for Denmark. Rob presented a poster at ESCAIDE 2019 (1), and was the lead author on a manuscript (2).

Supervisor(s): *Hilde Kløvstad*

Title: *The European Men who have sex with men Internet Survey 2017: Norwegian results*

EMIS-2017 (European Men who have sex with men (MSM) Internet Survey), is a cross-sectional internet-based survey conducted among MSM in 50 participating countries in 2017. The purpose of the study was to increase knowledge about MSM sexual health, mental health, risk behaviour, substance use, social support and use of healthcare services in order to better target preventive measures. Respondents were recruited from national and international sources via advertising on social media sites, websites and dating apps.

We analysed EMIS-2017 data from 2,728 respondents living in Norway. Among those who reported intercourse with a non-steady partner during the last year (n=1436), 44% had had unprotected intercourse with a non-steady partner whose HIV status they were not aware of. Twenty-four percent of respondents had never received the result of an HIV test, while 25% said they had never been tested for a STI other than HIV. Seven percent had used stimulant drugs to increase sexual pleasure during the past year. Among respondents who lived with HIV, 92% had an undetectable viral load at their last HIV check.

Results highlight the importance of further developing and targeting health promotion and preventive work in the MSM population in Norway. Health care providers, public health agencies and organisations working to promote the health of the MSM population should; continue to promote condom use, uptake of PEP and PrEP, testing for STIs/HIV and vaccination for hepatitis A and hepatitis B; ensure that people newly diagnosed with HIV receive necessary information and access to psychosocial support; enable better communication and greater openness about HIV status and PrEP use before or during sex; strengthen efforts to reduce substance abuse; and continue to work to ensure that the LGBT community feel safe and included in Norwegian society.

Role and outputs: *Principal investigator*

Rob managed data and conducted analysis for all chapters, drafted chapters 3, 4 and all comparisons between groups across chapters 3 – 8, drafted the executive summary, limitations and comparison with EMIS-2010, revised the report in collaboration with co-authors, presented results to external stakeholders, and published a national report (and related news item) (3). Rob also prepared and analysed Swedish EMIS data and produced outputs for all chapters of the Swedish EMIS-2017 report, at the request of the Public Health Agency of Sweden.

Supervisor(s): *Hilde Kløvstad*

Title: *Surveillance of hospitalisations, intensive care admission and deaths due to COVID-19, Norway*

Testing for SARS-CoV-2 was established on 23 January in Norway and the first case of COVID-19 was confirmed on 26 February. FHI is monitoring the pandemic in Norway, and has developed surveillance systems for hospitalisations, intensive care admission and deaths due to COVID-19. For hospitalisations and intensive care admissions, the Norwegian intensive care and pandemic registry was established. All hospitals and intensive care units in Norway report cases with demographic information, underlying risk factors, reason for admission, treatment and outcome. All COVID-19 associated deaths are notified to the public health institute by municipal medical officers. The data reported include demographics, date and place of death, hospitalisation and underlying chronic conditions. FHI regularly receives updated information from the cause-of-death and population registries, allowing any COVID-19 associated deaths not notified to FHI to be identified, and additional information on the underlying cause of death to be collected. FHI publishes these data in daily and weekly updates.

Role and outputs: *Co-investigator*

Rob contributed to the development and coordination of national surveillance systems for hospitalisations, intensive care admissions and COVID-19 associated deaths, including the inclusion of these data sources in a national preparedness registry (Beredt C19), established in response to the COVID-19 pandemic. For hospitalisations and intensive care admissions, Rob supported case-based data collection by validating test datasets, resolving data transfer issues, and contributing to the development of scripts to automate data analysis. For COVID-19 associated deaths, Rob supported the development and management of the surveillance system, including integrating information from the cause-of-death registry and population registry. Rob has coordinated the analysis and interpretation of surveillance data for daily (4) and weekly (5) reports, and has coordinated reporting COVID-19 associated deaths to WHO EURO.

Supervisor(s): *Ragnhild Tønnessen*

Competencies developed:

My surveillance projects allowed me to build on previous experience, through hands-on experience setting up and managing national surveillance systems, as well as exposure to new disease groups and methods such as second-generation surveillance (EMIS) and modelling using surveillance data (HIV). The COVID-19 outbreak has provided many learning opportunities in establishing new surveillance systems, both in administrative and scientific terms. I further developed competencies in protocol development, project coordination, data management, manuscript writing, surveillance report writing, conference presentation and formulating public health recommendations.

2. Outbreak investigations

Title: Outbreak of listeriosis caused by consumption of raw fermented trout, Norway, 2018 to 2019

In December 2018, the National Reference Laboratory for Enteropathogenic Bacteria (NRL) at FHI reported a whole genome sequencing (WGS) cluster of five cases of *L. monocytogenes*. We investigated the outbreak to identify its source in order to implement control measures and prevent further cases. Cases following the initial alert were reported to the NRL as part of routine reporting. Cases were interviewed with a standardised questionnaire to gather information on demographics, symptoms and exposures. The outbreak team sampled leftovers and unopened packages of commonly identified food exposures, and the laboratory performed WGS of all clinical and food *L. monocytogenes* isolates.

We identified thirteen cases, (77% male, median age: 74 years (range 53 – 90)). Twelve cases were diagnosed from five municipalities in Eastern Norway, and one case in Sweden. The index case was sampled in February 2018. The remaining 12 cases were sampled between November 2018 and January 2019. Twelve cases reported eating rakfisk from Norway prior to illness. No other common exposures were identified. Rakfisk samples provided by four cases, originating from a single producer in Norway, were positive for the outbreak strain.

The outbreak investigation indicated that rakfisk from a specific producer in Norway was the source of infection. The product was recalled in January 2019; no cases were reported thereafter. Environmental sampling in May 2019 found positive samples for the outbreak strain in the production environment, and filleted fish. Case distribution by sampling date suggests that *L. monocytogenes* was introduced into the production line prior to February 2018, followed by continued environmental and food contamination. All cases belonged to known risk groups for listeriosis, despite targeted advice from health authorities and package warnings. This outbreak illustrated the ongoing need to raise awareness of *Listeria* infection for populations at increased risk for serious outcomes, and clear communication that rakfisk consumption carries a risk for listeria exposure.

Role and outputs: *Co-investigator*

Rob communicated with municipality medical officers, collated and analysed data from exposure questionnaires, collaborated with the food safety authority and veterinary institute, and facilitated contact with colleagues in Sweden on a case diagnosed there. He wrote the outbreak report and presented a poster at ESCAIDE 2019 (6).

Supervisor(s): *Heidi Lange*

Title: Outbreak of norovirus after university student's seafood industry day, Bodø, Norway, November 2019

On Saturday, 23 November 2019, FHI was notified by the municipality medical officer in Bodø of a suspected outbreak of gastroenteritis following a university student's seafood industry day on 21 November 2019. An estimated 250 guests attended the event. A retrospective cohort study was conducted, and attendees were invited to complete a

questionnaire on demographics, symptoms and timing of illness, and food consumption during the event. The questionnaire was sent to 145 people, of which 118 people answered. The food safety authority tested samples of leftovers from the event.

The analysis was based on 103 respondents, 39 cases and 64 non-cases. The median age of the 103 respondents was 22 years (range 18 – 63), and 57 were women (55%). There were no differences in the age or gender distribution between cases and non-cases. Five guests (all non-cases) only attended the lunch, 33 guests (12 cases) only attended the dinner, and 65 guests (27 cases) attended both events. None of the dishes served at lunch were associated with illness. Univariable analysis of the dishes from the dinner showed a higher relative risk (RR) of illness among those who reported eating oysters, ponzu sauce, crayfish/crab/shrimp and mussels/scallops (p value <0.05). The highest relative risk was for oysters (RR=31.6 [95% CI: 4.5 – 220.6]), with an attack rate of 72% among those exposed. In a subsequent multivariable analysis, only consumption of oysters was associated with illness (RR=5.9 [95% CI: 2.5 – 14.0]). Norovirus genotype I was detected in two samples of oysters that were served for dinner. In view of the epidemiological and microbiological evidence, this outbreak was most likely caused by norovirus in oysters. This outbreak highlights the importance of good food preparation and handling, specifically the thorough cooking of shellfish.

Role and outputs: Co-investigator

Rob developed the cohort study questionnaire, analysed the data and wrote the outbreak report.

Supervisor(s): Heidi Lange

Title: Outbreak of COVID-19 in Norway, 2020

Testing for SARS-CoV-2 was established on 23 January in Norway and the first case of COVID-19 was confirmed on 26 February. In Norway, a case of COVID-19 was defined as a person with laboratory confirmation of SARS-CoV-2. For the first six weeks of the outbreak in Norway, all confirmed cases were reported by telephone to FHI, and notified in the national surveillance system (MSIS). A separate database was set up for cases notified by phone: each case was assigned a unique identifier, and information on age, sex, place of infection, type of exposure, symptom onset, date of testing and hospitalization were collected. Phone notification of COVID-19 cases was stopped with the advent of timely reporting to MSIS across the whole country, and reduced need for detailed information on type of exposure. For cases reported up to 9 March, the notifying municipality medical officer also filled out a detailed case report form on underlying risk factors, clinical picture, treatment, travel details and additional exposures, including occupation. During the first few weeks of the outbreak, FHI also facilitated contact tracing on flights, by acting as liaison between municipality medical officers and airlines.

Role and outputs: Co-investigator

As a member of the outbreak management team, Rob registered COVID-19 cases notified by telephone to FHI, contributed to the ethics application, Data Protection Impact Assessment (DPIA), analysis and co-authored a manuscript on the first six weeks of the outbreak in Norway (7). Rob was involved in contact tracing on flights, collecting passenger lists from airlines, determining close contacts of confirmed cases and reporting back to municipal medical officers in contacts' municipality of residence.

Supervisor(s): Emily MacDonald

Competencies developed:

Through involvement in the above-mentioned investigations, I became familiar with the steps of an outbreak investigation, and developed competencies in the development of questionnaires, outbreak data analysis, outbreak report/manuscript writing and conference presentation. As part of the COVID-19 outbreak I was also involved in active case investigation and contact tracing.

3. Applied epidemiology research

Title: Treatment uptake and health outcomes of hepatitis C infection in Norway, 1990 – 2030: monitoring progress towards the goal of eliminating hepatitis C as a public health threat

Following the global goal of eliminating viral hepatitis as a public health threat by 2030, the Norwegian national strategy against hepatitis aims to reduce the incidence of hepatitis C in Norway by 90%, and to eliminate serious illness or death due to hepatitis C infection by 2023. Modelling studies have estimated the burden of hepatitis C in Norway in some subpopulations; however, the actual number of treatment prescriptions, cases of HCV-related liver

cancer, liver transplants and death among those diagnosed with HCV have not been calculated using available data sources. We conducted a registry linkage study, using data from six registries (MSIS, cancer registry, prescription registry, Nordic Liver Transplant Registry, cause-of-death registry and population registry) to describe treatment uptake and health outcomes of HCV infection in Norway from 1990 – 2030.

The first analysis will be on data from 1990 – 2018, and as of the end of the fellowship the researchers were waiting to receive the final linked dataset from the registries.

Role and outputs: *Principal investigator*

Rob wrote the research protocol, submitted an application for ethics review to the regional research ethics committee, contributed to the DPIA, and prepared the data access request for the registries.

Supervisor(s): *Hilde Kløvstad*

Competencies developed:

I developed competencies in designing and coordinating registry linkage studies, including protocol development, and the writing of ethics applications, DPIAs, and data access requests.

4. Communication

Publications in peer reviewed journals

Two manuscripts (2, 7).

Conference presentations

Two poster presentations at ESCAIDE 2019 (1, 6)

Other presentations

Presented the results of modelling the HIV epidemic in Norway at an HIV modelling workshop at ECDC in Stockholm, 20 – 22 March 2019.

Presented the results in the Norwegian EMIS report at a Nordic meeting on HIV prevention in Oslo, 20 September 2020.

Reports

Three surveillance reports (3, 4, 5)

Other

Eight internal weekly reports as epidemic intelligence duty officer.

5. Teaching activities

Title: Case-study facilitation at FHI course on outbreak investigation

In April 2019, FHI held a one-day course in outbreak investigation with a focus on One Health as part of their Annual Infection Prevention Conference. The course centred on a case-study of a foodborne outbreak, which followed presentations on different elements of outbreak investigation by FHI. Participants were municipality medical officers and employees of the food safety authority, veterinary institute and FHI. Rob reviewed the case-study and was a facilitator during the course.

Supervisor(s): *Emily MacDonald*

Title: Lecture at Vrije Universiteit Amsterdam

In November 2019, five fellows from Cohort 2018 organised a seminar for MSc students in Health Sciences from Vrije University (VU), specialising in public health & infectious diseases, and 2nd/3rd year BSc students from Amsterdam University College. The aim of the seminar was to introduce students to the surveillance and control of infectious diseases and other cross border health threats or issues of public health concern in Europe. Rob gave a 15-minute lecture on "Monitoring progress towards a new global elimination goal: The example of hepatitis C in Norway". After the lecture, a Q&A session was held on careers in the field of infectious disease epidemiology & public health, during

which each fellow presented their background. Approximately 30 students participated in the seminar. Considering the aim of the session, the fellows did not consider that a subsequent formal evaluation of students' knowledge was appropriate. However, informal feedback was given by a lecturer at the VU.

Supervisor(s): *Hilde Kløvstad*

Title: *Lecture, case-study and practical facilitation at the University of Gothenburg*

The Nordic Education in Prevention and Control of Communicable Diseases and Health Care-Associated Infections (in Swedish: Nordisk utbildning i Smittskydd och Vårdhygien) is a one-year masters programme run by the University of Gothenburg. Students are health-care professionals from a Nordic country, with at least two years of work experience. Course 2 in the programme is "Infectious disease epidemiology and vaccinology". As part of this course, Rob developed a lecture on "The surveillance of infectious disease and development of surveillance systems", and designed an accompanying case-study on "The development of a surveillance system for non-cholera *Vibrio* infections in Norway", including facilitators notes, wrap-up slides and evaluation form. Rob also developed questions for and facilitated a practical session on surveillance data interpretation based on data from the ECDC Surveillance Atlas of Infectious Diseases, and facilitated a half-day practical session on excel (e.g. use of formulas, pivot tables, formatting datasets).

Thirty-two students attended the course. The lecture and the practical session on surveillance data interpretation were conducted in plenary and took two hours and one hour respectively. The case-study involved group work and a wrap-up/evaluation in plenary and took half a day. The results of the evaluation indicated that students felt like they had enough background information to generate discussion in the case-study and had enough time to discuss the questions in the case-study. The majority of students felt they achieved the learning objectives in the case-study.

Supervisor(s): *Hanne-Merete Erisken-Volle*

Educational outcome:

These teaching activities allowed me to gain valuable experience in the development and delivery of teaching material for epidemiology. The activities were enjoyable, and it was valuable for my own understanding of the subject area to develop the material, especially in collaborating and coordinating with other colleagues. I learnt the importance of concretely understanding the target audience in developing teaching material and of good preparation, particularly with regards to ensuring the clarity of the SOCO and time management, and in adapting the teaching approach to unforeseen practical challenges.

6. Other activities

- Four two-week periods as epidemic intelligence duty officer
- Reporting of national data to ECDC as part of 2020 Dublin Declaration reporting
- Reporting of national data to UNAIDS as part of the 2020 UNAIDS HIV estimates process
- Prepared and presented (at least) one internal daily national and global COVID-19 epi, media and literature update per week, February – March 2020
- Responding to COVID-19 related inquiries to FHI from journalists and the general public
- Verification of English translations of COVID-19 news articles to go on the FHI website

7. EPIET/EUPHEM modules attended

1. Introductory course, 23 September 2018 – 12 October 2018, Spetses, Greece
2. Outbreak investigation, 3 – 7 December 2018, Berlin, Germany
3. Multivariable analysis, 25 – 29 March 2019, Madrid, Spain
4. Rapid outbreak and surveys, 13 – 18 May 2019, Zagreb, Croatia
5. Project review module, 26 – 30 August 2019, Prague, Czech Republic
6. Time series analysis, 4 – 8 November 2019, Utrecht, Netherlands
7. Vaccinology, 4 May – 24 June, Online, country

- a. Institute Pasteur, SPOC (Small Private Open Course), 4 May – 12 June 2020, online.
- b. Rijksinstituut voor Volksgezondheid en Milieu (RIVM), facilitated sessions, 22 – 24 June 2020, Online Module.

Supervisor's conclusions

Rob has been an EPIET fellow at Department for Tuberculosis, Blood Borne and Sexually Transmitted Diseases at the Norwegian Institute of Public Health with myself as a department director, site supervisor and supervisor for many of Robs projects. Since November 2019 the Institution went through a reorganization and this department became part of a bigger department also including vaccine preventable diseases.

Rob has been working on a variety of projects during these (almost) two years using different epidemiological methods and approaches from mathematical modelling, register coupling, big online cross-sectional studies, outbreak investigations and setting up new national surveillance systems for hospitalisations, intensive care admissions and COVID-19 associated deaths.

Rob was already very experienced with epidemiological methods and data handling and analyses when entering the EPIET program. He has shown good in-depth knowledge to epidemiological methods and a strong will and interest to learn more and solve new epidemiological challenges – always driven by the aim to contribute to something useful that would address actual public health needs. His choice of projects is an example of this; for the first time Norway has been able to document our progress towards the 90-90-90 target for HIV and is on good track to document our progress towards reaching the hepatitis elimination goals. Robs contribution has been invaluable in this field.

Rob is polite, friendly, enthusiastic, efficient and energetic focusing both on the details and the broad picture. He is a team player and works well independently. No task is too big or small - ranging from routine register work to taking on project leadership which he does very well.

It's has been a pleasure to be Robs supervisor these two years. He has brought knowledge, enthusiasm, good atmosphere, but most of all important high-level epidemiological work to the Norwegian Institute of Public Health.

Coordinator's conclusions

It has been a pleasure working with Rob, both personally and professionally, during his fellowship. He has consistently demonstrated enthusiasm for his own learning, and it is gratifying to see that his contribution to FHI has been so highly valued. Rob has been able to expand his own knowledge of communicable disease epidemiology, and his technical skills, thanks to his placement in a supportive training site with many opportunities. More importantly, Rob has recognised that the fellowship is a launching pad for his public health career, which will involve continuous learning as well as sharing his expertise and enthusiasm with others. Rob's willingness to contribute to a team effort will ensure his future success, and a continued benefit for public health capacity in Norway.

Personal conclusions of fellow

EPIET has been an immensely enriching experience. I came into the programme with a relatively solid background in disease surveillance (predominantly on an international level) and some experience in research and outbreak investigation. I was looking to further develop the areas I knew well and fill gaps in my competencies, as well as work in a new setting and on a wider range of diseases. I feel as though I have had the opportunity to do this within the fellowship programme. At FHI, I have been able to work on new areas of surveillance and been involved with a variety of different outbreak investigations. While my research project did not get beyond applying for access to the data from the registries, the process of setting up this study has been a valuable learning experience. Developing and delivering teaching materials was a particularly rewarding and enjoyable part of the programme, and one that I will certainly look for opportunities to engage myself in in the future. The modules provided a good theoretical basis and complemented the work conducted at the site. Being an EPIET fellow at FHI provided the right opportunities for me to grow as a professional and I can only look back on the experience with fondness.

Acknowledgements

I would like to first and foremost extend my warmest and most heartfelt thanks to my site supervisor Hilde Kløvstad, who has been an exemplary supervisor and friend over the course of the last two years. She was always approachable, open to discussion, and an immense pleasure to work with and learn from. I would also like to extend my thanks to the different frontline coordinators I had throughout my fellowship, Biagio Pedalino, Marion Muehlen and Lisa Hansen, for all their guidance and support. A big thanks to Emily MacDonald for all her facilitation of the fellowship programme at FHI. I would also like to thank my other project supervisors for the opportunity and support they offered to work with such a wide variety of projects, as well as colleagues in the section for respiratory, blood-borne and sexually transmitted infections at FHI, particularly Øivind Nilsen and Hans Blystad. Lastly, thanks as well to FHI and ECDC for making the fellowship programme possible. One of the biggest drawcards of the fellowship

programme is the opportunity to learn and develop alongside other like-minded fellows, and Cohort 2018 was an absolute joy to be a part of both in terms of learning with and from each other, and as a lifelong group of friends.

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