FELLOWSHIP REPORT

Summary of work activities

Lukasz Henszel
Intervention Epidemiology path (EPIET)
Cohort 2018

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:

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 2020

- 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;
- 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 ECDC Fellowship Programme Manual.

Pre-fellowship short biography

Lukasz graduated as a Master of Science in Biology in 2004 and completed his PhD in Medical Biology at the Pomeranian Medical University, Poland in 2009. The same year he started working at the National Institute of Public Health – National Institute of Hygiene in Warsaw, Poland, where for 9 years he participated in carrying out the tasks of the Department of Epidemiology including infectious disease surveillance, response to the international outbreaks or the National IHR Focal Point assignments. He was involved in infectious disease prevention and control research projects, also while having an academic research position at the University of Physical Education in Warsaw, Poland alongside the teaching of epidemiology, microbiology and parasitology for 6 years.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 11 September 2018, Lukasz started his EPIET fellowship at the Austrian Agency for Health and Food Safety (AGES), Vienna, Austria, under the supervision of Daniela Schmid. 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

Meeting the competencies of the running of routine public health surveillance systems

In order to meet the competencies of the running of routine public health surveillance systems, I obtained some experience of the management and analysis of routine surveillance data through shadowing colleagues at the AGES working with the Austrian *Salmonella*, *Legionella* and measles surveillance systems.

To understand the aim of the routine surveillance, I was involved in activities related to ongoing, systematic collection, analysis and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice.

To understand the structure and the functioning of the national surveillance system, I have learned about the national electronic reporting system of all mandatorily notifiable diseases in Austria and the role of the main surveillance system components. To understand functioning of an effective surveillance system, I was involved in: 1) detection and notification of such health events, as outbreaks of measles and salmonellosis, 2) collection and consolidation of pertinent data through collection of missing information for outbreaks, preparing outbreak case-line lists and merging of data using case-based and isolate-based datasets, 3) investigation and confirmation of cases or outbreaks (measles and salmonellosis), 4) conducting regular analysis of surveillance data of Legionnaires' disease, measles and salmonellosis, 5) reporting data to higher administrative levels and 6) preparing communication reports such as scientific papers to peer-reviewed journals and conference abstracts.

To understand the purpose of the surveillance system evaluation, I critically reviewed the previously conducted (2009-2011) evaluation of the Austrian *Salmonella* surveillance system, to identify areas for improving surveillance. I wrote a reflective note, in which I suggested a new evaluation of the Austrian *Salmonella* surveillance system including such attributes as flexibility, acceptability, representativeness and data completeness.

Role and outputs:

Lukasz described the national surveillance systems, analysed national surveillance data on measles, *Salmonella* and *Legionella*. He was involved in collection and consolidation of pertinent data, detection and notification of health events, investigation and confirmation of cases or outbreaks, routine analysis and reporting data to higher administrative levels. He delivered the report (see report 1) in which he described his activities meeting the competencies of the running of routine public health surveillance systems.

Supervisor(s): Daniela Schmid, Elisabeth Kanitz

The surveillance system for acute respiratory infections (ARI) in Austria

The fellow was involved in activities of the sentinelsurveillance system for acute respiratory infections (ARI) in Austria. Within these tasks, he was preparing on a daily basis in March and April 2020, the charts on the epidemiological situation of ARI in Carinthia and Tirol in Austria. The input was prepared for the reports that have been sent out to the district public health authorities of the provinces Carinthia and Tirol daily. The reports also had relevance in the preparedness and response to COVID-19.

Role and outputs:

Lukasz prepared inputs to reports (see report 2 and 3) based on surveillance data.

Supervisor(s): Daniela Schmid

Competencies developed:

I believe that I had the opportunity to develop the specific competencies of the running of routine public health surveillance systems (knowing the law on communicable diseases reporting at regional, national and international level) based on the activities I was involved in, such as: contribution in running a surveillance system, participation in identifying surveillance data needs to assess risks and detecting public health threats, contribution in using surveillance information for decision making, using time-series analysis to propose interpretations and draw conclusions, outlining the evaluation needs of the existing surveillance system.

2. Outbreak investigations

A measles outbreak in a vaccine refusing community, Austria, 2019

Background

In Austria, the population immunity for measles is estimated to be below 95%. On 21 January 2019, Public Health authorities of two neighbouring provinces reported a rapid increase of 10 confirmed measles cases. We investigated this increase, in order to identify further cases and the contributing factors to recommend appropriate prevention measures.

Methods

Probable cases were residents of province Styria or Salzburg, with clinical presentation of measles after 1 January 2019, and a link to a confirmed case, defined as a probable case with RNA virus detection. We collected data on age, rash onset, certificate-based vaccination status and reasons for being unvaccinated. We described cases by time, place and person, and used their contact history to identify chains of transmission.

Results

By 11 March, we identified 47 cases (41 confirmed), 40 (85.1%) in unvaccinated patients. Thirty-five cases with a median age of 7 years (IQR: 1-11) occurred between 9 January-20 February in the province Styria, due to one transmission chain with four case generations. Of 31 vaccine-eligible cases, 25 (80.6%) were unvaccinated, of which 13 refused vaccines. In addition, between 10 January-1 March, we identified 12 cases in five, unlinked chains of transmission in the province Salzburg, each of which subsided after two generations (5 primary, 7 second generation cases, median age: 22 years, IQR: 11-35). Eleven of 12 cases occurred in unvaccinated patients, but none of the 11 had a vaccination-refusing attitude. In contrast to the Salzburg outbreaks, ring vaccination was hardly accepted in Styria.

Conclusion

A prolonged measles outbreak in a vaccination-refusing community, compared to five short-lived transmission chains concurrently occurring in the neighbouring province, illustrates how vaccine refusal hampers control of transmission. As declared vaccine refusers are generally not receptive to information campaigns, therefore further qualitative studies are needed to be able to tailor interventions to address the specific concerns of vaccine hesitant groups in a given context, time and towards a vaccine. We recommend information campaigns by the national health authority highly adapted to the Austrian vaccine-hesitant population-groups, to increase their knowledge and vaccine confidence.

Role and outputs:

Lukasz was involved in the outbreak investigation team as a co-investigator. He carried out the review of scientific literature, collaborated in data collection and analysed the data (descriptive epidemiology). Based on outbreak investigation findings, he prepared the outbreak investigation report (see report 4), abstract, which has been accepted as an oral presentation to ECCMID 2020 and the manuscript submitted to a peer-reviewed journal.

Supervisor(s): Daniela Schmid

An outbreak of nalidixic acid and ciprofloxacin resistant *Salmonella* Enteritidis linked to eggs from Poland, Austria, 2019

Background

On 29 July 2019, the National Reference Center for *Salmonella* reported 151 human isolates of nalidixic acid and ciprofloxacin (NAL-CIP) resistant *Salmonella Enteritidis* MLVA type 3-10-5-4-1 from Austrian residents identified since 11 May 2019, compared to no human-isolates of this MLVA type during the previous seven months. We conducted an investigation to confirm the outbreak, identify the source and implement control measures.

Methods

We defined an outbreak case as an infection with NAL-CIP-resistant S. Enteritidis, MLVA type 3-10-5-4-1 or 3-9-5-4-1 in an Austrian resident with symptom onset in May-August 2019. We identified cases through national surveillance and by active case finding. District public health authorities collected data on symptoms, travel history and food exposure using a standardized questionnaire. WGS followed by cgMLST was carried out for selected human and food/food associated isolates, and trace-back analysis was carried out for suspected food vehicles.

Results

400 cases were identified (median age: 22 years, range 0-89; 56% males, 32% hospitalized). Food consumption information was available for 88%. 48 cases ate at four of 12 Asian restaurants with outbreak strain positive food/food associated isolates, obtaining eggs from a single batch supplied by one egg producer in Poland. A single cluster type with an allelic difference ≤7 was found for 141/142 human isolates, and all 11 single batch egg isolates from 11 Asian restaurants.

Conclusion

This outbreak was linked to consumption at Asian restaurants supplied with eggs by a single egg producer in Poland. Eggs from this farm were withdrawn from the Austrian market and cleaning and disinfection measures were implemented at the Polish farm. WGS analysis initiated at EU level identified human isolates belonging to the same cluster in six other Member States.

Role and outputs:

Lukasz was the principal investigator and a member of the outbreak investigation team. He participated in outbreak control meetings. He collaborated in data collection, carried out a literature review and analysed the data (descriptive epidemiology). The fellow took part in trace-back analyses of food and in the microbiological investigation collaborating with the National Reference Centre for *Salmonella* at AGES. He participated in communicating results to the stakeholders at a high level (Ministry of Social Affairs, Health, Care and Consumer Protection) and wrote the outbreak investigation report (see report 5). Based on the outbreak investigation findings, he prepared the abstract for the ESCAIDE 2020 conference and the manuscript submitted to the peer-reviewed journal. He also communicated the results during an oral presentation at the Project Review Module 2020.

Supervisor(s): Daniela Schmid, Elisabeth Kanitz

Competencies developed:

I had the opportunity to be actively involved in most of the steps of an outbreak investigation. During the salmonellosis outbreak, I could experience the investigation from the beginning, while during the measles outbreak I was involved to investigate the outbreak retrospectively. As an outbreak investigation team member, I was involved in formulating a case definition, identifying outbreak cases and generating hypotheses about the causes. I have also supported the outbreak investigations with descriptive analysis. Being involved in the microbiological part of the investigation, I have strengthened my interpretation skills of the diagnostic laboratory test results including molecular tests and I have gained experience in how to communicate effectively with the laboratory team and public health microbiologists. I also formulated recommendations for identified target groups with evidence-based measures to control outbreaks and reported outbreak investigation results and prepared a paper for publication in a peer-reviewed journal, which allow me to strengthen my scientific writing competencies.

3. Applied epidemiology research

Survey of the strategies for preventing nosocomial Legionnaires' Disease in Austrian acute care hospitals

The study protocol

Background

The currently applied measures to prevent Hospital-Acquired Legionnaires Disease (HALD) can be separatedinto two different approaches (strategies) of controlling *Legionella* bacteria in the hospital hot/cold water system. The first is the routine environmental monitoring for *Legionella* at least once a year with immediate or long-term measures in case of *Legionella* detection. The second is a constant use of a comprehensive water safety plan operated by a designated team of water hygiene technicians on site with remediation measures in case of *Legionella* detection at any count.

Research question

This is the first study, which will ascertain in a standardized way the currently applied strategies for *Legionella* growth control in the water supply system (WSS) of the Austrian acute care hospitals in order to assess the effectiveness of the diverse strategies in a successive prospective cohort study.

Proposed methods

The proposed project consists of two studies (I and II). The study I aim is to identify and describe the current strategies for controlling *Legionella* growth in the WSS of the Austrian acute care hospitals using a descriptive cross-sectional survey. The study II aim is to generate a hypothesis on the most effective strategy(ies) of *Legionella* control in the WSS in Austrian acute care hospitals through conducting incidence studies. All acute care hospitals in Austria (N~220) in study I and patients admitted to the Austrian acute care hospitals within the previous 5 years ascertained from the hospital-specific patient databases in study II will constitute the study sample/population. In study I, the hospital hygiene experts will be interviewed using a designed standardized questionnaire, while in study II the number of bed days of the patients from the participating hospital will be provided by the head of the hospital. The data on HALD cases will be extracted from the national surveillance data on LD. The proportion of the participating hospitals by *Legionella* control strategy categories exposure status will be ascertained in the study. The patient bed days and the cases of HALD will be allocated accordingly to the defined categories in order to calculate the category specific HALD incidence rates.

Expected benefits

The findings from the survey and the incidence studies will be shared with stakeholders, hospitals directors and national policy makers.

Role and outputs:

As a principal investigator, Lukasz covered the following tasks: reviewed available scientific literature, designed the study and data analysis with his main supervisor, developed the study protocol, participated in the meeting with experts, and communicated and discussed the project proposal during the Project Review Module in Prague, 2019.

Supervisor(s): Daniela Schmid, Ziad El-Khatib

Risk factors for fatal outcome among hospitalized COVID-19 cases in Styria, Austria, June 2020: a case-cohort study

The study protocol

Background and justification

In the Austrian province of Styria, as of 9 June 2020, 1843 COVID-19 cases have been notified (148.3 per 100,000 inhabitants) with 150 reported deaths (case fatality rate of 8.4%). The clinical manifestations of COVID-19 are heterogeneous, ranging from no symptoms or mild respiratory symptoms to severe acute respiratory distress syndrome and multi-organ failure. COVID-19 is a newly emerged disease, and there is limited information regarding risk factors for severe illness.

Methods

The study aims to investigate risk factors associated with fatal outcome of hospitalized COVID-19 patients in the province of Styria, Austria, between February and June 2020 with the following objectives: 1) to describe the frequency and types of comorbidities present among COVID-19 deaths, 2) to measure associations between comorbidity and death in COVID-19 patients. We will carry out the case-cohort study, in which cases are defined as deceased hospitalized COVID-19 cases in Styria province, and controls are all hospitalized COVID-19 cases (irrespective of fatal outcome) in this province. All cases will be systematically included in the study (n=92, as of 9 June 2020). A random sample of controls will be drawn from the study population (all reported hospitalized COVID-19 cases in Styria province, N=316, as of 9 June 2020) and matched with cases according to frequency of the known risk factors gender and age group. Information for the cases and controls will be collected by reviewing hospital medical charts by a trained study nurse using a standardized paper questionnaire. Information, that will be collected anonymously, include variables to be used for stratification in the data analysis including demographic data, body mass index (BMI), co-morbidity and exposure variables classified and coded based on the International Classification of Diseases (ICD-10-GM). The risk of reaching the defined endpoints (death,

ICU-admission) will be compared according to the presence and number of comorbidities, smoking, epidemic stage, initial symptoms, bed days, time from onset to hospitalization between cases and controls. The frequency of comorbidities will be calculated as a proportion of study subjects included at time of diagnosis and provided with a 95% CIs. In the univariate analysis, we will calculate risk ratios for each exposure under study, taking into account the frequency-matched sampling of controls. The stratified analyses will be used to identify confounding and effect modification by, severity of co-morbidity and BMI. Adjusted RR estimates will be calculated using a Poisson regression model with robust variance or log-binomial regression model.

Expected benefits

Results will be published and inform the preparedness and response planning during later stages of the epidemic in Austria and will help to predict which individuals are at a high risk of severe illness resulting in fatal outcome due to SARS-CoV-2 infection.

Role and outputs:

As one of the main authors of the study protocol Lukasz covered the following tasks: reviewed available scientific literature, designed the study and data analysis plan with his main supervisor and co-supervisor, and co-developed the study protocol with the questionnaire. The study will be carried out after the end of Lukasz's fellowship.

Supervisor(s): Daniela Schmid, Elisabeth Kanitz

Competencies developed:

The fellowship added the applied epidemiology research to my background and reinforced my experience in the research field. Guided by supervisors and frontline coordinator, I have learned how to design a study in a structured manner to write a complete study protocol. I have also learned how to choose the right study design, select an appropriate sampling strategy and sample from a source population. Designing the data analysis for two different research studies allowed me to become more confident about setting up appropriate analytical methods suitable to the expected outcome measures. Preparing to conduct research studies, I developed my methodological skillset, including the statistical skills applicable in analytical epidemiology. I am convinced that my skills, key for the management of operational aspects of epidemiological projects were strengthened.

4. Communication

Manuscripts submitted to peer reviewed journals (in review process)

1. Henszel L, Kanitz E A, Grisold A, Holzmann H, Aberle S W, Schmid D. A prolonged measles outbreak in a vaccine refusing community, Austria, 2019.
   Submitted to: International Journal of Environmental Research and Public Health or Journal of Epidemiology and Global Health.

Manuscripts soon to be submitted

1. Henszel L, Kanitz E A, Kornschober C, Pietzka A, Ruppitsch W, Schaeffer J, Schmid D. An outbreak of nalidixic acid and ciprofloxacin resistant *Salmonella Enteritidis* linked to eggs from Poland, Austria, 2019.

Conference presentations

1. Henszel L, Kanitz E A, Grisold A, Holzmann H, Schmid D. A prolonged measles outbreak in a vaccine refusing community, Austria, 2019. Mini-oral Flash Session. Moving targets: vaccines and the changing epidemiology of measles and pneumococcal disease. ECCMID 2020 (abstract 9350).
2. Henszel L, Kanitz E A, Kornschober C, Pietzka A, Ruppitsch W, Schaeffer J, Schmid D. An outbreak of nalidixic acid and ciprofloxacin resistant Salmonella Enteritidis linked to eggs from Poland, Austria, 2019. Oral presentation. ESCAIDE 2020.

Other presentations

1. Henszel L, Kanitz E A, Kornschober C, Pietzka A, Ruppitsch W, Schaeffer J, Schmid D. An outbreak of nalidixic acid and ciprofloxacin resistant Salmonella Enteritidis linked to eggs from Poland, Austria, 2019. Plenary session, oral presentation. EPIET Project Review Module 2020.

Reports

1. Meeting competencies of running routine public health surveillance systems.
2. Kärnten SENTINEL Surveillance System für ARI (COVID-19 Surveillance) - 24.04.2020.
3. Tirol SENTINEL Surveillance System für ARI (COVID-19 Surveillance) – 17.03.2020.
4. A prolonged measles outbreak in a vaccine refusing community, Austria, 2019.
5. An outbreak of nalidixic acid and ciprofloxacin resistant Salmonella Enteritidis linked to eggs from Poland, Austria, 2019.
6. Case study facilitation: An epidemic of Trichinosis in France. Reflection and evaluation.

5. Teaching activities

Case study facilitation on "An epidemic of Trichinosis in France"

Lukasz delivered the facilitation of the case study during 2-day sessions of 1.5 hours each for the 4th year medical students at the Medical University of Innsbruck. The aim of the case study was to make participants understand the operational and epidemiological steps of an outbreak investigation. The learning objectives were: 1) to describe the steps in an outbreak investigation; 2) to develop a case definition in the context of an outbreak investigation; 3) to construct and interpret an epidemic curve; 4) to choose an appropriate control group for a case control study; 5) to calculate and interpret an odds ratio; and 6) to have an understanding of adopted control measures. The material for the case study was already available prior to the start of the teaching activity. At the beginning of the case study, the participants were asked whether the epidemiological concepts, that were supposed to be discussed, were familiar to them and to what extent. The students received printed copies of the case study as well as printed handouts concerning selected discussed concepts. Selected complex terms were discussed by examples written on the board. The participants took turns to read through the case study text and questions. Answering questions was open to the entire group. In addition, throughout the case study, all the students were asked if they understood the context addressed to the question. In addition, each participant was involved in constructing an epidemic curve and calculating an odds ratio. Lukasz was responsible for obtaining from the students an evaluation of the case study facilitation: 100% of participants responded to the survey and 71% of respondents rated the case study facilitation above average, while 29% rated it very high. Lukasz also delivered the report (see report 6) on the case study facilitation and submitted it to the frontline coordinator.

Supervisor(s): Peter Kreidl

Educational outcome:
The facilitating of this case study was an interesting experience to discuss the epidemiological concepts with the students and show them the importance of public health. Preparing for this task was a great opportunity to consolidatemy knowledge in epidemiology. I have more than 10 years of experience in teaching students, but each experience is a learning process in how to reach out to the participants by passing on my knowledge and enthusiasm for a topic. It is extremely important to me to make sure that everyone understands the topic being discussed. Sometimes, it is very helpful to get out from the framework of the particular case study and explain some terms with examples, which are clearer for the participants, even if they are medical students. During this study facilitation, I have also learned, that: 1) I cannot assume that everyone understands the basics of epidemiological concepts prior to the case study, so it is good to adjust the approach depending on the level of the students' preparation; 2) it is important to put attention into the preparation for the course, especially if the approach needs to be revised to make the case study facilitation better in order to improve the engagement of the students; 3) the facilitator should not put emphasis on forced response by every student, but on diversifying the exercise

in such a way that everyone is willing to participate in it and this might be achieved through involving each participant for instance to construct an epidemic curve or to calculate an odds ratio.

6. Other activities

1. **Activities related to response to COVID-19 in Austria**
   a. Lukasz was involved in co-creating the questionnaire used in the investigation of the COVID-19 outbreak among workers in the meat plant, Austria, July 2020.
2. **Survey 'Laboratory capacity for *Clostridium difficile* infections'**

   Lukasz has been involved in the activities regarding the survey among national experts to evaluate changes of laboratory capacity and identify training needs for *C. difficile* diagnostics in Europe. He was responsible for the translation of the completed questionnaires conducted among Polish experts. The survey was conducted by the AGES on behalf of ECDC.
3. **An outbreak of *Salmonella* Coeln CT1768, Austria, 2018**

   The investigation of a nationwide outbreak of *Salmonella Coeln* CT1768 in Austria, including 45 cases identified between February 2018 and November 2018. The food and environmental investigation found the outbreak strain in samples from bovine chewing bones for dogs. Lukasz carried out a literature review and analysed the data (descriptive epidemiology).

7. EPIET/EUPHEM modules attended

1. The ECDC Fellowship Introductory Course, 24 September - 12 October 2018, Spetses, Greece
2. The Outbreak Investigation Module, 3 - 7 December 2018, Berlin, Germany
3. The Multivariable Analysis Module, 25 - 29 March 2019, Madrid, Spain
4. The Rapid Assessment & Survey Methods, 13 - 18 May 2019, Zagreb, Croatia
5. The Project Review Module 2019, 26 - 30 August 2019, Prague, Czech Republic
6. The Time Series Analysis Module, 4 - 8 November 2019, Bilthoven, Netherlands
7. The Vaccinology Module, 4 May - 24 June 2019, online
   a. Small Private Open Course by Pasteur Institute, 4 May – 12 June 2020, online
   b. Facilitated Sessions by Rijksinstituut voor Volksgezondheid en Milieu (RIVM), 22 – 24 June 2020, webinar

Supervisor's conclusions

Lukasz Henszel has been a consistent fellow and eager to learn from colleagues at the department as well as the main supervisor. He has adapted well to the work and cultural environment. He has been becoming more and more independent and proactive in completing project-related tasks, and his written English skills have improved during the fellowship. Lukasz has picked up quickly on procedures concerning information flow of routine infectious disease surveillance at the department, and has a very good understanding of the national surveillance of mandatorily notifiable diseases in Austria. He has made good progress in assisting with several outbreak investigations and focusing on the research projects and surveillance assignments as well as writing the manuscript submitted to a peer-reviewed journal.

Coordinator's conclusions

Lukasz Henszel entered the Fellowship with experience of public health surveillance and teaching but with gaps in his competencies around outbreak investigation and epidemiological analysis. During his two-year Fellowship based at AGES, Lukasz successfully extended and built on his previous knowledge and skills to gain a good understanding of the role of field epidemiology in public health practice. In particular Lukasz contributed to the investigation of two significant outbreaks. There was some disruption to Lukasz's Fellowship with a changeover of scientific coordinator during the two years. Also, the acute COVID-19 response in the first half of 2020 affected the availability of project supervision, leading to some projects stalling. However, Lukasz and his supervisory team adapted well in the face of the pandemic, and modified project plans to meet the demands of the Fellowship.

Since taking over as Coordinator, I have enjoyed working with Lukasz and have found him to be courteous, self-motivated and diligent. Feedback from the supervisory team is that Lukasz has made good progress and developed both personally and professionally as a result of his Fellowship. I was pleased to hear that Lukasz will continue to work at AGES following graduation. This will provide an excellent opportunity for Lukasz to build further on his EPIET competencies and support the COVID-19 response in Austria. I wish him all the very best for his future career.

Personal conclusions of fellow

I am very thankful for the variety of professional experience during the EPIET fellowship. The EPIET was a great way to improve my competencies and to get access to the wider public health community and network within Europe. The training modules and the supervision with the high quality of the expertise (site and frontline) helped me to develop a methodological skillset and expand a knowledge in applied infectious disease epidemiology. The AGES in Vienna is a very well prepared institution to provide the necessary resources to complete the fellowship and conduct interesting projects. Through the fellowship, I developed also my organizational skills and multi-tasking abilities, but the experience I have gained gives me, above all, the opportunity to feel more confident about setting up studies, writing scientific papers or investigating outbreaks. Being exposed to a variety of public health topics has enabled me to broaden my profile as an epidemiologist and I am convinced that this experience will be used successfully as a contribution to the improvement of public health in Europe.

Acknowledgements

In the first place, I would like to thank my EPIET supervisor on site, Daniela Schmid for giving me the opportunity to work on a diverse range of interesting projects, for providing all the scientific input and teaching me a structured approach to epidemiology. Daniela helped me to develop my knowledge and methodological skill set, which significantly improved my outcomes. I would also like to thank my project supervisors: Elisabeth Kanitz and Ziad El-Khatib. I am grateful Elisabeth for her professional guidance and constructive and encouraging feedback while sharing her expertise. I have to say how much I appreciate how Ziad was constantly available for advice providing valuable feedback and technical guidance when needed. I also owe a very special thanks to Daniel Thomas, my frontline coordinator for the quality of his guidance and counselling. Daniel helped me keep track of my overall progress and provided me with excellent support I was able to count on throughout my EPIET fellowship. Special thanks also to my first frontline coordinator, Biagio Pedalino for a great support at the beginning of the fellowship. I am extremely grateful to Peter Kreidl who gave me the opportunity and amazing assistance for my teaching assignment at the Medical University of Innsbruck. My sincere thanks goes to all my colleagues at the AGES, especially the Department of Infectious Disease Epidemiology and Surveillance for providing such a welcoming and supportive professional environment during my EPIET fellowship. In particular, I would like to thank my department colleagues Samantha, Roland, Lukas and Ali as well as EUPHEM fellows Adriana and Justine for their help, constructive interactions, enthusiasm and allowing me to learn from their experience. Huge thanks to my peer cohort fellows for the encouragement provided also in difficult moments and all the nice experiences we have lived together.