



FELLOWSHIP REPORT

Summary of work activities

Lauriane Ramalli

Intervention Epidemiology path (EPIET)

Cohort 2016

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 European Union (EU) and European Economic Area (EEA) Member States.

Intervention Epidemiology path (EPIET)

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

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

The objectives of the ECDC Fellowship - EPIET path are:

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

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This portfolio does not represent a diploma. Fellows receive a certificate listing the theoretical modules attended and the 23-month training. Additionally, if all training objectives have been met, they receive a diploma.

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- 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.

Pre-fellowship short biography

Lauriane Ramalli has a Bachelor in Medical Biology from the University of Paris V and a Master of Public Health from the Ecole des Hautes Etudes en Santé Publique (EHESP). She previously worked with the French Red Cross in international missions. She started working at Santé publique France in 2013 in the nutrition surveillance unit, before joining the Cire Paca-Corse in 2014.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On September 2016, Lauriane Ramalli started her EPIET fellowship at Santé publique France in the Cire Paca-Corse, Ajaccio, France, under the supervision of Philippe Malfait. This report summarizes the work performed during the fellowship.

Methods

This portfolio demonstrates the competencies acquired during the ECDC Fellowship, EPIET path, 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; 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. The portfolio presents a summary of all work activities conducted by the fellow, unless prohibited due to confidentiality regulations.

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 EPIET scientific guide¹.

Fellowship projects

1. Surveillance

Supervisor(s): Florian Franke and Philippe Malfait

Title: Evaluation of the seasonal surveillance of human neuroinvasive West Nile virus infections in south of France, 2013-2016

In 2000, France implemented human surveillance for West Nile virus (WNV), to detect circulation as promptly as possible. It includes seasonal notification of suspected neuroinvasive WNV infections by hospital laboratories along the French Mediterranean coast, with samples submitted to the arbovirus national reference laboratory (NRL). As none of the 8 human cases identified in France from 2000 to 2016 were detected through seasonal surveillance, we evaluated the seasonal system to determine if it is meeting its objectives.

We evaluated the usefulness, simplicity and acceptability of the seasonal surveillance system using semi-structured interviews with stakeholders. Timeliness sensitivity and representativeness were assessed from surveillance data.

Participation in and acceptability of the system is low. Interview respondents reported that the seasonal surveillance system is complex and time consuming, and that there is little usefulness of the notification of

¹ European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2013. Available from: <http://ecdc.europa.eu/en/publications/Publications/.pdf>

suspected neuroinvasive infections. 45% of suspected cases are notified within the target timeframe, and 46% present complete data fields. While the age distribution of suspected cases in the seasonal system is representative, the time and geographical distributions are not. The sensitivity of the system is 12% for the 2013-2016 period.

The seasonal surveillance system is complex and deters ongoing participation. With appropriate screening by healthcare providers, WNV seasonal surveillance may be adequately addressed via passive submission of samples to the NRL. Seasonal notification of suspected neuroinvasive cases adds little value and could be stopped.

Role: principal investigator

Lauriane wrote the study protocol, developed questionnaires, collected data through semi-structured interviews, analysed quantitative and qualitative data, wrote the report (3) and made an oral presentation at ESCAIDE 2018 (9). She wrote an article to be submitted to Eurosurveillance (4).

2. Outbreak investigations

Supervisor(s): Harold Noel, Philippe Malfait

Title: Investigation of urogenital schistosomiasis transmission in Southern Corsica

Urogenital schistosomiasis re-emerged in Europe in 2013 with 106 cases linked to exposure to the Cavu River in Southern Corsica. Subsequent detection of cases exposed to the river in 2015 and 2016 has raised the question of a possible endemicization of schistosomiasis in Corsica.

From 2016, autochthonous urogenital schistosomiasis became a notifiable disease in France. A case was defined as a person with serological or parasitological evidence of schistosomiasis, with no history of travel outside of Corsica in a known endemic area. Patient specimens were genotyped and compared with the 2013 outbreak strain. Seasonal molecular surveillance of snails in the Cavu River was established for rapid detection of schistosomes.

Ten new cases were identified after the 2013 outbreak, with infections occurring in 2015 and 2016, in the Cavu River or Solenzara Rivers. Some patient specimens were closely related to the 2013 strain. Snail surveillance has not detected any *Schistosoma*-infected snails in the river in between 2015 and 2017.

Corsica has all the necessary conditions for repeated transmission of urogenital schistosomiasis. One or more individuals infected in the 2013 outbreak is hypothesized as the source of the re-contamination of the Cavu River as well as the contamination of the Solenzara River. As a large proportion of persons infected with schistosomiasis remain asymptomatic, other recent cases may exist in the region. Therefore, schistosomiasis awareness and screening should be reinforced among healthcare providers to prevent endemicization in Corsica.

Role: Co-lead investigator

Lauriane participated in running the surveillance system, analysed the surveillance data and co-investigated new detected cases. She was the lead author on a rapid communication in Eurosurveillance on the results of surveillance and investigations (1). She made an oral presentation at ESCAIDE 2017 (7) and at the European Congress of Epidemiology (EUROEPI) 2018 (8). She presented a poster at the national conference of infectiology 2018 (9).

Supervisor(s): Philippe Malfait

Title: Norovirus outbreak in a nursing home, December 2017, Paca region, France

On December 4th 2017, a nursing home in the Var district identified an outbreak of gastroenteritis among residents and staff. We investigated to find the source of infection, estimate the magnitude of the outbreak and implement appropriate control measures.

We defined a case as an acute onset of vomiting or diarrhoea between the 2nd and the 10th of December. We collected information on food exposures from 30 November- 2 December to compare attack rates among residents and workers. We collected leftover food items and stool specimens for laboratory investigation.

We interviewed 64/68 (94%) of residents and 17/17 workers (17). We identified 35 cases among residents (55% attack rate (AR)) and 6 cases among workers (35% AR). The AR was higher among those who ate at a local restaurant on the 30th of November (relative risk=1.68; 95% confidence interval: 1.14-2.49; attributable fraction: 35%). Norovirus was identified in stools samples; analysis of food items was not possible.

Although results suggest that a local restaurant may have been the cause of the nursing home's norovirus outbreak, it explained only 35% of cases. Memory deficiencies of many residents could have biased the study results. However, the distribution of cases indicated that consumption of an infected food item may have started the outbreak, with subsequent person to person transmission. This illustrates the importance of reactive control measures to avoid person to person transmission.

Role: Main investigator

Lauriane wrote the investigation protocol, developed the questionnaire, collected data with the outbreak investigation team, developed a data entry mask on a web-platform, did data analysis and wrote an outbreak investigation report (5).

Supervisor(s): Florian Franke

Title: Investigation of an autochthonous chikungunya outbreak in south of France, July-September 2017

In August-September 2017, we identified two clusters of autochthonous chikungunya virus (CHIKV) infection in south-eastern France in neighbouring locations. We investigated to determine the source of infection, the extent of CHIKV transmission, and to identify a link between the two clusters in order to guide control measures.

We conducted door-to-door case-finding in all households within a 200m radius around the autochthonous cases' dwellings to identify and test any individuals presenting chikungunya-like symptoms. We contacted general practitioners (GP), medical laboratories and emergency services in both towns and their surroundings, to request reporting and testing for any patient with chikungunya-like symptoms since June 1st. We reviewed surveillance data for a possible primary case among notified imported chikungunya cases. The National Reference Laboratory performed molecular analyses on selected cases. Vector control measures were implemented for both clusters.

Eleven cases were identified in the first cluster and six cases in the second. We identified the primary autochthonous case, and a case who epidemiologically linked to both clusters. Genomic characterization of the virus identified a strain belonging to the "East Central South African" (ECSA) lineage. Entomological surveys in both locations found adult mosquitoes and breeding sites in a large number of rainwater storage tanks in the neighbourhoods.

This outbreak is the third occurrence in France of local transmission of CHIKV and confirms that CHIKV represents an increasing threat in Europe. Regular awareness campaigns targeting physicians and biologists, should be conducted to improve the effectiveness of this surveillance. In addition, awareness campaigns targeting the public should be reinforced for improving vector control and community/individual prevention.

Role: co-investigator

Lauriane was part of the outbreak control and investigation team. She participated in the door-to-door investigations for both clusters and was co-author of a published rapid communication in Eurosurveillance (2).

Supervisor(s): Florian Franke

Title: Investigation of two human autochthonous West Nile virus infections in the district of Alpes-Maritime, South of France, October 2017.

In October 2017, two autochthonous cases of West Nile virus (WNV) infection were identified in the Alpes-Maritime district of France, with onset of symptoms between August 21st and September 4th. We investigated to determine the potential source of infection and the extent of viral circulation in the area, in order to guide control and preventive measures.

Samples from hospitalized individuals from August 1st in the local hospital with suspected neuroinvasive WNV infections were sent to the human arboviruses reference laboratory (NRL). A serological survey was carried out among horses in the first case's neighbourhood. Blood products collected in the Alpes-Maritime were secured and

tested for WNV as soon as the first case was detected. Blood donors indicating minimum one night of stay in the district were excluded from donation for 28 days after the last day of their stay.

Neither cases reported travel during the exposure period. All 61 samples from the local hospital tested negative. One serological infection was detected among 151 horses tested. All 4044 blood products tested were negative for WNV infection.

The detection of two human cases and one equine infection in the Alpes-Maritime in 2017 confirm a low circulation of WNV in the area. The surveillance system in France should be evaluated and adapted to the epidemiological context.

Role: co-investigator

Lauriane was part of the investigation team and participated in the coordination of the investigation. She wrote an internal investigation report and contributed to the writing of an abstract and poster presentation for the national conference of infectiology 2018 (11).

3. Applied epidemiology research

Supervisor(s): Philippe Malfait, Harold Noël

Title: Knowledge, attitude and practices towards urogenital schistosomiasis among general practitioners in Corsica

Since 2013, Corsica has been facing the emergence of urogenital schistosomiasis. After screening 106 cases between 2014 and 2015 exposed to the Cavu River in southern Corsica, 10 additional cases were detected between 2015 and 2018. Among these cases, two new years of transmission of schistosomiasis were identified (2015 and 2016) and a probable case was exposed to a neighbouring river (Solenzara River).

General practitioners (GPs) have a crucial role in detecting and reporting schistosomiasis cases, promoting health, preventing disease, and delivering medical advice. They can contribute to the early detection and early treatment of cases to eradicate any human reservoir in Corsica. Therefore improving awareness of GPs on urogenital schistosomiasis in Corsica is key. We developed a study to evaluate the knowledge, attitudes and practices towards urogenital schistosomiasis among GPs in Corsica, in order to adjust prevention and communication strategies for schistosomiasis, directed to them.

A knowledge, attitude and practices study was implemented among all GPs practicing in Corsica (n=317). GPs received a web-questionnaire by email and two reminders to respond to the study. Responses were analysed and knowledge, attitude and practice described with proportions.

Among 317 GPs contacted, 18 responded to the questionnaire (5.7% response rate). 50% of GPs declared being informed by the regional health authority on the first detection of schistosomiasis cases. Half of GPs did not know how many transmission episodes occurred in Corsica. The perception of the risk of transmission in Corsica was different between respondents, with 75% of GPs reporting the risk as ongoing, while some considerate that it was over. Screening practices were inconsistent between respondents.

Despite a low response rate, this study highlights the challenges to convey information to GPs on public health threats occurring locally. The regional health authority should review their communication strategy towards GPs in Corsica in order to reinforce their knowledge on screening recommendations (targeted population) and strategy (laboratory technics).

Role: principal investigator

Lauriane wrote the study protocol, developed the web-questionnaire, monitored the study, analysed the data and wrote the study report (6).

Supervisor(s): Philippe Malfait

Title: Protocol for evaluation of the use of motivational interviewing in two maternities to promote vaccination uptake, Paca region, France

In January 2018, the French Ministry of Health extended the immunization mandate to 8 additional vaccines. The Paca region has among the lowest vaccination coverage rates in France, and the highest levels of vaccination hesitancy. In order to improve vaccination uptake in the Paca region, we designed an intervention relying on motivational interviewing to promote vaccination towards parents of young children. The project will be implemented in maternities and will target mothers and their partners. Interviews will be performed after delivery and before hospital discharge.

A pilot project will be conducted and evaluated in order to provide evidence for the effectiveness of the intervention. The objective will be to evaluate the knowledge, attitude, beliefs and intention to receive vaccines in families before and after intervention. We will evaluate the impact of the intervention in terms of vaccination coverage, delays in vaccination uptake, and parental vaccination hesitancy. We will also evaluate the feasibility and acceptability of the intervention, and the satisfaction of participants in the project.

The evaluation will rely on a randomized controlled trial in 2 hospital maternity wards over 2 districts in the Paca region, with one group receiving the intervention and another one not receiving it.

Participation to the project will be proposed to all women after delivery in both maternities until 1 250 women are included in each group. The pilot project and the evaluation will start in 2019.

Role: co-lead investigator

Lauriane was part of the project development team and participated in the planning the intervention. Lauriane wrote the evaluation protocol, in collaboration with the project team.

4. Communication

Publications

1. Ramalli L, Mulero S, Noël H, Chiappini J-D, Vincent J, Barré-Cardi H, et al. Persistence of schistosomal transmission linked to the Cavu river in southern Corsica since 2013. *Eurosurveillance*. 2018;23(4):18-00017.
2. Calba C, Guerbois-Galla M, Franke F, Jeannin C, Auzet-Caillaud M, Grard G, et al. Preliminary report of an autochthonous chikungunya outbreak in France, July to September 2017. *Eurosurveillance*. 2017;22(39):17-00647.
3. Ramalli L, Paty M-C, Malfait P, Noël H, Grard G, Guerbois-Galla M, Franke F. Evaluation of the seasonal human surveillance system for neuroinvasive West Nile virus infections in France between 2013 and 2016. (In process)

Reports

4. Ramalli L. Evaluation of the seasonal surveillance of human neuroinvasive West Nile virus infections in south of France, 2013-2016. Saint Maurice: Santé publique France; 2018.
5. Ramalli L. Norovirus outbreak in a nursing home, December 2017, Paca region, France. Saint Maurice: Santé publique France; 2018.
6. Ramalli L. Connaissance, attitude et pratiques des médecins généralistes de Corse envers la bilharziose urogénitale. Saint Maurice: Santé publique France; 2018.

Conference presentations

7. Ramalli L, Mulero S, Noël H, Chiappini J-D, Vincent J, Barré-Cardi H, et al. Urogenital schistosomiasis acquired in Southern Corsica: are we observing the early signs of endemicization? Oral presentation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 6-8 November 2017, Stockholm, Sweden
8. Ramalli L, Mulero S, Noël H, Chiappini J-D, Vincent J, Barré-Cardi H, et al. A persistent risk of urogenital schistosomiasis transmission linked to the Cavu River in Southern Corsica since 2013. Oral presentation at the European congress of epidemiology (EUROEPI), 4-6 July 2018, Lyon, France
9. Ramalli L, Mulero S, Noël H, Chiappini J-D, Vincent J, Barré-Cardi H, et al. Persistence de la transmission de la bilharziose urogénitale en Corse du Sud depuis 2013. Poster presentation at the national conference of infectious diseases specialists in France (JNI), 13-15 June 2018, Nantes, France
10. Ramalli L, Noël H, Paty M-C, Malfait P, Grard G, Guerbois-Galla M, Franke F. Evaluation of the seasonal human surveillance system for neuroinvasive West Nile virus infections in France: a surveillance system that does not meet its objective. Oral presentation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 21-23 November 2018, Saint Julian's, Malta
11. Franke F, Grard G, Lecollinet S, Ramalli L, Gallian P, L'Ambert G et al. Infections à virus West-Nile dans les Alpes-Maritimes, 2017. Poster presentation at the national conference of infectious diseases specialists in France (JNI), 13-15 June 2018, Nantes, France

Other presentations

Several presentations at regional meetings about vaccination and arboviruses surveillance.

Other

Internal outbreak investigation reports for the investigation of two human autochthonous West Nile virus infections in the district of Alpes-Maritime, South of France, October 2017.

Teaching and pedagogy

Title: Disease surveillance in France, epidemiological intelligence and outbreak investigation

The audience were students in the second year of a Master's programme in health engineering for the management and prevention of infectious disease in healthcare settings. I was requested to introduce concepts of disease surveillance, epidemiological intelligence, and outbreak investigation, in 3 lecture periods of one hour each.

15 students were present in the room, and others could watch the lectures live or later as they were recorded and broadcasted on the program internet platform. Two students were asked to summarize the main points of the lecture and share them with the rest of the group in the days following each lecture. Students evaluated the class through an online questionnaire.

Reflection

This class was a new experience for me, as I had to introduce various and broad concepts to non-epidemiologists and therefore learn how to adapt content to a specific audience. I found the first two lectures too theoretical even though examples were used to illustrate the concepts. The lecture on outbreak investigation was built around a real investigation and it was for me easier to engage the students into the lecture. This gave me the desire to define more interactive teaching in order to improve the animation of a class.

5. EPIET/EUPHEM modules attended

Introductory course, 26th of September to 14th of October 2016, Spetses, Greece

Outbreak investigation module, 5th to 9th of December 2016, Berlin, Germany

Multivariable analysis, 13th to 17th of March 2017, Zagreb, Croatia

Rapid assessment and sampling module, 3rd to 13th of May 2017, Athens, Greece

Project review module, 28th of August to 1st of September 2017, Lisbon, Portugal

Time series analysis module, 20th to 24 of November 2017, Bristol, UK

Vaccinology module, 11th to 15 of June 2018, Cardiff, UK

Project review module, 27th to 31st of August 2018, Lisbon, Portugal

6. Other training

MSF Pre-deployment course, 27th of January to 1st of February 2017, Bonn, Germany

Introduction to public health promotion and prevention, 4th to 5th of December 2017, Saint-Maurice, France

Introduction to motivational interviewing in vaccination, 6th of April 2018, Marseilles, France

Discussion

Supervisor's conclusions

Lauriane Ramalli spent two years as a MS-track EPIET fellow at the Regional Office of Santé Publique France, the National French Agency for Public Health in France, and successfully managed to combine fellowship requirements with routine work. During these two years, Lauriane gained substantial professional experience and developed new skills due to her involvement in a large variety of epidemiological activities. She successfully carried out all of her projects and developed her ability to multitask and quickly adapt to new challenges.

Several of the projects Lauriane conducted during her fellowship had a clear public health value. Her contribution to the evaluation of the surveillance system of West Nile infections is particularly notable and will lead to a revision of the national system. She has collaborated closely with the vaccinology and vector-borne diseases departments within the National Infectious Disease Epidemiology Direction of Santé publique France. She accomplished all assigned tasks in a competent manner and worked on her projects, displaying a good degree of independence, but at the same time seeking assistance when appropriate. She is a reliable person who established a constructive working relationship with all of her colleagues, and she is a highly appreciated team member.

Coordinator's conclusions

Lauriane has been able to deepen and expand her knowledge and skills while undertaking the fellowship programme as an MS-track fellow. She has pursued a range of projects and dealt with complex and emerging public health issues, and has laid the foundation for further work beyond the fellowship. Lauriane has demonstrated a willingness to explore epidemiological methods and to independently develop her own learning by applying a wide range of data collection and analysis methods within the scope of fellowship projects. She is open to receiving feedback and is enthusiastic about opportunities to share her work with others. Lauriane has strong communication skills and a demonstrated interest in teaching, so I hope that her future career development allows her to move into a more senior role while continuing to support the work of her team in the Regional Office of Santé Publique France.

Personal conclusions of fellow

Being a MS-track EPIET fellow has been an enriching experience for me. The fellowship and my training site at the Regional Office of Santé Publique France gave me the opportunity to be exposed to a variety of public health issues and projects. The projects I undertook broadened the range of diseases in my expertise, but also allowed me to apply techniques in epidemiology that I had never worked with before. Through several international conference presentations, the fellowship helped me to gain confidence in scientific writing and communication. Combining routine work and fellowship requirements helped me to improve my organisational skills. Overall, the fellowship allowed me to expand my knowledge and competencies in infectious diseases and to strengthen my ability to undertake a broader variety of public health issues.

Acknowledgements of fellow

First, I would like to thank Philippe Malfait, my EPIET supervisor, for giving me the opportunity to follow this training, for his great support during the fellowship, his strong technical guidance and for the extended time he dedicated to aid me during these two years.

I would like to thank all my co-workers for their support during the fellowship and particularly Florian Franke for his guidance and valuable help in performing the West Nile evaluation project.

I also would like to thank Lisa Hansen, my front line coordinator, for providing me with great guidance and support and for her constant availability during the fellowship. I would like to express my gratitude also to the EPIET/EUPHEM coordinator and organization teams for ensuring the quality of this program and for providing highly valuable training modules.

Finally, I would like to thank EPIET/EUPHEM/FETP fellows for this great professional and personal experience we shared together.