EPIET & EUPHEM

Summary of work activities
Iris Finci
European Programme for Intervention Epidemiology Training (EPIET), 2019 cohort

Background

ECDC's Fellowship Programme is a two-year competency based training course offering two paths: the field epidemiology path (EPIET) and the public health microbiology path (EUPHEM). After the two-year training course, the graduates will have extensive expertise in applying epidemiological or microbiological methods to guide public health interventions for communicable disease prevention and control.

Both curriculum paths provide training and practical experience through a 'learning by doing' approach at acknowledged training sites across European Union (EU) and European Economic Area (EEA) Member States.

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

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

This report summarises the work activities undertaken by undertaken by Iris Finci, cohort 2019 of the Intervention Epidemiology path (EPIET) at the Baden-Württemberg State Health Office.

Pre-fellowship short biography

Iris Finci studied molecular biology in Croatia and Germany. She obtained her PhD in Life Sciences (bioinformatics) in Switzerland in 2016. Iris then joined Médecins sans Frontières, first in Geneva as data analyst and then as field epidemiologist in Sudan and Mozambique. During that time Iris worked in different areas of health: snake bites, cholera, malnutrition, HIV and tuberculosis. In 2019, she joined Research Center Borstel (Germany) where she coordinated an international project on the implementation of sequencing technology to diagnose drug-resistant tuberculosis.

Methods

This report accompanies a portfolio that demonstrates the competencies acquired during the EPIET fellowship by working on various projects, activities and theoretical training modules.

Projects included epidemiological contributions to public health event detection and investigation (surveillance and outbreaks); applied epidemiology field research; teaching epidemiology and the summary and communication of scientific evidence and activities with a specific epidemiological focus.

The outcomes include publications, presentations, posters, reports and teaching materials prepared by the fellow. The portfolio presents a summary of all work activities conducted by the fellow, with the exception of those prohibited for reasons of confidentiality.

Results

The objectives of these core competency domains were achieved partly through project or activity work and partly through participation in the training modules. Results are presented in accordance with the EPIET core competencies, as set out in the ECDC Fellowship Manual[1].

1. Epidemiological investigations

1.1. Outbreak investigations

Outbreak of Salmonella enterica serovar Bovismorbificans in Baden-Württemberg, October 2019 - January 2020

Supervisors: Stefan Brockmann

In October 2019, multiple states in Germany detected an increase in Salmonella Bovismorbificans infections. Outbreak investigation was initiated in collaboration with the national public health agency in order to find the source and prevent further infections. Case finding was intensified using national notification data. Exploratory interviews were conducted and shotgun questionnaires completed. Most isolates were sent to the National Reference Laboratory for Whole Genome Sequencing (WGS). In Baden-Württemberg, 36 cases were detected. The cases were spread across the state. Interviews pointed to pork meat as 96% of all interviewees ate pork in the week prior to symptom onset, and 73% ate ham. WGS detected three distinct clusters of infections, leading to a hypothesis of potential contamination in a meat production facility. However, sequencing took 3−4 weeks, which was not helpful for rapid investigation. Despite the fact that one sample of pork meat had 0 AD from one of the outbreak clusters, the source of the outbreak could not be found. As the outbreak slowed down and the COVID-19 pandemic started, the outbreak investigation was stopped, without finding the source of infections. This outbreak investigation illustrated various limitations that can occur, in particular as regards finding the exact food source.

Iris was a co-investigator. She investigated the outbreak, discussed the interview content, supported the conduct of exploratory interviews, collected and analysed data, exchanged information with the food authorities and other public health authorities and wrote the outbreak report.

Response to COVID-19 pandemic in Baden-Württemberg

Supervisors: Stefan Brockmann, Christiane Wagner-Wiening

Iris was part of the epidemiology and health protection team that responded to the COVID-19 pandemic in Baden-Württemberg. The activities conducted by the team included evaluation of the epidemiological situation based on surveillance data analysis and resulting recommendations; management of COVID-19 outbreaks; discussions on prevention measures to be implemented in the state of Baden-Württemberg; participation in various meetings within the institute with the relevant stakeholders and weekly meetings with other German states.

Iris was a co-investigator, she performed multiple literature reviews, she was involved in two COVID-19 outbreaks and their management and she actively participated in the analysis of COVID-19 surveillance data and discussed the implications of the results. She also contributed to the discussions on various policies. As the only person literate in R (statistical analysis) at the time, she wrote the majority of the daily reporting analysis script (see below). In addition, she was involved in two studies that were published in peer-reviewed journals, one describing transmission of SARS-CoV-2 in schools, and one describing outbreaks in the state of Baden-Württemberg.

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[1] European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2020. Available from: https://www.ecdc.europa.eu/en/publications-data/ecdc-fellowship-programme-manual-cohort-2021

Investigation of the last cluster of Ebola virus disease cases in eastern Democratic Republic of Congo, April to May 2020

Supervisors: Mory Keita

On 10 April 2020, two days before the declaration that the tenth Ebola epidemic in the Democratic Republic of Congo was over, a new confirmed case was notified in the city of Beni, the last epicentre of the epidemic. This case led to a cluster of seven cases of Ebola virus disease (EVD) in total, and these were the last cases in tenth Ebola epidemic. In a descriptive study, we reported on how the outbreak started and evolved, the challenges faced and the prevention measures implemented to halt the outbreak and end the epidemic.

Iris was a co-investigator, she analysed the data, discussed the outbreak with other co-investigators and wrote the manuscript.

Outbreak of Ebola Virus Diseases in Equateur Province, Democratic Republic of Congo (WHO GOARN deployment)

Supervisors: Mory Keita

The eleventh Ebola outbreak in the Democratic Republic of Congo was declared on 1 June 2020 in the Equateur Province, close to the border with the Republic of Congo. In total, 130 cases (119 confirmed and 11 probable) with 55 deaths were reported across 13 health zones of Equateur Province. Under the leadership of the Ministry of Health, and the World Health Organization (WHO), and together with other partners, a coordinated rapid response was implemented to limit the spread of the outbreak.

As the deployment was late in the outbreak, the main activities of the fellow focused on data analysis, capacity building and planning of the post-Ebola 90-day period. The fellow provided technical support for the analysis of different pillars of the outbreak response and helped to write the final reports summarising the outbreak and response activities. The fellow also participated in the multidisciplinary analytical cell where she actively engaged in discussions and data analysis planning with other partner organisations. The fellow also provided technical support to strengthen surveillance during the 90-day period of enhanced surveillance activities when the probability of hidden chains of transmission is still high. During this period the fellow actively engaged with the Ministry of Health and performed capacity building for surveillance data analysis. The fellow also participated in the epidemiological field investigations (i.e. re-analysis of chains of transmission by re-reading the reports and using WGS data to re-orient the investigations in order to find the missing links in the outbreak.)

Training modules related to assignment/projects
EPIET/EUPHEM Introductory Course
This module familiarised the fellow with the principal concepts of outbreak investigation, in particular the 10 steps of the outbreak investigation, different study designs and data analysis.

Outbreak Investigation Module
This module builds on knowledge gained in the introductory course, going into more depth for each of the 10 steps of the outbreak investigation with various examples using case studies, lectures, presentations, etc.

Educational outcome
Prior to joining EPIET, Iris had no experience of outbreaks and outbreak investigations. During the fellowship as a result of the various projects mentioned above, Iris was able to participate in all the steps of an outbreak investigation. She also gained valuable field experience through local field visits for outbreak management of COVID-19 and through deployment with WHO GOARN in response to the Ebola disease epidemic. Throughout the fellowship, Iris progressively took on roles with increasing responsibility, reflecting the knowledge and experience gained.

1.2. Surveillance

Incubation time estimation and epidemiology of the COVID-19 outbreak in the first two weeks of the epidemic in Baden-Württemberg, South-Germany, February and March, 2020

Supervisors: Stefan Brockmann, Martin Eichner

In the beginning of COVID-19 pandemic, Baden-Württemberg was the German state with one of the highest COVID-19 incidence rates and total numbers of cases. Using early detailed data, we described the start of the epidemic in Baden-Württemberg during the first two weeks, focusing on the main characteristics of cases and their exposures. We also estimated the incubation time for COVID-19 using data from travellers and other cases with known exposure intervals.

We described 217 first cases of COVID-19, 93.4% of which were imported or import-associated cases. During this period there were many simultaneous introductions of SARS-CoV-2 in connection with travel, particularly skiing holidays. A total of 40 (18.4%) cases were asymptomatic, 158 (72.8%) had mild disease, 11 (5.1%) had severe

disease and for eight cases (3.7%), symptom information was not available. Four (1.8%) cases died. Based on 100 cases with exposure information available, 49.3% of cases have developed symptoms within four days of exposure, 73.4% within seven days and 97% within 10 days after exposure. We described first cases of COVID-19 in Baden-Württemberg, demonstrating how the majority of cases were imported or import-associated, mainly in connection with skiing holidays. Our estimate of the incubation time distribution confirmed the findings of previous studies. Based on our study and the estimates of other researchers, we advocated for the duration of quarantine to be shortened to 10 days.

Iris was the principal investigator. She conceived the study, collected and analysed the data and wrote the internal report. The results were also presented as a poster at the ESCAIDE 2020 conference.

Development of automated analysis of COVID-19 surveillance data
Supervisors: Stefan Brockmann, Christiane Wagner-Wiening

In a rapidly-evolving situation like the COVID-19 pandemic, timely data analysis and reporting is crucial. The results of such analysis are used to assess the situation and to inform policy-makers and relevant stake holders on how to manage the pandemic. The tool commonly used to do this is Microsoft Excel, however, it is less reproducible and prone to errors, particularly when the datasets become larger. For this reason the COVID-19 analysis was automated using R software. The analyses included daily numbers of cases, deaths, hospitalisations, calculation of seven-day incidence, analysis of outbreaks, detection of imported cases and source countries, detection and analysis of variants of concern, etc. The outputs of these analyses were used to provide daily and weekly situation reports to the public, to answer media questions and, most importantly, to provide policy-makers with data for them to be able to make evidence-based decisions. In addition, in order to construct a COVID-19 dashboard for Baden-Württemberg, automated scripts were created that aggregated and transformed the surveillance data so it could be displayed in the dashboard.

Iris developed multiple R scripts for automatic analyses of COVID-19 surveillance data. She also responded to multiple ad hoc requests for analysis from the media and policy-makers. She was actively engaged in designing and implementing the COVID-19 dashboard for Baden-Württemberg.

Introduction of Salmonella sp. serovars outbreak detection tool at the State Health Office Baden-Württemberg

Supervisors: Stefan Brockmann

One of the main objectives of surveillance systems is to detect outbreaks and changes in disease incidence in a timely manner in order to limit disease spread by implementing targeted prevention measures. At Baden-Württemberg's State Health Office there was a need to develop and implement an outbreak detection tool to strengthen *Salmonella* surveillance, as no such tool existed. Using an existing R package developed by ECDC to analyse surveillance time series from TESSy, Iris adapted the package to be used for *Salmonella* surveillance data. Surveillance data was downloaded once or twice per month and run using a customised R script to produce graphs for each *Salmonella sp.* serovar that occurred within a defined period of time. For each of these serovars, calculation was performed to determine whether the number of cases was higher than expected (using Farrington flexible algorithm). When cases were higher than expected, the alarm was raised. An assessment was then made as to whether an outbreak investigation should be conducted. Such a tool facilitates the routine analysis of *Salmonella* surveillance data and the detection of outbreak signals. The same tool could be used for other notifiable diseases (e.g. cryptosporidiosis).

Iris was the principal investigator. She conceived the study, adapted existing tools for outbreak detection, and implemented an automated tool for *Salmonella* serovar outbreak detection.

Training modules related to assignment/projects
EPIET/EUPHEM introductory course
This module introduced basic principle of infectious diseases surveillance, evaluation of surveillance systems and basic concepts of surveillance data analysis.

Time Series Analysis modules
This module provided the fellow with in-depth knowledge of how to use time series analysis to examine surveillance data for the detection of trends (e.g. outbreak signals).

Educational outcome
From the start of the fellowship, Iris was heavily involved in the analysis of infectious disease surveillance data as she had solid data analysis skills. With the start of COVID-19 she became the key person analysing the surveillance data and through that experience she further developed her analytical and problem-solving skills. She also developed additional analytical skills related to time series analysis by implementing a new outbreak detection tool.

2. Applied public health research

Risk factors associated with an outbreak of COVID-19 in a meat processing plant in Southern Germany, April - June 2020

Supervisor: Stefan Brockmann

Outbreaks of coronavirus disease (COVID-19) were prominent in meat processing plants around the world. Following one such outbreak in Baden Württemberg between April and June 2020, an outbreak investigation was conducted in order to analyse the risk factors involved in the infection spread.

The cohort of all employees was analysed and cases were defined as employees with either a positive PCR or ELISA (IgG) result.

Of 1 270 employees, 453 (36%) had evidence of SARS-CoV-2 infection. The highest attack rates were observed in the meat processing and slaughtering sectors. Multivariable analysis revealed that there was an increased risk of infection for sub-contracted employees (aRR: 1.43, 95%CI: 1.06-1.96) working in the meat cutting sector (aRR: 2.44, 95%CI: 1.45-4.48), slaughtering (aRR: 2.35, 95%CI: 1.32-4.45) and veterinary inspection (aRR: 4.77, 95%CI: 1.16-23.68). The sharing of accommodation or transportation were not identified as risk factors for infection in this outbreak.

The results suggest that the work place was the main risk factor involved in the spread of infection in this SARS-CoV-2 outbreak. These results highlight the importance of implementing preventive measures at meat processing plants. Face masks, distancing, staggered breaks, increased hygiene and regular testing for SARS-CoV2 were implemented at the plant and these measures helped to limit the outbreak, even though plant in question continued to operate throughout the outbreak.

Iris was the principal investigator. As part of the investigation and outbreak management, she visited the meat processing plant, supported data collection, performed data analysis and communicated the findings to the relevant stakeholders. She wrote a manuscript that has been accepted by a peer-reviewed journal.

Randomised controlled intervention study on usage of protective measures against hantavirus infection

Supervisors: Stefan Brockmann

Baden-Württemberg is endemic region for hantavirus (Puumala type). As there is no treatment for hantavirus, prevention measures are crucial for controlling infections. Despite the public health communication on prevention measures, during an outbreak year in Baden Württemberg there are still close to 1 000 infections. Therefore the aim of the project was to determine the impact of enhanced public health communication and increased awareness on the application of preventive measures against hantavirus infection in order to adjust future public health communication strategies on hantavirus. In a randomised control intervention study, two arms will be randomly selected from population registers for regions of Baden-Württemberg where hantavirus is highly endemic. At the beginning of the hantavirus infection season, the intervention arm will receive information material on the virus, infection and different prevention measures that can be applied. The control arm will not receive any information. At the end of the season, both arms will receive questionnaires on their practices concerning the prevention measures communicated in the information material. If the results show that enhanced communication increases the use of protective measures, there will be a recommendation to increase communication on protective measures in highly endemic areas during outbreak years.

Iris conducted the literature review, wrote the protocol for the study, designed the information leaflet to be shared with the study participants and developed the questionnaire for the study.

Risk assessment for West Nile Virus transmission in Baden-Württemberg, Germany

Supervisors: Christiane Wagner-Wiening, Stefan Brockmann

West Nile Virus (WNV) is an emerging pathogen whose primary vector is mosquitoes and whose reservoir hosts are wild birds. However, equids and humans (dead-end hosts) can also occasionally become infected. Around 80% of human infections are asymptomatic, 20% symptomatic and in rare cases (less than 1%) WNV infection leads to a serious condition. In Germany, the first detection of WNV was in wild birds in 2018 and the first five locally-acquired vector-borne human cases were detected in 2019. To date, WNV has not been detected in mosquitoes, birds, horses or humans in Baden-Württemberg. However, Baden-Württemberg is an area which is predisposed to WNV infection since the ecological conditions are suitable for circulation of the virus. Using ECDC's WNV risk assessment tool, we assessed the risk level of human transmission of WNV in Baden Württemberg in order to carry out public health actions appropriate for the estimated risk. Through expert and stakeholder interviews, we identified key people who needed to be involved in the multisectoral WNV working group and take part in preparedness planning. This study and report will be the basis for future policies on WNV preparedness in Baden-Württemberg.

Iris conducted the literature review, wrote the project proposal, identified relevant experts and stakeholders to be interviewed, prepared and conducted interviews and wrote a short summary of risk assessment.

Training modules related to assignment/projects

EPIET/EUPHEM Introductory Course
This module introduced the core concepts of operational research. It familiarised the fellow with key study designs, framing research questions and planning and writing study protocols. All this knowledge was applied to the design of the hantavirus study.

Multivariable Analysis Module
This module strengthened the analytical and statistical skills needed for detailed analysis of data. It introduced different regression models which the fellow applied in an analysis of the risk factors associated with COVID-19 infection at a meat processing plant.

Educational outcome:
Iris was involved in designing and writing project proposals for several studies: hepatitis E incidence in blood donors, COVID-19 antibody response, risk factors for COVID-19 infection at a meat processing plant, hantavirus intervention study and risk assessment for West Nile Virus. These provided good training on how to conceptualise and structure studies. By writing the protocol for the hantavirus intervention study and creating a questionnaire she further enhanced her skills in conceptualising studies and writing protocols. She developed communication material on hantavirus infection prevention to be shared with study participants and used by the Baden-Württemberg State Health Office to communicate infection prevention measures to the local population. She also strengthened her analytical skills by carrying out analytical studies of risk factors. Through the study assessing the risk of WNV transmission she gained experience in interviewing experts/stakeholders, summarising their input and discussing preparedness plans.

3. Teaching and pedagogy

Introduction to R statistical software for analysis of surveillance data training for the Provincial Ministry of Health, Mbandaka, Equateur, Democratic Republic of Congo

During her deployment with the World Health Organization's Global Outbreak Alert and Response Network (GOARN) in the Democratic Republic of Congo, Iris conducted capacity building activities as a part of a post-Ebola 90-day period. The Provincial Ministry of Health expressed a wish to learn about a statistical and data analysis program in order to use it for surveillance activities. Iris planned, designed and conducted a six-day course introducing R and basic data analysis to the members of the Provincial Ministry of Health. The training consisted of presentations followed by exercises and interactive discussions and demonstrations.

Multivariable analysis module for EPIET/EUPHEM cohort 2020, virtual

Iris facilitated two case studies focusing on logistic, binomial, Poisson and negative binomial regression. The format was 'flying facilitation', where facilitators were called whenever the fellows had questions about the case study. The facilitation was very interactive and it involved technical aspects such as how to use the statistical software, but also theoretical aspects on when to use which regression method and the statistical principles behind the methods.

Training modules related to assignment/projects

EPIET/EUPHEM Introductory Course
In this module the fellow learned about principles of adult education that she used when conducting teaching activities.

Educational outcome:
While designing and preparing the R course, Iris learned how to tailor the course to the target audience by taking into account the prior knowledge of the participants and purpose of the course. Iris also learned how to make the course more engaging in order to maximise the knowledge gained. To facilitate the EPIET multivariable analysis module, she had to re-assess and revise her own knowledge of the topic first, as the questions often address the basic concepts which are often overlooked. Iris learned how to give real-life examples based on her own experience (e.g. regression analysis) in order to illustrate how the fellows could use their new skills in routine work.

4. Communication

Publications related to the EPIET fellowship

1. Dressler A, **Finci I**, Wagner-Wiening C, Eichner M, Brockmann SO. Epidemiological analysis of 3,219 COVID-19 outbreaks in the state of Baden-Wuerttemberg, Germany. Epidemiol Infect 2021; 149: e101.

2. Ehrhardt J, Ekinci A, Krehl H, Meincke M, **Finci I**, Klein J, Geisel B, Wagner-Wiening C, Eichner M, Brockmann SO. Transmission of SARS-CoV-2 in children aged 0 to 19 years in childcare facilities and schools after their reopening in May 2020, Baden-Württemberg, Germany. Eurosurveillance 2020; 25.

3. **Finci I**, Siebenbaum R, Richtzenhain J, Edwards A, Rau C, Ehrhardt J, Koiou L, Joggerts B, Brockmann SO. Risk factors associated with an outbreak of COVID-19 in a meat processing plant in Southern Germany, April - June 2020, [accepted for Eurosurveillance]

4. Keita M, **Finci I**, Kalongo M et al. Investigation of the last cluster of Ebola virus disease cases in eastern Democratic Republic of Congo, April to May 2020, [in preparation].

Reports

1. Outbreak of *Salmonella enterica* serovar Bovismorbificans in Baden-Württemberg [internal report].

2. Incubation time estimation and epidemiology of the COVID-19 outbreak in the first two weeks of the epidemic in Baden-Württemberg, South- Germany, February and March [internal report].

3. Daily situation reports on COVID-19 (link to reports).

Conference presentations

1. ESCAIDE 2020: Risk factors associated with an outbreak of COVID-19 at a meat-processing plant in Germany, April 2020; oral presentation.

2. ESCAIDE 2020: Incubation time estimation and epidemiology of the COVID-19 outbreak in the first two weeks of the epidemic in Baden-Württemberg, South Germany, February and March, 2020; poster presentation.

Other presentations

1. German FETP weekly meeting: Responding to the 11th Ebola virus disease epidemic in Equateur Province, DR Congo; oral presentation.

Other activities

*   Communication piece for general public on experiences during the World Health Organization GOARN deployment (written together with a fellow from cohort 2019, Héloïse Lucaccioni) for the EPIET segment: Postcard from the field. Title: 'Responding to the Ebola outbreak in Equateur Province, Democratic Republic of the Congo'.

Other training modules

Not applicable.

5. Other activities

Not applicable.

6. EPIET/EUPHEM modules attended

1. Introductory course, 23/09 – 11/10/2019, Spetses, Greece

2. Outbreak Investigation, 9/12 – 13/12/2019, Nicosia, Cyprus

3. Multivariable Analysis, 20/04 – 24/04/2020, virtual

4. Project Review, 24/08 – 28/08/2020, virtual

5. Time Series Analysis, 25/01 – 29/01/2021, virtual

6. Rapid Risk Assessment, 27/04/2021; 05/05 – 06/05/2021, virtual

7. Vaccinology Module, 14/06 – 18/06/2021, virtual

8. Project Review, 23/08 – 27/08/2021

9. Multivariable Analysis Inject Day, 18/03/2021, virtual – excused.

7. Other training

Laboratory Module organised by the Robert Koch Institute, 7/06 – 8/06/2021, virtual.

Discussion

Coordinator's conclusions

This report summarises all activities and projects conducted by Iris Finci during her two-year EPIET fellowship (cohort 2019) as an EU-track fellow at the Baden Württemberg State Health Office in Stuttgart, Germany. Iris constitutes a great example of the qualities the EPIET programme seeks to convey and promote. She has clearly contributed with substantial support to the most pressing needs of the training site in helping to set up and support the surveillance of COVID-19, thereby taking the best advantage possible during this unique and challenging period. Her skills in R have been generously shared and spread at the training site and beyond. Despite her intense and long-term work with COVID-19 response activities, she has managed to work effectively across all competency domains. During the second year her contribution to the COVID-19 work in DR Congo was especially noteworthy. Here she applied many of the newly obtained skills in epidemiology and collaborated smoothly with a range of new stakeholders in a completely new and very different setting. Iris also did some impressive work facilitating during the multivariable analysis module to the fellows of cohort 2020. It has been a delight to work with Iris and I would without any hesitation take the chance to do so again, should the chance arise in the future.

Supervisor's conclusions

Iris is an extremely respected and popular work and conversation partner within the department. She started her fellowship shortly before the global SARS-CoV-2 pandemic. During that extraordinarily difficult time for any public health institute, she introduced the R statistical programming language within the department and led the development of sophisticated analysis for daily epidemic intelligence reports that were used for press and political briefings. She also taught these skills to co-workers. Her technical solutions and discussion inputs helped to shape the COVID-19 response of the Baden-Württemberg State Health Office. She is a very committed, reliable and active employee who is characterised by creativity and assertiveness. Time and again she gave important input and led the way in breaking new ground.

Personal conclusions of fellow

The past two years of the EPIET fellowship have been a very enriching experience on many levels. This was my first experience of the public health system in Europe. At the Baden-Württemberg State Health Office, I had the opportunity to work on the surveillance of various infectious diseases, to plan studies and to participate in and manage outbreak investigations. Being a fellow during the COVID-19 pandemic was challenging as the training capacity was limited due to the COVID-19 workload. However, it also provided an unparalleled experience in epidemic response. Furthermore, the international mission to DR Congo in the second half of my fellowship was an opportunity to apply the skills acquired skills in a novel context, where I recognised that I had matured as a field epidemiologist. I also met a fantastic group of fellows with whom I exchanged professional and personal experiences throughout the two years, forming a network that we will be part of in our professional and personal lives long after the fellowship ends.

Acknowledgements of fellow

I would like to thank my main supervisor, Stefan Brockmann for his supervision, support, interesting scientific discussions and for teaching me about the work of a field epidemiologist. I would also like to thank Christiane Wagner-Wiening and Maylin Meincke for navigating me through German public health system and for very interesting scientific discussions that helped me to advance my projects. In addition, I would like to thank Florian Burckhardt for his involvement in my supervision and for interesting discussions about R. I would also like to thank all my colleagues at the Baden-Württemberg State Health Office, who were very patient with me when I was struggling with my German, and with whom I had many great discussions about different projects. Thank you for providing such a nice working atmosphere. I would also like to thank both of my frontline coordinators, Louise Coole and Adam Roth, who supported and guided me throughout the fellowship. All the modules and logistics would not have been possible without the great team of EPIET/EUPHEM coordinators and the faculty office, so thank you to them too. Last, but not least, thank you to the cohort 2019 for sharing the experience and supporting each other over the last two years.