



Summary of work activities

Despina Pampaka

Intervention Epidemiology path (EPIET), 2019 cohort

Background

The ECDC Fellowship Programme is a two-year competency-based training with two paths: the field epidemiology path (EPIET) and the public health microbiology path (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 provide 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.

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 Despina Pampaka, cohort 2019 of the Intervention Epidemiology path (EPIET) at the Centro Nacional de Epidemiología (CNE), Instituto de Salud Carlos III (ISCIII), Madrid, Spain.

Pre-fellowship short biography

Despina Pampaka obtained a bachelor's degree in biological sciences (2007) and a master's degree in environmental health (2009). She worked as a research and teaching assistant at the Cyprus International Institute for Environmental and Public Health, where she was also enrolled in the PhD programme in Public Health. Upon completion of her post-graduate studies (2018), she worked as a field epidemiologist for Médecins Sans Frontières in South Sudan.

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Methods

This report accompanies a portfolio that demonstrates the competencies acquired during the EPIET fellowship by working on various projects, activities, theoretical fellowship training modules, other modules or trainings and from international assignments or exchanges.

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 ECDC Fellowship Manual¹.

1. Epidemiological investigations

1.1 Outbreak investigations

COVID-19 outbreak in a hotel in Tenerife, Spain, February–March 2020

Supervisors: Noemí López Perea, Rosa Cano Portero, Domingo Núñez Gallo (Consejería de Sanidad - Gobierno de Canarias)

On 24 February, an individual travelling from an at-risk region in Italy presented to a hospital in Tenerife with symptoms of an acute respiratory infection that started on 16 February and tested positive for SARS-CoV-2. The index case arrived in Tenerife on 17 February with their partner and a group of eight individuals. The investigation focused on the management of the outbreak, which was the first outbreak in Spain. Contact tracing and active case finding were performed. The clinical, epidemiological and laboratory data compiled by the public health authorities of the Canary Islands were used to describe the evolution of the outbreak. Over the course of this investigation, nine close contacts of the index case and 24 casual contacts were identified. Another seven cases associated with this outbreak were confirmed. Seven cases including the index case were transferred to a local hospital for isolation and monitoring. Due to the prolonged exposure of this symptomatic index case to their travel group and other hotel guests, public health authorities placed the hotel under quarantine. The temperature of the guests was recorded twice a day. Over 400 samples from hotel guests, hotel workers and other cases under investigation unrelated to the hotel were tested by PCR. A field clinic was established outside of the hotel to organise daily activities and address the medical needs of guests. Non-pharmaceutical interventions were implemented. The quarantine finished on 10 March with no other cases. The collaboration and communication between the public health authorities and the hotel management were vital for controlling this outbreak.

Despina was a co-investigator with the EUPHEM fellow in Spain, Andreas Hofer. She was involved in contact-tracing activities, data entry and data analysis. Moreover, a rapid communication was prepared and was submitted to a peer-reviewed journal with recommendations. She presented the results in a poster during ESCAIDE 2020.

COVID-19 outbreak in a reception centre for refugees, asylum seekers and migrants in Spain, August–September 2020

Supervisor: Jorge del Diego-Salas (Ministry of Health, Spain)

On 20 August 2020, the public health services of Melilla were informed of the first COVID-19 case detected in a reception centre for refugees, asylum seekers and migrants. The centre was overcrowded with 1 354 people, almost three times the initially intended capacity of 480, which was later expanded to 782. By 15 September, the number of cases increased to 84 and the chains of transmission were uncontrolled. Therefore, a team from the Ministry of Health (MoH) and ISCIII conducted a field investigation, from 20 to 25 September, to support the response to the outbreak by assessing the situation and identifying key actions for controlling the outbreak. The oversaturation of the centre, the lack of space and their consequences were the main barriers for the implementation of effective prevention and control measures for COVID-19. Based on the interviews conducted and the observations during the field investigation, the following recommendations were proposed: conduct screening of all the residents to understand the current situation and identify cases so that they can be treated and isolated; decongest the centre so that isolation,

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

quarantine and social distancing can be implemented successfully; and strengthen prevention and control measures, especially through health promotion.

Despina was a co-investigator with the EUPHEM fellow in Spain. She was involved in risk evaluation, preparation of questions for residents, interviews with residents, descriptive analysis of the outbreak, and preparation of an internal report and a manuscript.

Analysis of COVID-19 contact tracing data (assignment with ECDC)

Supervisors: Erika Duffell (ECDC), Emmanuel Robesyn (ECDC), Stefania De Angelis (ECDC)

Contact tracing is an important public health measure for the control of COVID-19, aiming to promptly identify and manage contacts of COVID-19 cases in order to reduce further onward transmission. There are many features of contact tracing that have developed rapidly during the COVID-19 pandemic, such as the use of mobile apps and new analysis software. Analyses of data from contact tracing can provide key information that can help to inform more effective response measures. The objectives of this project were to perform an analysis of contact tracing data and to describe the methods used to analyse the data in order to enhance the use of contact tracing data and facilitate the sharing of information and experiences among Member States. Access to regional data was made available via the regional authorities since contact tracing data are collected at the local/regional level in Spain. A close collaboration with the region of La Rioja was established through collaboration with the epidemiological services in La Rioja. The data collection tool and the dataset were explored to get an overview of contact tracing in the region. The ECDC contact tracing indicators were calculated, according to the availability of the corresponding variables and data.

Three EPIET fellows working in three different countries (Ireland, Italy, Spain) collaborated for this project, each analysing data from the corresponding host country. Despina was the fellow working in Spain. She analysed data and contributed to the final ECDC technical report, as well as the preparation of a manuscript that will be submitted to a peer-reviewed journal.

Investigation of an outbreak of SARS-CoV-2 B1.671.2 variant in Santander, Cantabria, May–June 2021

Supervisor: Adrian Hugo Aginagalde Llorente (Observatorio de Salud Pública de Cantabria)

On 1 June, two COVID-19 cases (mother and son) were notified to the Surveillance System of Cantabria. The index case had onset of symptoms on 28 May 2021 and was tested on 1 June. Additional PCR tests and partial sequencing suggested that the case was infected with the SARS-CoV-2 B1.671.2 (Delta) variant of concern (VOC). An extensive investigation was conducted to identify close contacts of the cases and to mitigate the risk of transmission. Of the five family members identified as close contacts of the first two cases, four were PCR-confirmed as COVID-19 cases and were asked to stay in isolation. Contact-tracing of secondary cases revealed another two close contacts, of whom none had a positive PCR test. All cases experienced symptoms but none of them required hospitalisation. None of the cases was vaccinated against COVID-19. Backward contact-tracing was conducted to identify the primary case, since none of the cases reported travelling in other regions or countries. The primary case remained unknown and there was no evidence of a link with the previous three outbreaks of the Delta VOC in the region of Cantabria. The genomic surveillance and contact-tracing activities in place facilitated the early detection of this outbreak, despite the lack of link to an imported case. Enhancing genomic surveillance is essential for early detection and control of future clusters and outbreaks related to VOCs.

Despina was a co-investigator in this outbreak and was involved in contact-tracing, case finding, interviews with cases and contacts, descriptive analysis of the outbreak and the preparation of an internal report.

Interregional measles outbreak with nosocomial transmission in Spain, November 2017–July 2018

Supervisors: Noemí López Perea, Josefa Masa Calles

In Spain, a measles outbreak was detected in the autonomous region of Valencia in November 2017 and it was linked to an imported case from Romania. The aim of this work was to describe the evolution of the outbreak, present the main characteristics of the cases and explore the role of nosocomial infections in the magnitude of this outbreak and the control measures implemented. We used descriptive epidemiology to perform a retrospective analysis of the outbreak using cases notified to the National Epidemiological Surveillance Network (RENAVE in Spanish), via the Spanish Surveillance System electronic platform (SiVIES in Spanish). The first case had rash onset on 19 November 2017 and the last case on 12 July 2018. The epidemic peaked in March, on week 11 of 2018. There were 148 laboratory-confirmed cases and six probable cases. Cases occurred primarily in two autonomous regions: Valencia (2.8 per 100 000 population) and Catalonia (0.2 per 100 000 population). Five chains of transmission were identified, with significant transmission in hospital settings. The median age of cases was 33 years old (range: 0-55 years old) and 87 were females (56.5%). Eleven cases occurred in infants of less than 1 year old and another 11 in children between 1 and 9 years old. Overall, 102 were unvaccinated (66.2%). Genotype B3 was identified in all specimens analysed (n = 69), which were identical to the reference variant MVs/Dublin.IRL/8.16. Local and regional public health authorities implemented control measures according to regional and national guidelines. This work is ongoing and some results are pending. The work will be finalised after the completion of EPIET.

Despina was the principal investigator for this retrospective analysis and was involved in revision of data, data analysis and preparation of a manuscript. She is currently preparing a manuscript that will be submitted to a peer-reviewed journal.

Training modules related to assignments/projects

EPIET/EUPHEM Introductory Course

The module introduced the main concepts of outbreak investigations, study designs and analysis. The fellows familiarised themselves with the 10 steps of outbreak investigations, questionnaire design and formulating public health recommendations, and practiced outbreak investigations and analysis of data from outbreaks in case studies.

Outbreak Investigation Module

The module deepened the fellows' understanding of outbreak investigations. The module introduced the fellows to univariable and stratified data analysis, epidemic intelligence, mapping, and spatial analysis. A core component of the course is a multi-day case study on a cohort study for an outbreak of gastroenteritis.

Educational outcome

Despina was involved in the outbreak investigation with multiple levels of responsibility. The field assignments and retrospective analyses strengthened her skills in outbreak investigation, data analysis and report writing. Through the ECDC project she became familiar with the contact-tracing work conducted at the local/regional level and she got hands-on experience with the analysis of contact-tracing data.

1.2 Surveillance

Molecular and epidemiological characterisation of toxigenic and non-toxigenic *Corynebacterium diphtheriae*, *Corynebacterium belfantii*, *Corynebacterium rouxii*, and *Corynebacterium ulcerans* isolates identified in Spain, 2014–2019

Supervisors: Silvia Herrera Leon (National Centre for Microbiology – CNM in Spanish), Laura Herrera Leon (CNM), Noemí López Perea, Josefa Masa Calles

We used microbiological and epidemiological data to describe the characteristics of toxigenic and non-toxigenic *Corynebacterium* isolates submitted to the national reference laboratory in Spain between 2014 and 2019, in order to describe the current situation and improve our knowledge regarding these emerging pathogens. Surveillance information was extracted from the Spanish Surveillance System. Microbiological and molecular characterisation was carried out using phenotypic methods, multilocus sequence typing (MLST), whole-genome sequencing (WGS), and core genome MLST (cgMLST). Thirty-nine isolates were analysed. Twenty-one isolates were identified as *Corynebacterium diphtheriae* (6 toxigenic), 14 as *C. belfantii*, 4 as *C. ulcerans* (3 toxigenic), and 1 as *C. rouxii*. One *C. diphtheriae* isolate was identified as non-toxigenic tox gene bearing (NTTB). Ages of patients ranged from 1 to 89 years old, with 10% (3/30) of non-toxigenic and 22% (2/9) of toxigenic isolates collected from children less than 15 years old. Twenty-five of the patients were males (17/30 non-toxigenic; 8/9 toxigenic). MLST identified 28 sequence types (STs), of which seven were described for the first time in Spain. WGS analysis showed that 10 isolates, including 3 toxigenic isolates, harboured a variety of antibiotic resistance genes in addition to the high prevalence of penicillin resistance phenotypically demonstrated. Phylogenetic analysis revealed one cluster of isolates from family members. Risk information was available for toxigenic isolates (9/39); three patients reported recent travel to countries of endemicity and three had contact with cats/dogs. One unvaccinated child with respiratory diphtheria had a fatal outcome.

This work was a joint work with the EUPHEM fellow in Spain and a collaboration between the CNM and CNE. Despina was the principal co-investigator and was in charge of the epidemiological analysis. The fellows wrote a manuscript (shared first authorship) that was published in a peer-reviewed journal. Despina participated in the preparation of graphs and figures of a report on this topic. This work was presented as a poster at ESCAIDE 2020 by the EUPHEM fellow.

Measles surveillance

Supervisors: Noemí López Perea, Josefa Masa Calles

Following the WHO Regional Office for Europe's recommendations for measles elimination in each country of the European region, Spain prepared a national plan to eliminate measles. The plan was approved in 2000 and by 2016 Spain gained its measles elimination status, as a result of sustained high vaccination coverage and enhanced disease surveillance. Measles is a notifiable disease in Spain. The aim of this work was to understand the measles surveillance system in Spain and get familiar with the reporting procedures at national, European and global levels.

Despina was involved in routine surveillance activities for measles. Her duties included monitoring line-lists and preparing weekly reports that were shared with the members of the Measles Elimination Plan Group.

COVID-19 surveillance

Supervisor: Amparo Larrauri

The first wave of the COVID-19 pandemic spread rapidly in Spain, one of Europe's most affected countries. A national lockdown was implemented on 15 March 2020. National surveillance data were used to describe PCR confirmed cases as at 27 April 2020 and to identify disease severity risk factors in this population. We compared case characteristics by severity categories (hospitalisation, admission to intensive care unit (ICU), death) and identified severity risk factors using multivariable regression. The epidemic peaked on 20 March. Of 218 652 COVID-19 cases, 45.4% were hospitalised, 4.6% were admitted to ICU and 11.9% died. Among those who died, 94.8% had at least one underlying disease. Healthcare workers (HCWs) represented 22.9% of cases. Males were more likely to have severe outcomes than females. Cardiovascular disease was a consistent risk factor. Patients with pneumonia had higher odds of hospitalisation (odds ratio (OR): 26.63; 95% confidence interval (CI): 25.03–28.33). The strongest predictor of death was age ≥ 80 years (OR:28.4; 95% CI: 19.85-40.78). Among underlying disease, chronic renal disease had highest odds of death (OR:1.47; 95% CI: 1.29-1.68). COVID-19 cases began declining six days after the national lockdown. The first wave of the COVID-19 pandemic in Spain had a severe impact on elderly people. Patients with cardiovascular or renal conditions were at higher risk for severe outcomes. A high proportion of cases were HCWs.

Despina participated in discussions about the analysis and the interpretation of the statistical results, and she was actively involved in the preparation, review and editing of the manuscript. The manuscript was published in a peer-reviewed journal and she presented this work as an oral online presentation at ESCAIDE 2020.

Training modules related to assignments/projects

EPIET/EUPHEM introductory course

The module familiarised the fellows with the core concepts in surveillance. It covered the development and evaluation of a surveillance system as well as key aspects of the analysis of surveillance data.

Multivariable Analysis Module

The module deepened the fellows' statistical skills by covering various aspects of multivariable analysis, confounding and effect modification. The module introduced a variety of regression methods that can be applied to surveillance data analysis and it also provided the basis on which the Time Series Analysis module could build.

Educational outcome

Despina became familiar with the surveillance of various infectious diseases in Spain, including the contribution of laboratory surveillance. She analysed and interpreted surveillance data. She was involved in routine surveillance activities for measles and COVID-19, participating in regular feedback of surveillance data to stakeholders. She contributed actively to the preparation of manuscripts and reports. The field visits helped her gain insight into surveillance at the local/regional level and thus a better understanding of surveillance in decentralised systems. Moreover, her deployment to Bosnia and Herzegovina with the Global Outbreak Alert and Response Network (GOARN), as described in Other activities, was an opportunity to experience surveillance activities in other countries.

2. Applied public health research

Assessment of missed opportunities for vaccination among children < 24 months old in Zimbabwe, 2017 (assignment with WHO)

Supervisor: Laura Nic Lochlainn (WHO)

A missed opportunity for vaccination (MOV) occurs when someone eligible for vaccination has a health service encounter but does not receive vaccine(s) for which they are eligible. In November 2017, Zimbabwe conducted a MOV assessment, in order to estimate the magnitude and explore possible reasons for MOV and factors that could inform interventions to prevent MOV. Using the WHO MOV strategy, the assessment was conducted in 10 provinces. Data were collected by conducting health facility exit interviews with caregivers accompanying children < 24 months old. A knowledge, attitudes, and practices (KAP) survey was self-administered to healthcare workers. We estimated the magnitude of MOV using only documented vaccination dates from records and analysed the reported reasons for MOV and timeliness of vaccination. Of the 493 children with documented vaccination dates, 60% (n = 295) were vaccine-eligible at the time of the assessment. Of these children, 25% (n = 73) had a MOV. Among 64 children attending for a non-vaccination visit, 66% (n = 42) had a MOV, whilst 92% (n = 34) of children aged 12 to 23 months had a MOV. With multi-dose vaccine series, the prevalence of MOV increased with subsequent doses. A third of healthcare workers (36%; n = 113) reported their vaccine knowledge was insufficient. Only 35% (n = 109) of healthcare workers identified the correct contraindications against vaccination. A majority of healthcare workers were concerned about adverse effects events following immunisation (71%; n = 220) and believed that parents' negative beliefs (63%; n = 195) and distance from vaccination site (65%; n = 203) were the main determinants for incomplete childhood vaccination. The MOV assessment in Zimbabwe highlighted areas for improvement that could increase vaccination coverage and equity. Interventions to reduce MOV should include providing training to healthcare workers and improving the screening for vaccine-eligible children, irrespective of the reason for the visit or the age of the child.

Despina was responsible for cleaning and analysing the quantitative data. She summarised the key findings in a manuscript to be submitted to a peer-reviewed journal. This work was presented as a poster in ESCAIDE 2020. A supplementary statistical analysis (multivariable logistic regression) was performed to identify the factors that were associated with MOV in Zimbabwe. Another EPIET fellow was the primary investigator for the analysis of the qualitative data. Despina contributed as a co-author to this work and both fellows triangulated the quantitative and qualitative results.

Meteorological conditions and Legionnaires' disease – a systematic review

Supervisors: Rosa Cano Portero, María Del Rocío Carmona Alférez, Diana Gómez Barroso, Noemí López Perea

A number of studies suggest that meteorological conditions are related to the risk of Legionnaires' disease (LD), but the findings are not consistent. Identifying which conditions influence disease occurrence can improve differential diagnosis for community-acquired pneumonia and surveillance of LD. A systematic review was conducted to describe the evidence on the association of weather with sporadic LD and highlight the key meteorological conditions related to this outcome. PubMed, EMBASE, The Cochrane Library and OpenGrey were searched on 26 and 27 March 2020 without date, language or location restrictions. Keywords included 'legionellosis', 'legionnaires' disease', combined with 'meteorological conditions', 'weather', 'temperature', 'humidity', 'rain', 'ultraviolet rays', 'wind speed', etc. The study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and it was registered in PROSPERO (#CRD42020168869). There were 811 articles identified, of which 17 were included in the qualitative synthesis. The studies investigated different meteorological variables and most of them examined the combined effect of several meteorological variables. The most commonly examined factors were precipitation (15/17) and temperature (15/17), followed by relative humidity (12/17). The studies suggested that increased precipitation, temperature and relative humidity were positively associated with the incidence of LD. There was weak evidence that higher wind speed, UV radiation and longer sunshine duration were inversely linked with the occurrence of LD. A period of increased but not very high temperatures, followed by a period of increased precipitation, favour the occurrence of LD. Taking weather conditions into account helped explain the epidemiological patterns of LD sporadic cases. Increased awareness on the contribution of weather conditions among clinicians and public health professionals can improve diagnosis and enhance surveillance of LD.

Despina wrote a protocol that was submitted to PROSPERO. She performed all the steps of the systematic review and prepared a manuscript to be submitted to a peer-reviewed journal. An abstract was prepared for ESCAIDE 2021 that was accepted as a poster presentation.

The risk of autochthonous malaria in Spain

Supervisors: Beatriz Fernández Martínez, Diana Gómez Barroso

In Spain malaria was eradicated in 1964. Since then, only a few autochthonous cases have been detected and described, but the vector is still present, especially in former endemic areas. More precisely, 13 *Anopheles* species have been previously identified and a few studies have suggested that there is potential risk of malaria transmission in certain areas of Spain. From 2014 to 2017, 3 005 cases were notified, five of whom were not imported. Taking into consideration the hundreds of malaria cases imported each year and the volume of tourist or immigrant arrivals from malaria-endemic countries, the risk of locally acquired malaria may not be negligible, especially in areas where the vector is abundant and transmission is possible. Identifying higher risk areas can guide prevention and control measures and mitigate the risk of autochthonous malaria and disease resurgence. Therefore, the aim of this work was to map the risk of autochthonous malaria across Spain in order to guide prevention and control measures. An ecological study that combines epidemiological, entomological, demographical, travel and tourism data from 2016 to 2019 was conducted. This project is ongoing and will continue after completion of EPIET. Preliminary results of the epidemiological analysis were shared with project supervisors.

This project is a collaboration with other colleagues who are responsible for the entomological data collection, analysis of entomological and environmental data and preparation of the vector risk map. Despina prepared the protocol. She is currently conducting the analysis of the epidemiological data and is expected to contribute to the manuscript.

Training modules related to assignments/projects

EPIET/EUPHEM Introductory Course

The module familiarised the fellows with the core concepts of operational and applied research. It covered the development of study protocols and the drafting of aims and objectives relevant to a national public health institute, as well as data analysis and presentation for the other modules to build on.

Multivariable Analysis Module

The module deepened the fellows' statistical skills by covering various aspects of multivariable analysis, confounding and effect modification. The module introduced a variety of regression methods that can be applied to data analysis in research projects and it also provided the basis on which the Time Series Analysis module could build.

Educational outcome

Despina further developed her skills in research. She prepared protocols for two projects and she formulated research questions. She extracted and cleaned data and she performed an analysis. She interpreted the results and she presented them in manuscripts and posters, along with public health recommendations. Through the project in collaboration with WHO, she learned about the MOV methodology, the aim of this survey and the challenges of analysing survey data retrospectively.

3. Teaching and pedagogy

Facilitation of the case study 'An outbreak of gastroenteritis in Kalundborg, Denmark'

Despina facilitated the case study 'An outbreak of gastroenteritis in Kalundborg, Denmark' for the Master of Applied Microbiology in Public Health at the Escuela de Salud Publica, Instituto de Salud Carlos III, on 5 December 2019. The students were divided into three groups and Despina facilitated the case study for one of the groups. The session lasted four hours.

Lecture on observational studies and co-facilitation of a practical session on epidemiological study design

Despina gave an online, one-hour lecture on observational studies (ecologic, case reports, case reports series and cross-sectional) for the Master of Applied Microbiology in Public Health on 5 October 2020 in Spanish. The lecture was followed by a practice session, prepared by Despina, on the study design of epidemiological studies (one hour).

Co-facilitation of the case study 'An outbreak of food poisoning at a wedding in Dublin'

Despina co-facilitated the case study 'An outbreak of food poisoning at a wedding in Dublin' for the Master of Applied Microbiology in Public Health on 7 October 2020. The case study was facilitated online and lasted for approximately two hours.

Introduction to Go.Data, GOARN deployment to Bosnia and Herzegovina

Despina facilitated various sessions on Go.Data (February–March 2021) for data managers and epidemiologists who work at local, regional and central levels in Bosnia and Herzegovina (see Other activities). The three to four hour sessions included an introduction to this contact tracing tool and were delivered face-to-face and online.

Lecture on 'Health promotion in humanitarian settings'

An online presentation was given to the students of the Master of Public Health at the Cyprus University of Technology on 26 March 2021. The presentation lasted for one and a half hours.

Training modules related to assignments/projects

EPIET/EUPHEM Introductory Course

The module familiarises the fellows with the principles of adult education, including development and facilitation of training activities. It was also the first of many modules where case studies were used as a teaching method. This provided a valuable introduction to case studies as tools for teaching.

Educational outcome

Despina facilitated case studies in Spanish for students. She adopted lectures and prepared new material, as well as practice exercises. During her GOARN deployment (see Other activities) she planned, organised and delivered training sessions on Go.Data for public health professionals, face-to-face and online. The aforementioned activities contributed to strengthening her skills in public health training and teaching. She became more familiar with the challenges of online training and aware of the importance of interactive techniques.

4. Communication

Publications related to the EPIET fellowship

1. Hoefler A, **Pampaka D**, Wagner ER, Herrera AA, Alonso EG-R, López-Perea N, et al. Management of a COVID-19 outbreak in a hotel in Tenerife, Spain. *International Journal of Infectious Diseases*. 2020;96:384–6.
2. Hoefler A, **Pampaka D**, Castrillejo D, Luenga-Cabrera J, Paisi M, Herrera-León S, et al. Considerations for COVID-19 management in reception centres for refugees, asylum seekers and migrants following a risk evaluation during a COVID-19 outbreak in a reception centre, September 2020, Spain. Under review.

3. De Angelis S, Urdiales AM, **Pampaka D**, Ferenczi A, Duffell E, and Robensyn E. Towards a European standard for the collection and analysis of contact tracing data: lessons learned from a project in Ireland, Italy, and Spain. In preparation.
4. Hoefler A, **Pampaka D**, Herrera-León S, Peiró S, Varona S, López-Perea N, et al. Molecular and epidemiological characterization of toxigenic and nontoxigenic *Corynebacterium diphtheriae*, *Corynebacterium belfantii*, *Corynebacterium rouxii*, and *Corynebacterium ulcerans* isolates identified in Spain from 2014 to 2019. *Journal of Clinical Microbiology*. 2021;59(3):e02410-20.
5. Working group for the surveillance and control of COVID-19 in Spain. The first wave of the COVID-19 pandemic in Spain: characterisation of cases and risk factors for severe outcomes, as at 27 April 2020. *Euro Surveill*. 2020;25(50):2001431.
6. **Pampaka D**, Rupfutse M, Shendale S, Machekeyanga Z, Makwabarara E, Ogbuanu I, et al. Assessment of Missed Opportunities for Vaccination among children below 24 months in Zimbabwe, 2017. In preparation.
7. Hammer CC, Rupfutse M, Shendale S, Machekeyanga Z, Makwabarara E, **Pampaka D**, et al. Qualitative Insights into Reasons for Missed Opportunities for Vaccination in Health Facilities in Zimbabwe, 2017. In preparation.
8. **Pampaka D**, López-Perea N, Barroso DG, Carmona Alférez R, Cano R. Meteorological conditions and Legionnaires' disease - a systematic review. In preparation.
9. Fernández-Navarro P, Nuñez O, **Pampaka D**, Mazagatos C, Peñuelas M, Larrauri A, et al. Impact of Lockdown on COVID-19 Transmissibility During the First Pandemic Wave in Spain. Available at SSRN 3811670. 2021. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3811670
10. Fernández-Martínez B, **Pampaka D**, Suárez-Sánchez P, Figuerola J, Sierra-Moros MJ, León-Gómez I, et al. Mapping the risk of dengue in Spain. New tools for risk assessment from a spatial approach. Under review.

Reports

1. **Pampaka D**, Hoefler A. A COVID-19 outbreak in a reception centre for refugees, asylum seekers and migrants, August-September 2020, Spain. Internal report. 2020.
2. European Centre for Disease Prevention and Control. Contact tracing data analysis EPIET/EUPHEM Fellowship project. Stockholm: ECDC; 2021.
3. **Pampaka D**. Investigation of an outbreak of SARS-CoV-2 Delta variant in Cantabria, May-June 2021. Internal report. 2021 Jun.
4. Centro Nacional de Microbiología, Centro Nacional de Epidemiología. Situación de la difteria en España. Características microbiológicas, clínicas y epidemiológicas de las cepas de *C. diphtheriae*, *C. belfantii*, *C. rouxii* y *C. ulcerans* identificadas en España, 2014-2020. Madrid: Instituto de Salud Carlos III.; 2021 Jun.
5. **Pampaka D**. GOARN End of mission report - Despina Pampaka. Internal report. 2021 Mar.

Conference presentations

1. Hoefler A, **Pampaka D**, Wagner ER, Herrera AA, Alonso EG-R, López-Perea N, et al. Management of a COVID-19 outbreak in a hotel in Tenerife, Spain. Poster presentation. ESCAIDE; 24-27 November 2020, online.
2. Hoefler A, **Pampaka D**, Herrera-León S, Varona S, López-Perea N, et al. Molecular and epidemiological characterisation of toxigenic and non-toxigenic *Corynebacterium diphtheriae* and *Corynebacterium ulcerans* isolates identified in Spain from 2014 to 2019. Poster presentation. ESCAIDE; 24-27 November 2020, online.
3. **Pampaka D** and the Working group for the surveillance and control of COVID-19 in Spain. The COVID-19 epidemic in Spain: Characterisation of cases and risk factors for severe outcomes. ESCAIDE; 24-27 November 2020, online.
4. **Pampaka D**, Nic Lochlainn L. Assessment of Missed Opportunities for Vaccination among children below 24 months in Zimbabwe, 2017. Poster presentation. ESCAIDE; 24-27 November 2020, online.
5. **Pampaka D**, López-Perea N, Barroso DG, Carmona Alférez R, Cano R. Meteorological conditions and Legionnaires' disease - a systematic review. Poster presentation. ESCAIDE; 16-19 November 2021, online.
6. **Pampaka D**, Fernández-Martínez B, Suárez-Sánchez P, Figuerola J, Sierra-Moros MJ, León-Gómez I, et al. Mapping the risk of dengue in Spain. Poster presentation. ESCAIDE; 16-19 November 2021, online.

Other activities

1. **Pampaka D**, López-Perea N, Barroso DG, Carmona Alférez R, Cano R. Meteorological conditions and Legionnaires' disease - a systematic review. Protocol. Prospero.CRD42020168869; 2020. Available from: https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=1688691.
2. **Pampaka D**, Fernández-Martínez B, Barroso DG. Risk of malaria in Spain – Research Protocol. 2021.

3. Centre for Health Alerts and Emergencies, Ministry of Health. COVID-19 scientific and technical information. <https://www.mscbs.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov/ITCoronavirus/home.htm>
4. **Pampaka D**, Andrianou X. 2019-nCoV, Public Health, Epidemiology. Philelefttheros. 2020 Feb 9:34.

5. Other activities

1. Go.Data implementation – Despina deployed with GOARN to Bosnia and Herzegovina (10 February 2021–22 March 2021). The aim of the mission was to begin the implementation of Go.Data, after collecting information on COVID-19 surveillance. Despina met key people coordinating COVID-19 surveillance and had informal interviews about surveillance. In collaboration with the WHO country office they organised trainings on Go.Data for epidemiologists and data managers at local, regional and central levels.
2. Coordination Centre for Health Alerts and Emergencies (CCAES in Spanish) – Despina spent a couple of weeks working with the group responsible for producing the technical and scientific guide for COVID-19.
3. Writing and revising manuscripts at the training site – Despina contributed to other manuscripts on work conducted at her training site, by writing, reviewing and editing drafts.

6. EPIET/EUPHEM modules attended

1. Introductory course, 23/9–11/10/2019, Spetses, Greece
2. Outbreak investigation, 9–13/12/2019, Nicosia, Cyprus
3. Multivariable analysis, 15–18/06/2020, online
4. Project review module 2020, 24–28/08/2020, online
5. Time-series analysis, 25–29/01/2021, online
6. Rapid assessment and survey methods, 27/04 and 5–6/05/2021, online
7. Vaccinology, 14–18/06/2021, online

7. Other training

1. RECON/EAN Introduction course in R for outbreak analytics, 26/11/2019, Stockholm, Sweden
2. BSAFE UNDSS training, 29/01/2021, online
3. Go.Data training, 16–18/03/2021, online
4. e-Learning course on introduction to designing in- and after-action reviews (Pilot edition), 12/04/2021, online

Discussion

Coordinator's conclusions

This report summarises all activities and projects conducted by Despina during her two-year EPIET fellowship (cohort 2019) as an EU-track fellow at the Centro Nacional de Epidemiología, Instituto Carlos III in Madrid, Spain. It's been a pleasure to work with Despina during her fellowship. She has consistently demonstrated enthusiasm and energy for new projects and for her own learning, and it has also been great to see that her contribution to Instituto Carlos III has been highly valued. Despite the challenges of the COVID-19 pandemic, she has managed to conduct a successful fellowship with a very comprehensive portfolio. Clearly Despina is a strong communicator, a skilled epidemiologist, proactive and an appreciated coworker in all her collaborations. This is demonstrated through her ability to make the most of the fellowship and the opportunities given at the training site, as well as in the other regional and international collaborations in which she has been involved. Despina has honed further her

epidemiological and public health skills during her fellowship, and I'm sure she will continue to share her expertise, contribute greatly to the field and make a genuine difference.

Supervisor's conclusions

Despina has proven to be a great professional in the field of public health in general and epidemiology in particular. She has been deeply involved in several projects at the National Centre for Epidemiology, where she was always considered as a member of the team.

Among her impressive portfolio, I would note that she has increased knowledge on legionellosis and its relationship with meteorological conditions by conducting a systematic review. She has also contributed to a better understanding of measles transmission in outbreaks involving health care settings in Spain. Her collaborative character has been reflected in the work she carried out in collaboration with a EUPHEM fellow on diphtheria in Spain.

In addition to her involvement in projects at the national level, she has shown a great interest in broadening her knowledge and collaborating with organisations such as the WHO, with the ultimate aim of improving the health of the population. This can be seen in her collaboration on 'Assessment of Missed Opportunities for Vaccination' or the Go.Data training in Bosnia and Herzegovina.

Finally, I have to emphasise the importance not only of the great professional skills that Despina has demonstrated, but also her great character, proactivity and continuous desire to improve. It has been an honour to have her as a fellow, and I am very grateful for it.

Personal conclusions of fellow

The EPIET fellowship has been an invaluable professional experience. Through the structured training of the EPIET programme that included modules, on-site supervision and mentoring by frontline coordinators, I was able to expand my knowledge on applied epidemiology and infectious diseases, develop new skills and strengthen my competencies.

Being an EPIET fellow at the National Centre of Epidemiology has been a privilege. I worked on different diseases and I was provided with different opportunities for on-site and field assignments. Through the field assignments I was able to gain a deeper understanding of the work conducted at the local/regional level but also at the Coordination Centre for Health Alerts and Emergencies (Ministry of Health). Therefore, I obtained a better understanding of public health activities in Spain, at different levels. Furthermore, the ECDC and WHO assignments, and the interaction with other fellows and colleagues, contributed enormously to my understanding of European and international public health.

Through this journey I met passionate and experienced public health professionals, in Spain and elsewhere. I learned a lot from them and they contributed to the development of my professional and interpersonal skills. Most importantly, I became part of a network of field epidemiologists and other public health professionals.

Acknowledgements of fellow

I would like to express my warmest thanks to colleagues mentioned in this portfolio and to everyone who made this journey such a rewarding experience. I am especially grateful to Noemí López Perea for her supervision and continuous support, and for encouraging me and believing in me; Rosa Cano Portero, for selecting me as a fellow, for being approachable and for doing her best to make the fellowship the most enriching experience; my project supervisors at CNE and at CNM, for the learning opportunities; Adam Roth, Frantiska Hrubá and Alicia Barrasa for their mentorship and support, and Zaida Herrador for the EPIET networking at CNE; CCAES for the outbreak investigations opportunities and the director and colleagues at CNE for making them administratively possible; the public health professionals that I worked with in Spain and at ECDC, for their collaboration and for sharing their knowledge and experience; Laura Nic Lochlainn (WHO) for the opportunity to work on MOV; GOARN, the Go.Data team and the WHO office in Bosnia and Herzegovina for the invaluable experience in Bosnia and Herzegovina; the ECDC fellowship team, including coordinators, facilitators and the fellowship office for making the programme possible; and the cohort 2019 for sharing this journey, for the educational days, the dancing nights and the beautiful memories.