

The section header 'Summary of work activities' in a bold, white, sans-serif font, set against a blue background.The author's name 'Rolf Kramer' in a white, sans-serif font, positioned below the section header.The main title of the report, 'European Public Health Microbiology Training Programme (EUPHEM), 2016 cohort', in a white, sans-serif font, centered on a blue background.The section header 'Background' in a bold, blue, sans-serif font.

According to the European Centre for Disease Prevention and Control (ECDC) Advisory Group on Public Health Microbiology ('national microbiology focal points'), public health microbiology is a cross-cutting area that spans the fields of human, animal, food, water, and environmental microbiology, with a focus on human population health and disease. Its primary function is to improve health in collaboration with other public health disciplines, in particular epidemiology. Public health microbiology laboratories play a central role in detection, monitoring, outbreak response and the provision of scientific evidence to prevent and control infectious diseases.

European preparedness for responding to new infectious disease threats requires a sustainable infrastructure capable of detecting, diagnosing, and controlling infectious disease problems, including the design of control strategies for the prevention and treatment of infections. A broad range of expertise, particularly in the fields of epidemiology and public health microbiology, is necessary to fulfil these requirements. Public health microbiology is required to provide access to experts in all relevant communicable diseases at the regional, national and international level in order to mount rapid responses to emerging health threats, plan appropriate prevention strategies, assess existing prevention disciplines, develop microbiological guidelines, evaluate/produce new diagnostic tools, arbitrate on risks from microbes or their products and provide pertinent information to policy makers from a microbiological perspective.

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. Therefore, 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 Rolf Kramer, cohort 2016 of the European Public Health Microbiology Training Programme (EUPHEM), at the Institut des agents infectieux (WHO National Influenza Centre), Centre Hospitalier Universitaire (CHU), Lyon, France.

All EUPHEM activities aim to address different aspects of public health microbiology and underline the various roles of public health laboratory scientists within public health systems.

Pre-fellowship short biography

Rolf Kramer has a PhD in Microbiology and a Master in Biology (Immunology, Genetics). He completed his PhD research in 2013 at the Helmholtz Centre for Infection Research, Germany, in collaboration with an outpatient clinic for cystic fibrosis, where he focused on innovative molecular diagnostics for respiratory bacterial and fungal infections. Before joining the EPIET/EUPHEM programme, Dr Kramer worked as a postdoctoral researcher at the University Pretoria, South Africa, where he performed studies on ecology of viruses and metagenomic approaches for virus detection. His ambition in global health is to apply innovative strategies for public health policies and emergency responses by combining different disciplines, such as epidemiology and microbiology, in order to design specific solutions within each context.

Methods

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

Projects included epidemiological investigations (outbreaks and surveillance); applied public health research; applied public health microbiology and laboratory investigation; biorisk management; quality management; teaching and public health microbiology management; summarising and communicating scientific evidence and activities with a specific microbiological 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 projects or activities (on-job services) and partly through participation in the training modules. Results are presented in accordance with the EUPHEM core competencies, as set out in the EUPHEM scientific guide¹.

1. Epidemiological investigations

1.1. Outbreak investigations

A. Retrospective identification of nosocomial bacterial outbreaks in intensive care units (ICU)

Supervisor: Philippe Vanhems

The risk of nosocomial infections in ICUs is significantly higher than that of patients in conventional units. The 2006 French national prevalence survey of 2,337 establishments revealed that 22% of patients in ICUs contract a nosocomial infection but only 5% of patients in conventional units. The main objective of this study was to identify previously undetected outbreaks in three ICUs between 2003 and 2016 in Lyon, France. The fellow was the main investigator and identified 12 small-scale outbreaks in the study period caused by rare bacterial pathogens detected in respiratory specimen, blood and urine. Pathogens included environmental and commensal bacteria with known potential to cause nosocomial infections. Recommendations were made to further improve hospital surveillance. Hospital services were informed about the findings.

B. Malaria in refugee populations in Northern Uganda, 2017

Supervisor: Ruby Siddiqui

Malaria was a major cause of morbidity and mortality in Rhino refugee camp in Northern Uganda 2017. To identify misconceptions contributing to high case numbers as well as to estimate coverage of long-lasting insecticide-treated

¹ European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/en/publications/Publications/microbiology-public-health-training-programme.pdf>

bed nets (LLITN), a knowledge, attitudes, and practice (KAP) survey was conducted among the refugee population in April. In May, numbers of malaria cases were rising with the arrival of the rainy season. MSF distributed LLITNs and conducted information campaigns. A follow-up KAP study was performed in July to assess the impact of distributions and campaigns. Distributions resulted in a three-fold increase of households with LLITN and significantly more LLITN owners received explanations on correct usage and maintenance. These improvements were accompanied by decreasing numbers of malaria cases. The fellow analysed the follow-up KAP study, compared results of both and concluded on the effectiveness of implemented measures to prevent malaria outbreaks among refugee populations in Northern Uganda. Results were communicated to MSF headquarters.

Training modules

During the EPIET/EUPHEM introductory course, participants were familiarised with the methods and logistical aspects of outbreak investigations. Additional, training during the 'Outbreak Investigation Module' taught essential data management skills (entering, validating and cleaning data), dataset management and how to perform case-control studies, descriptive and cohort studies, including stratified analyses. Likewise this module familiarized fellows with different tools for bioinformatics and phylogenetic analysis for outbreak investigations. Building on these courses, during the 'Multivariable analysis Module', fellows discussed the principles, application and interpretation of multivariable analysis and its role in field epidemiology.

Educational outcome: The fellow gained first-hand experience in outbreak investigations in interdisciplinary environments and in complex emergency situations. He was involved in all steps of an outbreak investigation including implementation of control measures.

1.2. Surveillance

A. Investigation of nosocomial influenza using whole genome sequencing and vaccination coverage data of healthcare workers

Supervisor: Bruno Lina

Vaccination of healthcare workers (HCW) against seasonal influenza is subject to controversial debates. Coverage is frequently low, providing limited protection against nosocomial influenza. During the influenza season 2016/17, a vaccination campaign was launched in selected hospital wards which increased their coverage to 39% compared to 26% for the entire hospital Croix-Rousse, Lyon, France. Large differences were observed between short-term geriatrics with 38% and the infectious disease unit with 73% vaccination coverage of HCW. In total, 105 nosocomial influenza cases were epidemiologically investigated and whole genome sequencing (WGS) confirmed that transmission mostly occurred within the wards. All but five nosocomial influenza cases were detected in geriatric services and highlighted the need to improve vaccination coverage of HCW in geriatrics hospital wards. The fellow was involved in all steps of the study, performed the phylogenetic analysis and interpreted combined epidemiological and phylogenetic results.

B. Local circulation pattern and global dynamics in molecular diversity of enterovirus D68

Supervisor: Isabelle Schuffenecker

Enterovirus D68 (EV-D68) was first isolated in 1962 from a pediatric patient with bronchiolitis. Rarely reported until 2008, small outbreaks occurred worldwide between 2008 and 2014. Retrospective phylogenetic analyses revealed the emergence of three different EV-D68 clades (A, B, C). In 2014, an outbreak with more than 1,000 cases and significant morbidity and mortality occurred in the USA. The aim of this study was to identify circulation patterns and genetic diversity of EV-D68. A total of 11,132 respiratory specimens, collected between 2010 and 2016 from hospitalised patients in Lyon, France, were screened for EV-D68 by PCR assays. Phylogenetic relationships of the viral protein 1 gene sequences were reconstructed using maximum-likelihood and Bayesian-MCMC approaches. Overall, 171 infections were detected in a biennial pattern: with 7, 1, 55, 0, 42, 1 and 65 cases from 2010 to 2016, respectively. Mostly children were affected with 71% being under 5 years of age. No association between clinical presentations and virus genotypes was found. Genotypes A, D, B1, B2 and B3 were observed circulating during the study period in Lyon with continuous emergence and replacement. Using global databases, ancestors of currently circulating genotypes were estimated to have emerged between late-1990 to end-2000s. Rises of the effective population size of EV-D68 in Lyon was observed to coincide with upsurges of infections. At a world-wide scale, ongoing diversification coincided with an increase of infections in recent years. Based on these observations and the association of the virus with acute flaccid myelitis, the study supports the need for an active surveillance of EV-D68 in Europe. The fellow was the main investigator and coordinated the multidisciplinary analyses.

Training modules

The EPIET/EUPHEM introductory course familiarised participants with the main concepts of surveillance, including how to develop, validate, evaluate and operate a surveillance system. The "Rapid assessment and survey methods" module provided fellows with knowledge on how to contribute to the multidisciplinary response to complex emergencies as well as sampling techniques, and morbidity and mortality surveys.

Educational outcome: The fellow gained substantial experience integrating epidemiological and microbiological data in surveillance as well as coordinating multidisciplinary projects. The fellow participated in disease specific networks at the regional and European level, integrated phylogenetic analyses as well as next generation sequencing technologies to support surveillance systems and formulated specific public health recommendations.

2. Applied public health microbiology research

A. Transmission of hepatitis C virus in men who have sex with men (MSM) in Lyon, France

Supervisor: Christophe Ramière

Hepatitis C virus (HCV) affects about 170 million people worldwide and approximately half a million people die from HCV-related diseases every year. There is no vaccine but infections can be cured if diagnosed early and treated appropriately. Since 2000, an epidemic of HCV infections is ongoing among human immunodeficiency virus (HIV)-positive MSM in high-income countries. To monitor HCV circulation among 49 MSM in Lyon, genotyping and phylogenetic cluster analyses of HCV variants were performed by sequencing of the NS5B gene. Four clusters and three pairs were identified and chronological analyses suggested HCV transmissions from HIV-positive to HIV-negative MSM. The study concluded to extend recommendations for HCV surveillance to HIV-negative MSM and demonstrated the benefit of pre-exposure prophylaxis (PrEP) programs for HCV monitoring in HIV-negative MSM. The fellow was involved in the combined epidemiological and phylogenetic analyses and in formulating recommendations.

B. Use of hospital databases to monitor respiratory syncytial virus (RSV)-related hospitalisation in the first year of life

Supervisor: Jean-Sébastien Casalegno

RSV is a leading cause of lower respiratory infections, particularly in infants and elderly. Several vaccine candidates are currently in clinical trials including one in phase III. Surveillance data on virus circulation and disease burden in high-risk groups are still incomplete, thus, hindering evidence-based recommendations on RSV vaccine policies. A surveillance concept was developed and tested in this proof-of-concept study to illustrate the feasibility of RSV monitoring in infants using birth databases and data on hospitalisation for clinical bronchiolitis. In total, 663 of 45,820 children born between 2012 and 2016 met the case definition. The most predictive independent risk factor for RSV hospitalisation was month of birth. Odd ratios gradually increased from 0.31 (95% CI 0.18–0.49) in May to 3.73 (95% CI 3.11–4.48) in November and were lowest in March with 0.26 (95% CI 0.14–0.43). Likewise, prematurity and socio-economic factors were shown to significantly increase risk of severe RSV infections in the first year of life. The surveillance concept was successfully applied to identify the population at-risk in a practical and cost-efficient manner. Using routine data of hospitals in metropolitan areas, this concept allows estimation of the local RSV burden in infants and identification of target groups for public health interventions. The fellow was responsible for all epidemiological analyses, interpretation of results and formulating recommendations.

Educational outcome: The fellow applied concepts in virology in relation to public health microbiology and gained substantial experience in time-management, project writing, interpreting and integrating results.

3. Applied public health microbiology and laboratory investigations

A. Diagnostic efficacy of multiplex PCR systems for surveillance of Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

Supervisors: Bruno Lina, Martine Valette

MERS-CoV is a zoonotic virus causing significant mortality and morbidity in humans. All cases outside the Middle East are imported cases and WHO encourages surveillance of MERS-CoV introduction in its member states. Suspected, symptomatic cases are recommended to be screened for additional respiratory viruses in order to identify the cause of symptoms. The purpose of this study was to test the analytical performances of automated multiplex PCR systems for MERS-CoV surveillance in the Rhone-Alpes region, France. In total, 28 suspected cases were included in the study with respiratory symptoms of unknown cause, chest X-ray abnormalities and a travel history to the Middle East. All cases were negative for MERS-CoV. Using a multiplex panel with 17 viral and 3 bacterial pathogens, the cause of symptoms was identified in 23 patients and outperformed conventional assays. Lower respiratory samples were shown to better represent virus aetiology. Automated, multiplex PCR systems were recommended for surveillance of MERS-CoV in France. The fellow was the main investigator and performed all analyses.

B. Antimicrobial resistance (AMR) in *Aspergillus fumigatus* isolated from clinical specimens in Lyon, France

Supervisor: Jean Menotti

Triazole antifungals are the first line therapy for invasive aspergillosis, commonly caused by *Aspergillus fumigatus*. Since 1997, AMR was increasingly reported, leading to recommendations of susceptibility testings for triazoles by the ECDC. A total of 203 isolates of *A. fumigatus* from 182 patients were analysed from February to September 2017. Prevalence of azole-resistance among these patients was 2.2%. Of four isolates with AMR, two strains were resistant against itraconazole/posaconazole/isavuconazole and another two were also resistant against voriconazole. Sequencing of the *cyp51A* gene was performed in order to identify molecular determinants of resistance, silent polymorphisms in an intronic part of the gene were detected in three isolates and another presented simultaneously the F46Y, M172V and E427K mutations. These findings highlight the diversity of underlying molecular mechanisms of AMR in fungi and emphasize the importance for susceptibility testings before treatment of patients. The fellow was involved in all stages of the study, particularly in the combined epidemiological and phylogenetic analyses.

Educational outcome: The fellow gained knowledge on application of laboratory methods to analyse resistance data and clinical datasets. The fellow gained experience in understanding limitations of diagnostic methods and laboratory data.

4. Biorisk management

A. Risk of waterborne diseases in Palorinya refugee camp, Uganda

In Uganda and Eastern Africa, outbreaks of faecal-oral transmitted diseases, like cholera or hepatitis E, are known to potentially occur in refugee camps with inequality in water distribution while the coping mechanism is to take water from unprotected sources. In December 2017, surveillance suggested water shortage and inequality in water availability in Palorinya refugee camp, Uganda. The fellow analysed the risk and preparedness towards waterborne disease in the camp. The results and recommendations were shared with the main water and sanitation (WatSan) actor in Palorinya and MSF headquarters.

B. Biosafety and Biosecurity assessment

The fellow participated in a course on Biosafety and Biosecurity Management in Laboratories which was developed in collaboration with international experts appointed by WHO/IHR/LBS. The BioRAM Biosafety and Biosecurity Tool was used to assess and mitigate risks in simulation exercises. The fellow also acquired the WHO certificate for International Transport of Infectious Substances.

C. Biosafety level 3 (BSL-3) training

The fellow participated in a theoretical and practical training in the BSL-3 facilities of the Institut des agents infectieux (WHO National Influenza Centre) in Lyon, France.

Educational outcome: The fellow gained an understanding in principles of biorisk management, use of personal protection equipment, working with known and unknown infectious agents, understanding processes in BSL-3 and BSL4 work environments, biosafety and security risk assessments and mitigation procedures. The fellow gained experience in analysing risk and preparedness towards disease outbreaks in complex emergency situations.

5. Quality management

A. Internal audit for serology platforms of the diagnostic laboratory

The fellow participated in an internal audit for the workflow of immunoassay analyses. The audit included sample transport and arrival, sample registration and storage, technical references, documentation, qualifications of users, storage of reagents, data analyses and communication of results.

B. Laboratory quality assessment

The fellow completed training sessions on Laboratory Quality Management which derived from Total Quality Management (TQM) courses developed by experts from WHO, CDC, CLSI, and ISO. The training included an exercise on laboratory auditing at the Service du Laboratoire de Virologie du CHU Lyon.

Training modules

The Biorisk and Quality Management Module provided training on topics related to quality management in biomedical as well as public health laboratories according to ISO 15189, training for international shipping of infectious substance, biosafety assessment and mitigation techniques in biomedical laboratories and a visit to a biosafety level 4 (BSL4) facility.

Educational outcome: The fellow gained an understanding in the principles and practices of quality assurance, local and European accreditation procedures and performance of quality assessments.

6. Teaching and pedagogy

A. Training of outreach workers for surveillance activities

The fellow gave continuous training for outreach workers on survey methods in Palorinya refugee camp, Uganda. Teaching sessions were organised every two weeks in November/December and included lessons on application of 'KoBoCollect' surveillance software, data collection and health education.

B. Quality management in diagnostics of infectious diseases

The fellow gave a lecture on quality management in biomedical laboratories during the biorisk and quality management module in February 2018 in Stockholm, Sweden.

Educational outcome: The fellow planned and organised lectures, defined and adapted learning objectives to the specific context.

7. Public health microbiology management

A. Expert meeting: Biomarkers to guide public health interventions

The fellow was invited to participate in an international, multidisciplinary meeting on serology-based surveillance for public health interventions in July 2018. The 3-days meeting took place in Les Pensières Center for Global Health, France, organized by the Mérieux Foundation and Bill & Melissa Gates Foundation. Recent advancements in research and technology were discussed in order to identify candidate biomarker for large-scale, multiplexed surveillance in low income countries. The framework of a pilot project in Mozambique was reviewed in order to facilitate its implementation in existing, local infrastructures.

B. Interdisciplinary working group to coordinate advocacy efforts for systematic surveillance of enterovirus D68 in Europe

The fellow became a member of the Enterovirus-D68 Acute Flaccid Myelitis Working Group. This interdisciplinary, joint European initiative was created by public health experts from multiple disciplines including epidemiology, virology, neurology and pediatric medicine. In February 2017, the group met in Schiphol, the Netherlands, to discuss evidence for causation of acute flaccid myelitis (AFM) by enterovirus D68 and agreed to combine efforts for advocacy on surveillance of EV-D68 and AFM in Europe. Different roles for each expertise were defined to coordinate advocacy and to maintain ongoing discussions in 2017/18. The fellow was particularly involved in transversal communications to create group agreements for case definitions including diagnostic guidelines.

C. Investigation on use of whole genome sequencing and molecular typing in routine surveillance in France

The fellow gathered information on next generation sequencing for surveillance activities and compared current practices in France with the timeline of ECDC roadmap for integration of molecular and genomic typing into European-level surveillance and epidemic preparedness. The fellow gave a short presentation on the results at the ECDC.

D. Management of regular projects and meetings

Public health management components were regular parts of projects conducted during the fellowship. This includes laboratory management, ethical and integrity considerations, team building and coordination, time and research management, research collaborations and communication strategies. The fellow worked in multidisciplinary teams on a regular basis to combine the activities of microbiologists, epidemiologists and physicians in particular. The fellow managed teams with multicultural backgrounds in international environments, coordinated transversal approaches to support advocacy efforts and formulated recommendations to international organisations.

Training modules

During the module on Management, Leadership and Communication in Public Health, participants were introduced to the principles of effective management as well as different management, motivation and leadership styles. Likewise, this module focussed on personality traits relevant to professional development strategies and on effective communication and structured feedback with peers, stakeholders as well as media/public.

Educational outcome: The fellow gained substantial experience in working in multidisciplinary teams and gained valuable knowledge on developing customised approaches for a specific public health context. The fellow gained experience in team management, time management, prioritizing as well as presenting data, results and strategies to varied audiences.

8. Communication

Publications (peer-reviewed articles)

1. Charre C, Cotte L, Kramer R, Miaillhes P, Godinot M, Koffi J, Scholtès C, Ramière C. Hepatitis C virus spread from HIV-positive to HIV-negative men who have sex with men. *PLoS One*. 2018; 13:e0190340.
2. Kramer R*, Sabatier M, Wirth T, Pichon M, Lina B, Schuffenecker I, Josset L. Molecular diversity and biennial circulation of enterovirus D68: a systematic screening study in Lyon, France, 2010 to 2016. *Euro Surveill*. 2018; 23(37):pii=1700711
3. Kramer R, Duclos A, the VRS study group in Lyon, Lina B, Casalegno JS. Cost and burden of RSV related hospitalisation from 2012 to 2017 in the first year of life in Lyon, France. *Vaccine* 2018 Sep 25. doi: 10.1016/j.vaccine.2018.09.029 [Epub ahead of print]
4. Knoester M, Helfferich J, Poelman R, Van Leer-Buter C, Brouwer OF, Niesters HG on behalf of the 2016 EV-D68 AFM Working Group[±]. Twenty-nine cases of Enterovirus-D68 associated acute flaccid myelitis in Europe 2016; a case series and epidemiological overview. *Pediatr Infect Dis J*. 2018 Sep 18. doi: 10.1097/INF.0000000000002188 [Epub ahead of print]
5. Kramer R*, Lina B, Shetty J. Acute flaccid myelitis caused by enterovirus D68: case definitions for use in clinical practice. [submitted to *European Journal of Paediatric Neurology*]
6. Kramer R, Gillet Y, Javouhey E, Valette M, Duclos A, Biot B, Ploin D, Vanhems P, Morfin F, Lina B, Casalegno JS. Hospital-based surveillance for respiratory syncytial virus to identify risk factors for severe infection in the first year of life, Lyon, France 2012 to 2017. [in final preparation]
7. Forissier MF, Gerbier-Colomban S, Houhamdi L, Josset L, Kramer R, Lina B, Pasquet-Volckmann C, Pichon M [authors in alphabetical order]. Effect of a reinforced campaign for seasonal influenza vaccination of healthcare workers on nosocomial outbreaks in the University Hospital of Lyon, France during the 2016-2017 influenza season. [manuscript in preparation]

*corresponding author

±member of the working group

Reports

1. Survey report. Knowledge, Attitude, and Practice (KAP) survey of Long-Lasting Insecticide-treated Nets (LLITNs) in Ofua zone, Rhino settlement, Arua district, Uganda. Médecins Sans Frontières (MSF), 2017
2. Study report. Exhaustive community surveillance in Palorinya settlement camp, Moyo district, Uganda. Médecins Sans Frontières (MSF), 2017
3. Situation report. Water and sanitation in the Palorinya settlement camp, Uganda – a public health perspective. Médecins Sans Frontières (MSF), 2017
4. Outbreak report. Rare bacterial pathogens in ICUs. Hospices Civils de Lyon, 2018

Conference presentations

Oral presentation

1. Kramer R, Casalegno JS on behalf of the VRS study Group in Lyon. Hospital surveillance for respiratory syncytial virus (RSV) in the main metropolitan area of Lyon, France, using birth databases and data on hospitalization for clinical bronchiolitis from 2012 to 2017. European Congress of Epidemiology 2018, July 2018, Lyon, France
2. Kramer R, Déméautis T, Garnier H, Dupont D, Lina B, Rabodonirina M, Wallon M, Persat F, Menotti J. Antimicrobial resistance in *Aspergillus fumigatus* isolated February to September 2017 from clinical specimens in Lyon, France. ESCAIDE 2018, November 2018, Saint Julian's, Malta [confirmed]

E-poster presentation

1. Kramer R, Sabatier M, Wirth T, Josset L, Schuffenecker I, Lina B. Biennial pattern in enterovirus D68 infections from 2010 to 2016, Lyon, France. ESCAIDE 2017, November 2017, Stockholm, Sweden

2. Kramer R, Houhamdi L, Gerbier-Colomban S, Forissier MF, Pasquet-Volckmann C, Lina B. Effect of a reinforced hospital campaign for seasonal influenza vaccination of healthcare workers 2016-2017 on nosocomial outbreaks in the University Hospital of Lyon, France. ESCAIDE 2017, November 2017, Stockholm, Sweden
3. Casalegno JS, Kramer R, Lina B, on behalf of the VRS study Group in Lyon. Burden of respiratory syncytial virus associated hospitalisation in the first year of life in a major urban city, Lyon, France 2010 to 2016. ESCAIDE 2018, November 2018, Saint Julian's, Malta [confirmed]

Poster

Kramer R, Bal A, Valette M, Morfin F, Lina B. Surveillance of introduction of MERS-CoV and other respiratory viruses: appraisal of an alternative screening procedure. ECCMID 2017, April 2017, Vienna, Austria

9. EPIET/EUPHEM modules attended

1. EPIET/EUPHEM Introductory Course, 26. September - 14. October 2016, Spetses, Greece
2. Outbreak Investigation Module, 05.-09. December 2016, Berlin, Germany
3. Multivariable Analysis Module, 13.-17. March 2017, Zagreb, Croatia
4. Rapid Assessment and Survey Methods, 08.-13. May 2017, Athens, Greece
5. Project Review Module, 28. August - 01. September 2017, Lisbon, Portugal
6. Biorisk and Quality Management Module, 05.-09. February 2018, Stockholm, Sweden
7. Management, Leadership and Communication in Public Health, 12.-16. February 2018, Stockholm, Sweden
8. Project Review Module, 27.-31. August 2018, Lisbon, Portugal

10. Other courses

1. Influenza vaccination of health care workers - can uptake be improved? MOOC by ECDC, November 2016
2. Vaccinology. MOOC by Institute Pasteur, January 2017
3. Preparation Pre Departure (PPD) training, Médecins Sans Frontières, 23.-28. March 2017, Bonn, Germany

11. International mission

Palorinya refugee camp, Uganda: Epidemiological support for Médecins Sans Frontières / Doctors Without Borders (MSF)

The refugee camp in Palorinya in north-western Uganda is stretched out over larger areas than conventional camps in order to allow for both shelter and agricultural production. The camp was being designed for the clustering of household plots of 30 x 30 metres and reached an official population count of 161,000 South Sudanese refugees in summer 2017. In November and December 2017, the fellow coordinated the epidemiology activities in the camp including an exhaustive electronic surveillance system to monitor morbidity, mortality, vaccination status, malaria prophylaxes and other public health concerns. Data was collected by outreach teams who received support and on-the-job-training by the fellow on a regular basis. The fellow also supported the project coordination team of the camp to identify vulnerable groups to violence and waterborne disease. Weekly surveillance reports as well as additional situation reports were written by the fellow and distributed to the Ministry of Health of Uganda, UNHCR and MSF headquarters.

Discussion

Coordinator's conclusions

One of the main goals of the EUPHEM programme is to expose fellows to diverse and multidisciplinary public health experiences and activities, thus enabling them to work across different disciplines. This report summarises all activities and projects conducted by Rolf Kramer during his two-year EUPHEM fellowship (cohort 2016) as an EU track fellow at the Hospices Civils de Lyon (HCL), France. Rolf is the second appointed EU track EUPHEM fellow in Lyon. The projects described in this portfolio demonstrate a diversity of public health microbiology projects. The epidemiological studies consisted from outbreak investigations (at regional level in Lyon and national level in Uganda) to surveillance activities including influenza or enterovirus infections in France or implementation of an intensive surveillance system in a refugee camp in Uganda. The laboratory and epidemiologically based projects covered all diverse range of disease programmes involving multidisciplinary working and teamwork on all levels such as physicians, laboratory technicians, epidemiologists, statisticians, government officials and public health officers, showing strength of the fellow and ability to work within such an extended environment(s). Rolf has participated in different study groups and has assisted MSF in different activities during his international mission: outbreak investigation, surveillance and teaching. Rolf has shown a high capacity of public health management by working with an active role in interdisciplinary groups and bringing different professionals together. Activities were in line with the 'learning by doing' of the EUPHEM programme and fulfilled the core competency domains described for professionals in their mid-career and beyond. Activities were complimented by nine training modules providing theoretical knowledge. Projects had a clear outcome, with results communicated in scientific journals and at conferences. The contributions made by Rolf to HCL work indicates importance of developing a future critical mass of highly skilled field public health microbiologists within Member States to contribute towards national preparedness as well as being available for responses in the interest of the EU. The EUPHEM Coordinator Team concludes that the fellow has succeeded in performing all his tasks to a very high standard and with a professional and critical attitude. We wish the fellow every success in his future career.

Supervisor's conclusions

During this 2-year training program, Rolf has been involved in a large number of projects covering all major aspects of the Public Health Microbiology. In addition, he has been invited to join informal discussions during meetings dealing with surveillance and research issues, where he could grasp the work done in the different National Reference Centres of the site. He has been in close contact with a large number of biologists, and definitively gained some experience in both epidemiology and microbiology. He has always been very active to be involved in a large number of programs and projects, including international missions with MSF. The global output of Rolf's work is excellent.

Overall, Rolf has been an asset of the team during his stay. He developed excellent connections within and out of the lab, allowing his implication in a large number of projects. Some have been carried out thanks to his very strong commitment.

Personal conclusions of fellow

Being a fellow of the EUPHEM programme has exposed me to a broad range of activities in public health on a national and international level. I gained hands-on experience in outbreak investigations, surveillance activities and public health research covering virology, bacteriology, parasitology and mycology. Working in cross-cutting areas spanning microbiology to epidemiology, I developed skills to bridge the gap between the disciplines. From my personal view, one of the strongest assets of the EUPHEM fellowship are the multiple opportunities to work with interdisciplinary professionals in public health management and global health. It broadened my knowledge in epidemiology and control of infectious diseases. In the past two years, I could establish and develop professional connections across Europe and beyond. I very much enjoyed working in those networks and I am looking forward to strengthen them in my future professional roles.

Acknowledgements of fellow

I would first like to thank my local EUPHEM supervisor Bruno Lina for his excellent supervision, guidance and commitment. Thanks to all project supervisors and colleagues in the Institut des agents infectieux and the epidemiology unit of the CHU Lyon as well as to all collaboration partners in various projects and working groups for their support and motivation. A special thank you to the entire team of my MSF mission in Uganda for their outstanding team spirit. I would like to express my gratitude to my frontline coordinator Silvia Herrera for her guidance and continuous support. Thanks to all other EUPHEM and EPIET coordinators, heads of programme and members of the fellowship office for their enthusiasm, administrative support, scientific input and leadership.

A huge thank you to all fellows from C2016 for their friendship, energy and great team spirit over the past two years. Finally, thank you to C2015 and C2017 as well as to all EPIET/EUPHEM alumni who I met along the way for sharing their experience and for always having a great time together.