FINAL REPORT

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The European Programme for Intervention Epidemiology Training (EPIET), 2021 Cohort
National Public Health Organisation (NPHO), Greece

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 at acknowledged training sites across European Union (EU) and European Economic Area (EEA) Member States.

According to Article 9 (6), Article 5 (8) and Article 11a (1) of Regulation (EU) 2022/2370 of the European Parliament and of the Council of 23 November 2022 amending Regulation (EC) No 851/2004 establishing a European centre for disease prevention and control (the ECDC Founding Regulation):

Article 9 (6) 'The Centre shall, as appropriate, support and coordinate training programmes, in particular in relation to epidemiological surveillance, field investigations, preparedness and prevention, response to public health emergencies, public health research and risk communication. Those programmes shall take into consideration the need for training to be kept up-to-date, take into account the training needs of Member States and shall respect the principle of proportionality.'

Article 5 (8) 'By encouraging cooperation between experts and reference laboratories, the Centre shall foster the development of sufficient capacity within the Union for the diagnosis, detection, identification and characterisation of infectious agents that have the potential to pose a threat to public health. The Centre shall maintain and extend such cooperation and support the implementation of quality assurance schemes'.

Article 11a (1) 'The Centre shall establish a EU Health Task Force and ensure that there is a permanent capacity and an enhanced emergency capacity to mobilise and use it. The EU Health Task Force shall provide assistance with regard to requests for prevention, preparedness and response planning, local responses to outbreaks of communicable diseases and after-action reviews in Member States and in third countries, in cooperation with the WHO. The EU Health Task Force shall include the Centre's staff and experts from Member States, fellowship programmes and international and non-profit organisations.

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 final report describes the output of the fellow and the competencies they acquired by working on various projects, activities, theoretical fellowship training modules, other modules or trainings and international assignments or exchanges during the fellowship.

Pre-fellowship short biography

Lida Politi holds a Bachelor of Science in Biology from the Faculty of Biology at the National and Kapodistrian University of Athens and a PhD in Molecular Microbiology from the Medical at the National and Kapodistrian University of Athens, Greece. Lida holds a two-decade strong laboratory background in the field of public health, where she participated among others in the investigation of hospital outbreaks of multi-drug resistant pathogens and antimicrobial resistance mechanisms. Since 2009, she has been working for Greece's National Public Health Organisation (NPHO) as a public health professional, initially as a laboratorian working on laboratory diagnosis and surveillance of influenza, West Nile virus, and antimicrobial resistance in the Microbiology Department of Medical School of Athens University. Since 2018, she has been working in the Directorate of Surveillance and Prevention of Infectious Diseases; initially she worked in the Department of Vector-borne Diseases, and since 2020, she has been working in the Department of Microbial Resistance and Infections in Health Care Settings. In September 2021, she started her EPIET fellowship as a Member State (MS) track fellow.

Results

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

1. Epidemiological investigations

Outbreak investigations

1.1 A presumed waterborne non-typhoidal salmonellosis outbreak in town A in Greece, August 2022

Supervisors: Theologia Sideroglou, Kassiani Mellou, NPHO

Category: Food- and waterborne diseases

On 19 August 2022, the Department of Foodborne and Waterborne Diseases (FWD) of the NPHO was notified by the Health Centre (HC) of town A about an increasing number of inhabitants with acute gastroenteritis visiting the HC, both children and adults. Reported symptoms were acute diarrhea, vomiting, fever, and nausea. An outbreak control team was established in order to investigate the outbreak.

Data collection was conducted via telephone interviews using structured questionnaires. The information collected included demographics, food consumption, hospitalisation, symptoms, and laboratory results. A total of 33 cases meeting the case definition were identified. A 1:3 case-control study was conducted, showing that the odds of consuming municipal tap water among cases were 5.5 times higher than the odds of consuming tap water among controls (aOR=5.46, 95%CI=1.02 − 53.95, p=0.025).

Microbiological analysis of 15 case stool samples and one tap water sample from a case household revealed *Salmonella enterica* serovar Bovismorbificans. Genotyping analysis showed an identical macrorestriction profile among isolates. Microbiological and chemical analysis results on collected tap water samples from various sites of the water supply system in town A indicated that tap water was not suitable for drinking purposes according to Greek regulations.

The results of the case-control study indicated that the consumption of tap water was the main risk factor for developing symptoms. These epidemiological findings and the laboratory results of collected tap water samples pointed to tap water as being the most probable vehicle of this relatively short-lived community outbreak due to *Salmonella* Bovismorbificans. Public advice was released immediately to drink bottled water instead of tap water and adhere to hand hygiene procedures until the tap water source serving town A was declared suitable again for drinking purposes according to Greek regulations. NPHO recommended corrective actions to the municipal water authorities to be taken, concerning chemical and microbiological suitability of tap water disinfection of the water system with chlorine. It also recommended that more frequent microbiological and chemical analyses should take place.

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

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Role: Lida was the lead investigator in NPHO and coordinated the work between the regional, municipal, and national teams. She developed the protocol, structured case and control questionnaires, line list and case-control database, performed case and control interviews by telephone, performed data entry using EpiData Manager (v4.6.0.6.) and EpiData Entry Client (v4.6.0.6.), data analysis using MS Office and the Stata 16 statistical package, and wrote the outbreak investigation report (see section 5.1.3, Outbreak Report 5). Lida will present a poster of this outbreak investigation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE, 2023) in Barcelona (see section 5.2, Presentation 3). In 2023, Lida prepared and drafted a manuscript on the results of the outbreak investigation as a first author for submission to a peer-reviewed journal. The manuscript is under development (see section 5.1.2).

1.2 A presumed waterborne norovirus outbreak caused in town B in Greece, March 2023

Supervisors: Theologia Sideroglou, Kassiani Mellou, NPHO

Category: Food- and waterborne diseases

On 4 March 2023, the FWD department of NPHO was notified about large numbers of people (>100) with acute gastroenteritis visiting the HC in town B. The main symptoms were diarrhea and vomiting. An outbreak control team was created to investigate the outbreak.

Data collection was conducted via telephone interviews using semi-structured questionnaires. The information collected included demographics, date of symptom onset and duration of symptoms, food and water consumption, hospitalisation, and participation in social events. A case-control study was conducted to reveal the source and vehicle of the outbreak.

Role: Co-investigator. Lida co-developed semi-structured questionnaires for cases and controls interviews, developed a database using EpiData Manager (v4.6.0.6.), collaborated with local and national teams, performed interviews of cases and controls, and performed data entry using EpiData Entry Client (v4.6.0.6.). She also prepared a case and control database that was used for the case-control study. The information was used by the FWD department for analysis to produce an internal report, and Lida included this outbreak investigation in the activity report (see section 5.1.3, Activity Report 10).

1.3 Investigation of COVID-19 clusters due to SARS-CoV-2 Omicron variant of concern with a potential international dimension, December 2021 –January 2022

Supervisors: Kassiani Mellou, NPHO, Orla Condell, ECDC

Category: Respiratory diseases

In November 2021, Belgium identified COVID-19 Omicron variant of concern (VOC) cases among returning attendees or delegates of two potential international superspreading events, occurring at an international sports event in another EU country and a large international conference outside the EU in October 2021. At the time, the new VOC was not yet widely circulating in Europe; European countries followed a screening strategy of all cases returning from abroad for the early identification of imported cases. An investigation was launched into the two clusters and their potential international dimensions.

During online meetings, the investigation steps, involving the access of available information in ECDC's Early Warning Response System (EWRS), usage of the EpiPulse platform, and the sharing of confidential information through secure channels (with colleagues at Sciensano and focal points for EWRS, IHR, and EpiPulse), were discussed. However, the outbreak could not be verified through epidemic intelligence activities, as all requests (initial and updated on EWRS and EpiPulse) were unsuccessful in retrieving any relevant information. As a result, the collaborative project was halted. The lack of generic pre-existing protocols for timely response to international superspreading events at the time was noted. These would prepare countries for the management of potential outbreaks during forthcoming international events and in the event of an emergence of a new VOC. This recommendation was given to ECDC to be further discussed.

Role: Co-investigator. Lida responded to ECDC's published request for assistance concerning the investigation of COVID-19 clusters due to the Omicron VOC with a potential international dimension, December 2021 to January 2022. Lida was selected to participate remotely in this investigation to assess the international dimension. She actively joined the international investigation team by participating in all online meetings, proposed ways to collect epidemiological data, prepared a line listing tool that could assist the collection of relevant information and that would be used for confirming the international dimension of the two clusters, estimating their size and formulated hypotheses for further investigation and dissemination across leading investigators. Lida communicated and together with ECDC EPRS staff contacted countries directly to follow up on the EpiPulse event and requested and reminded EU/EEA countries to share relevant information in relation to the international event. She wrote the outbreak report with general recommendations that was disseminated among stakeholders for review (ECDC the EPRS team, KU Leuven, Sciensano, and Federal Public Service Health) and finally sent to ECDC (see section 5.1.3, Outbreak Report 6).

1.4 Educational outcome

Being the lead or co-investigator in two outbreaks, along with her participation in the respective EPIET modules during the fellowship, tremendously enabled Lida to absorb information provided by the curriculum and learn by doing, taking initiative, leading and managing a team, and cooperating with local teams, but also working independently following the process of the 10 steps of the outbreak investigation. Among her acquired competences were the evaluation of outbreak signals, the dynamic features of case definitions, the choice of appropriate study design, the design of questionnaires, the use of new software for the design of a database, data entry, data analysis, and the development of outbreak reports. The involvement in the ECDC remote assignment, although unsuccessful, offered some very important lessons, namely that outbreak investigations are not always as in textbooks, several limitations and challenges usually occur, and it takes experience and skill to overcome them through inter-disciplinary and inter-institutional communication and management.

2. Surveillance

2.1 Salmonellosis among children aged 0–14 years in Greece, 2005–2021. Summary and descriptive analysis of data from the Mandatory Notification System

Supervisors: Theologia Sideroglou, Kassiani Mellou, NPHO

Category: Food- and waterborne diseases

Non-typhoidal salmonellosis in humans persists in industrialised countries, despite monitoring programmes and public health measures. Surveys have shown that children, especially infants and children aged one to five years are the groups most susceptible. Lida aimed to review national surveillance data on reported salmonellosis cases between 2005 and 2021 and describe the subset of notified cases of salmonellosis among children aged 0–14 years in Greece.

Lida utilised routine surveillance data from the Mandatory Notification System (MNS) database and the outbreaks database of the FWD department of NPHO. Population data were obtained by the Hellenic Statistical Authority (ELSTAT) from 2021 population census. Lida conducted descriptive analysis of cases, calculation of notification rates by age, sex, temporal and geographical distribution over the 17-year period, and descriptive analysis of outbreaks, to reveal associations with food sources, seasonality and causative serotypes.

Between 2005 and 2021, a gradual decrease of the overall salmonellosis notification rate among children younger than 15 years old was observed. Infants (children <1 year old) showed the highest mean annual notification rates. Eggs were the most frequently suspected vehicle of exposure among children. There was no distinction between residents and travellers, and no differences across certain community populations. A seasonality pattern was observed: notification rates would gradually increase from spring months onwards, reaching a peak in August, and then gradually decline from September onwards. Serotypes *Salmonella* Enteritidis and *Salmonella* Typhimurium remained dominant among cases, and poultry products and mainly eggs were the most commonly suspected vehicle of exposure among children, especially for children aged 0–4 years.

The results were used by the FWD department to produce an internal report that was uploaded on NPHO's website and was communicated to paediatricians, to raise awareness among parents.

Role: Lead investigator. Lida designed the study and wrote the protocol (see section 5.1.3, Surveillance Protocol 3), submitted a request for data provision and analysis to the Ethical Committee of NPHO, conducted data cleaning and analysis, using MS Office and the Stata 16 statistical package, wrote the report, and translated it into Greek to be uploaded on NPHO's website (see section 5.1.3, Surveillance Report 4, and section 5.1.4, Manuscript 1).

2.2 Setting up a new laboratory-enhanced hospital-based surveillance system for the detection of Candida auris in Greece

Supervisors: Antonis Maragkos, Kassiani Mellou, NPHO

Category: Hospital-acquired infections

Healthcare facilities around the world have been reporting increasing numbers of cases of the yeast *Candida auris* (*C. auris*), known to cause severe illness in hospitalised patients, with rising resistance to antifungal drugs, challenging identification and ability to cause various outbreaks among inpatients. As a result, it is important to identify cases quickly in order to take special precautions and stop any further spread.

In Greece, such pathogens are under surveillance by the Department of Microbial Resistance and Infections in Health Care Settings (DMRIHCS). Since its initial isolation in 2019, an increase in the isolation of *C. auris* among patients in public and private hospitals has been noted. There is currently no structured notification or surveillance system in use for *C. auris* infections, although there are guidelines for the identification, control, and prevention of the spread of *C. auris* in healthcare settings. The design of a comprehensive surveillance system (Candida Auris Surveillance System – CASS) with hospital case-based data aims to rapidly detect and monitor cases and outbreaks of *C. auris*. The system was designed as a comprehensive, voluntary, passive, hospital case-based notification

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system. A notification form was designed for data collection, to be completed for each case by hospital infection control committee personnel and to be reported to NPHO through the existing disease reporting system. A database was designed to import and store data after collection. Early findings have been used to create an internal report uploaded on NPHO's website. The system was first piloted before nationwide launch in 2022 (see project below).

Role: Lead investigator. Lida designed the system and wrote the analytical protocol (see section 5.1.3, Surveillance Protocol 1), submitted a request for designing the system to the Ethical Committee of NPHO, developed the data collection tool and database, communicated with hospitals' infection control committee personnel, and disseminated and trained personnel in the use of the data collection tool, while providing guidelines for the identification, control, and prevention of the spread of *C. auris* in the respective healthcare settings. Lida also received case reports, performed data entry and analysis using MS Office and the Stata 16 statistical package, and wrote the internal report based on early findings.

2.3 Retrospective pilot project of the new C. auris surveillance system (CASS) in three hospitals, Attica region, March to May 2022

Supervisors: Antonis Maragkos, Kassiani Mellou, NPHO

Category: Hospital-acquired infections

Before being implemented on a nationwide scale, the surveillance system CASS was launched as a retrospective pilot project in which three public hospitals in the Attica region were chosen to participate. The main aim of the pilot project was to initiate the use of the new system in selected hospitals in Attica, to identify the strengths and limitations of the protocol, and to make necessary adjustments prior to the final nationwide launch of the system.

The pilot was first Implemented in Attica hospitals because of the proximity to the Fungi Reference Laboratory in Athens, which would confirm the diagnosis and ease of transportation of samples from participating hospitals to it. The hospitals were selected based on the number of patient admissions, the variety of treated conditions, laboratory capacity, personnel and equipment to participate in this project, and willingness to cooperate. The pilot project team was constituted by Lida, supervisors, and representative members of each participating hospital's Infection Control Committee. The pilot project was presented and explained to all stakeholders in order to assure correct implementation, and was implemented from March to May 2022. Participating hospitals were asked to report any identified *C. auris* cases between January 2020 and May 2022.

A descriptive analysis of the collected data was performed. A brief evaluation of the pilot project was conducted; data quality, simplicity, stability and timeliness were assessed.

Results of the descriptive analysis were used to generate an internal report at NPHO that was disseminated among stakeholders. Results of the evaluation were discussed, and changes were made in the surveillance protocol and data collection tool.

Role: As lead investigator, Lida designed the pilot protocol, submitted a request for the implementation to the Ethical Committee of NPHO, communicated with the pilot project team, disseminated information, and trained participants in the use of the data collection tool. Lida received reports, performed data entry and analysis using MS Office and the Stata 16 statistical package, and wrote the pilot project report (see section 5.1.3, Surveillance Report 2), which was translated into Greek and disseminated to stakeholders. She also conducted an evaluation of the system based on the findings and made all the necessary adjustments.

2.4 The epidemiological situation, laboratory capacity, and preparedness for C. auris in Greece

Supervisors: Antonis Maragkos, NPHO

Category: Hospital-acquired infections

In 2022 Lida participated in the third survey conducted by ECDC on the epidemiological situation, laboratory capacity and preparedness for *Candida auris* in the European Union and European Economic Area (EU/EEA), by providing available surveillance data. The aim was to collect information on the epidemiological situation, laboratory capacity and preparedness for *C. auris* in the European Union and European Economic Area (EU/EEA) for the periods 2013 to 2017 and January 2018 to May 2019. However, this information was not updated after the start of the COVID-19 pandemic. Attention to *C. auris* was raised again after a *large C. auris* outbreak affecting healthcare facilities in two regions in Italy, resulting in the initiation of a third *C. auris* survey in April 2022 to update the information on the epidemiological situation and control efforts for *C. auris* in the EU/EEA. The results of this survey were published in Eurosurveillance (see section 5.1.1, Publication 2).

Since the design of the new surveillance system CASS, although still on a voluntary basis, all affected hospitals started to complete and send the case-based data collection tool to NPHO. Retrospective data on *C. auris* infections since 2019 were also collected and reported. As a result, Lida was involved in routine surveillance of *C.*

auris, communicating on a weekly basis with members of the hospitals' Infection Control Committees, sending them guidelines for the identification, control, and prevention of the spread of *C. auris* in healthcare settings and the data collection tool. Lida would also follow up via telephone calls to be informed of the cases outcomes and the results of the infection control measures, as well as perform data entry and database maintenance. Prior to the introduction of CASS, reports on *C. auris* cases were sparse, incomplete, collected only via active surveillance, and restricted to a few hospitals within the Attica region. At the moment, 56 hospitals from all 13 Greek regions are sending reports on *C. auris* cases through CASS. All available data (2019–2021) were analysed, and a manuscript was submitted and is currently under review (see section 5.1.1, Publication 1).

In 2023, Lida participated in the development of updates in the guidelines for the diagnosis, prevention, and control of the spread of *C. auris* in healthcare settings. These guidelines were uploaded on NPHO's website (see section 5.1.3, Activity Report 10 and section 5.1.4, Manuscript 2).

Also in 2023, Lida analysed all available data on *C. auris* infections in Greece for the period between 2019 and 2022 using MS Office and the Stata 16 statistical package. The results will be integrated into an internal report that will be uploaded to NPHO's website (see sections 5.1.2 and 5.1.3, Activity Report 10).

2.5 Antimicrobial resistance (AMR) surveillance (routine surveillance activities)

Supervisor: Antonis Maragkos, NPHO

Category: Hospital-acquired infections

During the fellowship Lida participated in routine surveillance activities of the Department of Microbial Resistance and Infections in Health Care Settings, and in the regular meetings of the AMR team. Lida also participated in the development of guidelines for the prevention and control of the spread of *Aspergillus spp*. in healthcare settings, internal reports on AMR, and in the performance of Point Prevalence studies in health-care settings (see sections 5.1.2 and 5.1.3, Activity Report 10).

2.6 COVID-19 surveillance in Greece (routine surveillance activities)

Supervisor: Kassiani Mellou, NPHO

Category: Respiratory diseases

Lida was actively involved in national COVID-19 surveillance since the beginning of the pandemic. She contributed on a daily/weekly basis to the laboratory surveillance and the COVID-19 case and contact tracing. She also collected and analysed the weekly total number of COVID-19 cases and deaths. Finally, she participated as coordinator of surveillance duty shifts during weekends.

Role: Lida worked with these surveillance activities alongside the main EPIET projects from March 2021 to June 2022 (see section 5.1.3, Activity Report 10).

2.7 Educational outcome

All the above-mentioned surveillance projects contributed greatly to a deeper understanding of a surveillance system's structure and the different types of surveillance. Lida learned the type of needed indicators depending on the system and its desired output, and ways to collect, review, validate, and analyse surveillance data. She also learned to interpret and report surveillance data, and how to overcome problems in surveillance procedures. Moreover, she contributed to the collection, analysis, and dissemination of information on the emerging fungal pathogen *C. auris*, which helped policy-makers decide to include it among the notifiable pathogens in Greece. Finally, Lida contributed surveillance data to an international survey, thereby gaining insight into cross-border and international surveillance procedures.

3. Applied public health research

3.1 Protective effectiveness of COVID-19 vaccines against first reinfection among children 10–17 years old in Greece during the Omicron variant's circulation, from December 2021 to October 2022

Supervisors: Dimitrios Paraskevis, Kalliopi Papadima, Kassiani Mellou, NPHO

Category: Respiratory diseases

COVID-19 vaccines protect against severe illness and hospital admission due to COVID-19. Vaccine effectiveness is monitored by analysing data from different registries and by conducting specific research. Various studies have been published showing that vaccination also reduces transmission of the virus from one person to another. In Greece, the age group of children aged 10 to 17 years was officially invited to get vaccinated in July 2021, although there was already a debate concerning the need for vaccination of children and adolescents against SARS-CoV-2. The performance of a vaccine effectiveness study in the age group of 10–17 years to provide data on

vaccine protection from reinfections was considered a useful tool. The project aimed to study whether children aged 10 to 17 years vaccinated against SARS-CoV-2 had a lower risk of being reinfected compared to unvaccinated individuals of the same age group, during the Omicron variants circulation.

A retrospective cohort study was conducted, by analysing anonymised data from an already existing registry that included information on infections, laboratory testing results, vaccination status, and demographics. The dataset consisted of only infected individuals. The outcome analysed was the event of reinfection (positive SARS-CoV-2 result by polymerase chain reaction (PCR) or rapid antigen test (RAT), during the Omicron variant circulation, and reinfection incidence rates among exposed and unexposed were calculated.

Individuals were followed up from the start of the follow-up period until the date of reinfection event, or the end of the follow-up period. Survival analysis (Kaplan-Meier) was conducted, and time-to-event (duration between the starting point and the event of interest, i.e., reinfection) was estimated for both exposed and unexposed. A Cox hazards regression model was used to estimate hazard ratios (HRs), adjusted for possible confounders. Vaccine effectiveness adjusted for possible confounders was calculated as percentage, as one minus HRs (95% confidence intervals, and p-values<0.05 were considered significant): $VE_{adjusted}= (1-HR_{exp}/HR_{unexp})$ x100. The dataset was stratified according to the periods of the circulation of the different Omicron variants. The waning effectiveness of the vaccines dropped from 33% during the circulation of SARS-CoV-2 Omicron B.A.1 variant, to 18% during the circulation of SARS-CoV-2 Omicron B.A.2 variant, and finally to 14% during the circulation of SARS-CoV-2 Omicron B.A.4 & B.A.5 variant. These results were comparable to those of other studies in EU countries.

Role: Lead investigator. Lida participated in the project design, wrote the study protocol (see section 5.1.2, Applied Research Protocol 8), submitted a request for the implementation to the Ethical Committee of NPHO, performed data cleaning (with some statistical support) and analysed the data using MS Office and the Stata 16 statistical package, and wrote the applied research report (see section 5.1.2, Applied Research Report 9).

3.2 Activities regarding research on COVID-19

Supervisor: Dimitrios Paraskevis, Kassiani Mellou, NPHO

Category: Respiratory diseases

In 2022, Lida participated in a research project within the Directorate of Epidemiological Surveillance and Intervention for Infectious Diseases at NPHO concerning re-infections during the circulation of the Delta and Omicron variants. Lida was not the main investigator; she reviewed literature on the subject and drafted the research protocol outline (see section 5.1.3, Activity Report 10).

3.3 Educational outcome

The applied research projects helped Lida to further enhance her skills in planning and conducting research in the field of public health and epidemiology. She also benefited by working with biostatisticians in analysing the quality and suitability of existing data for analyses purposes, thereby overcoming problems rising from incomplete datasets. Lida prepared the study protocol and set the research question as well as the study's aim and objectives. She conducted data cleaning, descriptive and multivariable analysis, and wrote the report. As a result, she became more confident in performing all the steps of a research project.

4. Teaching and pedagogy

Supervisor: Kassiani Mellou, NPHO

During the fellowship, Lida conducted five teaching assignments at the University of Athens to MSc students with backgrounds in Medicine, Biology, Chemistry, Pharmacy/Pharmacology, Chemical Engineering, nurses specialised in Public Health and Community Nursing, and doctors, via PowerPoint presentation. The lectures had a duration of 1.5 to 2.5 hours. Audiences had no previous experience in outbreak investigations of infectious diseases and no similar case studies had ever been presented to them before. For each lecture, the educational material was developed and adapted to the participants' backgrounds and experiences. Relevant EPIET and ECDC online program material was used for the presentations, while texts were translated into Greek. For two teaching assignments (3.4 and 3.5), a fictional case study was developed and presented. After each teaching assignment, participants were asked to fill in anonymous questionnaires to evaluate the teaching sessions.

The teaching assignments were the following:

3.1. 'Introduction to Outbreak investigation' and Case study: 'Giardiasis in Bergen'

3.2. '10 steps of an outbreak investigation' and Case study: 'Gastroenteritis outbreak in Sweden'

3.3. 'Public Health Surveillance systems and the role of the microbiology laboratory in surveillance and outbreak investigations'

3.4 and 3.5. 'Introduction to epidemiological study designs and statistical analysis' and Case study: 'Use of a cohort study in outbreak investigation'

After the completion of teaching assignments 3.1, 3.3, 3.4 and 3.5, as these were part of MSc curriculums at the University of Athens, Lida was assigned to provide questions and corrects answers for the examination of students during respective mid-term exams (see section 5.1.3, Activity Report 10).

4.1 Educational outcome

Engagement in the above-mentioned teaching activities enabled Lida to review and refresh epidemiological and statistical concepts gained from attended EPIET modules and disseminate them to a targeted audience. She further developed competencies of identifying training needs of a particular target group and developing and adapting educational material accordingly. These teaching activities were a good opportunity to review and refresh fundamental epidemiological and statistical concepts. Lida also further developed skills in planning, organising training sessions, facilitating case studies, applying pedagogical techniques, and planning and conducting the evaluation of training sessions. She prepared reflective notes after all teaching assignments (see section 5.1.3, Reflective Notes 11–15).

5. Communication

Publications related to the EPIET fellowship

5.1 Manuscripts published/submitted in peer-reviewed journals

1. **Lida Politi,** Sofia Hatzianastasiou, Georgia Vrioni, Malvina Lada, Maria Martsoukou, Nikolaos V. Sipsas, Maria Chini, et. al. *Candida auris* in Greek healthcare facilities: active surveillance results on first cases and outbreaks from eleven hospitals within Attica region. Manuscript under review (eurosurveillance-D-23-00243).

2. Kohlenberg Anke, Monnet Dominique L, Plachouras Diamantis. *Candida auris* survey collaborative group*. Increasing number of cases and outbreaks caused by *Candida auris* in the EU/EEA, 2020 to 2021. Euro Surveill. 2022;27(46):pii=2200846.

* Lida Politi was part of the *Candida auris* survey collaborative group.

5.2 Manuscripts and reports under development

In 2023, Lida:

- participated in the development of guidelines for the prevention and control of the spread of *Aspergillus spp*. in healthcare settings. Once completed, the guidelines will be uploaded to NPHO's website. The project is under development (see section 5.1.3, Activity Report 10).

- prepared and drafted a manuscript on the results of the presumed waterborne non-typhoidal salmonellosis outbreak investigation as a first author for submission to a peer-reviewed journal.

- analysed all available data on *C. auris* infections in Greece for the period 2019 – 2022 using MS Office and the Stata 16 statistical package. The results will be integrated in the internal AMR surveillance report that will be uploaded on NPHO's website.

5.3 Reports

Surveillance Protocol 1: Setting up a new laboratory enhanced, hospital-based surveillance system for the detection of Candida auris in Greece, CASS – project protocol, 2022.

Surveillance Report 2: CASS pilot project report, 2023.

Surveillance Protocol 3: Salmonellosis among children aged 0-14 years in Greece, 2005–2021. Summary and descriptive analysis of data from Mandatory Notification System – project protocol, 2022.

Surveillance Report 4: Salmonellosis among children aged 0-14 years in Greece, 2005–2021. Summary and descriptive analysis of data from Mandatory Notification System – project report, 2022.

Outbreak Report 5: Investigation of a presumed waterborne non-typhoidal salmonellosis caused by Salmonella Bovismorbificans outbreak in a small town of Peloponnese in Greece, August 2022 – outbreak investigation protocol and report, 2022.

Outbreak Report 6: Investigation of COVID-19 clusters due to SARS-CoV-2 Omicron VOC with a potential international dimension, December 2021 to January 2022 – outbreak investigation report, 2022.

Outbreak Report 7: Investigation of gastroenteritis outbreak in town B in March 2023 - outbreak investigation activity report, 2023.

Applied Research Protocol 8: Protective effectiveness of COVID-19 vaccines against reinfection among children aged 10–17 years old in Greece during the Omicron variant's circulation, from December 2021 to October 2022 – research project protocol, 2023.

Applied Research Report 9: Protective effectiveness of COVID-19 vaccines against reinfection among children aged 10–17 years old in Greece during the Omicron variant's circulation, from December 2021 to October 2022 – research project report, 2023.

Activity Report 10: EPIET Fellowship Activity Report.

Reflective Note 11: 'Introduction to Outbreak investigation' and Case study: 'Giardiasis in Bergen' - reflective report, December 2021.

Reflective Note 12: '10 steps of an outbreak investigation' and Case study: 'Gastroenteritis outbreak in Sweden' - reflective report, February 2022.

Reflective Note 13: 'Public Health Surveillance systems and the role of the microbiology laboratory in surveillance and outbreak investigations' - reflective report, June 2022.

Reflective Note 14: 'Introduction to epidemiological study designs and statistical analysis' and Case study: 'Use of a cohort study in outbreak investigation' - reflective report, March 2023.

Reflective Note 15: 'Introduction to epidemiological study designs and statistical analysis' and Case study: 'Use of a cohort study in outbreak investigation' - reflective report, April 2023.

5.4 Manuscripts, reports or guidelines uploaded on NPHO's website

1. Epidemiological data for salmonellosis (non-typhoid/paratyphoid) in children aged 0-14 years in Greece, 2005-2021 (in Greek). Available at: https://eody.gov.gr/disease/salmonellosi-mi-tyfo-paratyfiki

2. Guidelines for the diagnosis, prevention and control of the spread of C. auris in healthcare settings (in Greek). Available at: https://eody.gov.gr/wp-content/uploads/2023/06/candida-auris_2023.pdf

5.2 Conference presentations

1. **L. Politi**, S. Chatzianastasiou, M. Lada, M. Chini, N. Sipsas, A. Masgala, M. Pirounaki *et al.*, '*Candida auris* in Attica hospitals, Greece: yet another Hospital Acquired Infection'. Poster presentation, ESCAIDE 2022, Stockholm, Sweden (hybrid).

2. C. Kavakioti, D. Krystallaki, S. Sypsa, D. Kalotychou, **L. Politi**, K. Mellou. 'Incidence of healthcare-associated infections in Greek long-term care facility residents, May-December 2022 (GR-H4LS)'. Oral presentation in ESCAIDE 2023, Barcelona, Spain (Fireside session).

3. **L. Politi**, T. Sideroglou, A. Chrysostomou, G. Mandilara, I. Spiliopoulou, A. Theofilou, A. Bordhoka *et al.* 'A community waterborne outbreak due to *Salmonella* Bovismorbificans, Greece, August 2022'. ESCAIDE 2023, Barcelona, Spain. Poster presentation.

4. D. Krystallaki, K. Palaiopanos, K. Mellou, A. Maragkos, **L. Politi**, T. Zaoutis, D. Paraskevis. 'Antimicrobial use in acute care hospitals in Greece remains high; results of the third Point Prevalence Survey, April-December 2022'. ESCAIDE 2023, Barcelona, Spain. Online poster.

5.3 Other presentations

1. EPIET site visit at NPHO Presentation of all EPIET fellowship projects' outputs to supervisors, NPHO's administration and site visitors. 6–7 March 2023.

2. CASS pilot project report. Oral presentation of results to staff of the Department of Microbial Resistance and Infections in Health Care Settings, NPHO, 20 March 2023.

3. Salmonellosis among children aged 0-14 years in Greece, 2005–2021. Summary and descriptive analysis of data from Mandatory Notification System. Oral presentation of results to staff of the Department of Foodborne and Waterborne Diseases, NPHO, 10 January 2023.

4. Investigation of a presumed waterborne non-typhoidal salmonellosis outbreak in town A in Greece, August 2022. Oral presentation of results to staff of the Department of Foodborne and Waterborne Diseases, NPHO, 4 April 2022.

6. EPIET/EUPHEM modules attended

1.   Introductory Course part 1, 20 September 2021 – 8 October 2021, virtual.

2.   IC Inject Day – Operational Research, 27 October 2021 – 28/10/2021, virtual.

3.   IC Inject Day – Data Management 10–11 November 2021, virtual.

4.   Outbreak Investigation, 6–10 December 2021, virtual.

5.   Multivariable Analysis, 14–18 March 2022, and Inject Day 30 March 2022, virtual.

6.   Mid-term Project Review 2022, 20–22 April 2022, Spetses, Greece, hybrid.

7.   Introductory Course part 2, 25–29 April 2022, Spetses, Greece, hybrid.

8.   Rapid Assessment and Survey Methods, 6–10 June 2022, Stockholm, Sweden.

9.   Project Review Module, 29 August – 2 September 2022, Lisbon, Portugal.

10.   Time Series Analysis, 7–11 November 2022, Bilthoven, the Netherlands.

11.   Qualitative Research- Optional Inject Days, 31 January 2023 and 3 February 2023, virtual.

12.   Vaccinology, 13–17 February 2023, virtual.

13.   Biorisk and Quality Management Optional Inject Days, 16–17 March 2023, virtual, including on-site laboratory audit and off-site risk assessment (see section 5.1.3, Activity Report 10).

14.   Management, Leadership and Communication in Public Health, 8–12 May 2023, Solna Stockholm.

15.   Project Review Module, 28 August 2023 – 1 September 2023, Lisbon Portugal.

7. Other training

1.   Workshop: 'Fungal infections and COVID-19 era: from the laboratory to clinical decision' held in the Microbiology Department of Medical School in Athens, 28–29 May 2021, Athens, Greece.

2.   Winter Workshop 2021 – After-Action Reviews (AAR) and In Action Reviews (IARS), 1 December 2021, 3 December 2021 and 7 December 2021, virtual, ECDC e-learning platform.

3.   'Introduction to Outbreak Investigation', November 2021, ECDC e-learning platform.

4.   Drivers and modifiers of antibiotic prescribing and infection prevention & control practices in healthcare settings (Pilot), 1 March 2022, ECDC e-learning platform.

5.   Gilead Sciences Webinar on: Candida auris: from laboratory identification to routine clinical practice in Greece, 22 July 2022, virtual attendance.

6.   Training course: 'Basic principles for prevention and control of infections', April to May 2022, Athens, Greece.

7.   Training course: 'Quality and Safety of Medical Laboratories', November 2022 to June 2023, Athens, Greece.

8.   Introduction to infectious disease preparedness micro learning, 22 December 2022, virtual, ECDC e-learning platform.

9.   Tabletop exercise 'HERMES' organised in the context of JA SHARP WP8 (Training and local exercises, exchange of working practices, Strengthening preparedness for serious cross-border health threats), 17 June 2022, virtual attendance.

10.   Assessing and grading evidence in public health e-learning course (PRECEPT), 12–14 June 2023, ECDC e-learning platform.

11.   Addressing online vaccination misinformation, 15–16 June 2023, ECDC e-learning platform.

8. Other activities

1.   ESCAIDE 2021, 16–19 November 2021, virtual attendance.

2.   Appointed member of the NPHO team for the EU MOBILISE project. NPHO is a consortium partner under the (Work Package 2) WP2, WP5 and WP6. Participation in consortium meetings and intra-institutional meetings, assistance in coordinating the preparation of deliverables' material and communications with other consortium partners.

3.   Appointed member of the supervising committee in the Memorandum of Cooperation between NPHO and the Health Districts of the Health Ministry of Cyprus. Project: Antimicrobial Resistance Surveillance.

4.   Routine surveillance activities of the DMRIHCS, participation in the regular meetings of the AMR team, participation in the development of internal reports on AMR, participation in Point Prevalence studies in health-care settings.

5.   Participation to the mid-term examination at the Medical School of the National and Kapodistrian University of Athens of MSc curriculums procedures (post-Graduate master's degree Program 1: 'Industrial Pharmacy' and 'Cosmetology – Dermatopharmacology' of the Department of Pharmacy of the National and Kapodestrian University of Athens and post-graduate Master's degree Program 2: 'Clinical Biochemistry – Molecular Diagnostics' of the National and Kapodestrian University of Athens) after completion of teaching assignments.

6.   Appointed member of the EU-JAMRAI 2 Project working team, participated in meetings concerning preparation of deliverables under WP5, WP6, WP7, and WP8.

7.   ESCAIDE 2022, 23–25 November 2022, virtual attendance.

8.   ESCAIDE 2023, 22–24 November 2023, virtual attendance.

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