EPIET & EUPHEM

# FINAL REPORT

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## 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.



Stockholm, November 2023

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

Eftychia Kotronia holds a PhD in epidemiological methods in cohort studies of older people from Newcastle University, United Kingdom, and a Master's degree in Nutrition and Health with specialisation in 'Epidemiology and Public Health' from Wageningen University, the Netherlands. Her PhD focused on epidemiological methods, including different methods of survival analysis, longitudinal analysis, and causal mediation. Prior to this fellowship, Eftychia worked as an Infant and Young Child Feeding Counsellor (IYCF) with Save the Children International at refugee camps in Northern Greece during the Refugee Crisis in 2016-2017. As an IYCF, while promoting breastfeeding, she also monitored malnutrition, participated in the WASH programme, monitored health status (i.e. infections, gastrointestinal symptoms) of mother and child, and collected data for the evaluation of the effectiveness of the programme. Eftychia is interested in the application of advanced epidemiologic methods in infectious diseases research and surveillance, preparedness in emergency situations, infodemic management and science communication.

# 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

### 1.1. Outbreak investigations

#### *Investigation of a national outbreak of mpox in Poland, May-September 2022*

Supervisors: Małgorzata Sadkowska-Todys, Karolina Zakrzewska

Category: Emerging and re-emerging diseases including vector-borne diseases

On the 31 May 2022, the first mpox case was reported in Poland. Case definition and diagnosis, and risk assessment guidelines were shared with all stakeholders involved. A surveillance form was incorporated into the routine surveillance electronic system. We aimed to detect clusters, co-exposures of mpox cases and patterns of transmission/behaviour. We defined a case as an individual who experienced fever, headache, back pain, fatigue, enlargement of the lymph nodes, and/or rash and had laboratory confirmation of MPXV. We analysed data from two sources from May to mid-September 2022. The date of onset of the first mpox case was on the 16 May 2022. We identified 174 confirmed and 18 probable cases. Most cases were MSM, whereas one was a woman. Transmission was also reported among heterosexual individuals. The first cases were imported; however, 79% of cases were domestic. Median age (years) was 33 (IQR: 28-38). Sexual contact in a club/sauna/private party was the most common co-exposure. We identified one big regional cluster which included cases from two Polish cities. We observed several smaller clusters, involving three people, mainly between regular partners and one anonymous individual. Finally, there were other suspected clusters of transmission, but we were unable to confirm connection due to limited data.

Role: This outbreak investigation was conducted in collaboration with the local sanitary and epidemiological stations across Poland. Karolina Zakrzewska was the principal investigator from the National Institute of Public Health (NIPH NIH-NRI). Eftychia drafted the exposure questionnaire and checked data sources and communicated with the team. Eftychia also conducted the statistical analysis of the outbreak investigation, explored clusters and co-exposures, and wrote an outbreak report. Eftychia will be a co-author in the manuscript which is in preparation.

[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

## *Investigation of an outbreak of Enteroaggregative* Escherichia Coli *(EAEC) in a kindergarten in northern Poland, December 2022-March 2023*

Supervisor: Małgorzata Sadkowska-Todys

Category: Food and waterborne diseases

In December 2022 we were notified about a suspected outbreak of Enteroaggregative *E. Coli* (EAEC) in a kindergarten in northern Poland. Consumption of fresh products (carrots, milk, meat) bought and consumed by family A from farm A (child from family A attended the kindergarten) or meal consumption at the kindergarten prepared by a catering company were suspected sources of the outbreak. We conducted an investigation to identify the source of the outbreak and advise local authorities on prevention of further spread. We suspected exposure to Shiga toxin-producing *E. Coli* (STEC) which happened the week of 21 November 2022. We defined a case as an individual who developed diarrhoea and/or abdominal pain; and/or haemolytic uremic syndrome (HUS) and had laboratory confirmation of EAEC infection with onset of disease between 29 November 2022 to 10 of January 2023. Stool samples were provided for laboratory testing. Overall, 16 cases were reported; 10 were confirmed and four remained probable. Four cases developed HUS, five cases were hospitalised, and one case died. STEC serotype O104:H4 was identified in samples from seven cases. Sour cream from farm A was contaminated with STEC. Since the 7 of January 2023 no further cases have been reported. We were not able to confirm the source of the outbreak and exposure to contaminated products from farm A remains suspected.

Role: The main epidemiological investigation was performed by the local sanitary and epidemiological station. Eftychia was a co-investigator. Eftychia drafted the exposure questionnaire, conducted statistical analysis on food data, participated in meetings with local and regional health authorities and the Department of Bacteriology at the NIPH NIH-NRI and actively participated in decision making. The fellow wrote an outbreak report and will be the first author of a manuscript which is in preparation.

## *Investigation of an outbreak of Yersinia Enterocolitica in a kindergarten in northern Poland, January-March 2023*

Supervisor: Małgorzata Sadkowska-Todys

Category: Food and waterborne diseases

On the 16 January 2023, we were notified about a suspected outbreak of *Y. Enterocolitica* at a kindergarten in northern Poland. Consumption of meals provided by a catering company were suspected as a source of the outbreak. We conducted an investigation to identify the source of the outbreak and advise local authorities on prevention of further spread. We suspected that exposure to *Y. Enterocolitica* took place on the 2nd or 3rd of January 2023. We defined a case as an individual who developed at least one of the following symptoms (fever, diarrhoea, vomit, abdominal pain, tenesmus) and had a laboratory confirmed *Y. Enterocolitica* infection with onset of symptoms between the 5th and 20th of January. Stool samples were provided for laboratory testing. In total, 45 people attended the kindergarten (children, employees). All children ate meals at the kindergarten supplied by a catering company. Employees were not expected to eat from these meals. In total, 16 cases were identified; 15 attended the kindergarten and one was a contact case. Out of the 15 kindergarten cases, two were employees; one ate two food items from catering. The serotype *Y. Enterocolitica* O:3 was identified in three cases. We were unable to reach any conclusions on the food source because children ate most of the items, and it was hard to pinpoint which meal could have been the source. Water at the kindergarten was negative for *Y. Enterocolitica.* After two secondary cases on the 16th and 17th of January, no further cases were reported.

Role: The outbreak investigation was conducted in collaboration with the local and regional sanitary and epidemiological stations. Eftychia was a co-investigator. Eftychia led the statistical analysis for food data, participated in meetings with local and regional health authorities and wrote an outbreak investigation report.

## *Educational outcome*

During the outbreak investigations, Eftychia gained knowledge on how to conduct an outbreak investigation at the local and national levels. The fellow collaborated closely with local and regional actors and had an active role in decision making. The fellow gained experience and improved skills in preparing outbreak investigation materials, study design, data management and statistical analysis as well as interpretation of laboratory findings and how whole genome sequencing can be used in outbreak management and control.

## 1.2. Surveillance

### *A simple approach to evaluate representativeness of genomic surveillance of SARS-CoV-2 in Poland*

Supervisors: Małgorzata Sadkowska-Todys, Magdalena Rosińska

Genomic surveillance of SARS-CoV-2 is essential for the detection of new emerging variants and monitoring of circulating variants influencing outbreak progression. We aimed to develop a new method to evaluate representativeness of genomic surveillance of SARS-CoV-2 from December 2021 to February 2022 in Poland. Data from 14/12/2021 to 14/02/2022 from the genomic surveillance of SARS-CoV-2 in Poland were used. In mid-November 2021, an algorithm was introduced creating daily a list of randomly sorted registered cases ($c_n$, n-position on the list) and assigning a daily required number (DRN) of samples to be sequenced by voivodeship (administrative region) according to voivodeship distribution of cases. Voivodeships collected samples starting from the top of the list until reaching DRN samples for sequencing. Representativeness was assessed for each voivodeship through the percentage of skipped samples (not provided to sequencing lab) among samples $C_1$ to $C_{DRN}$. We repeated calculations excluding samples not sequenced because of quality (inadequate cycle threshold (CT), no RNA/material) and availability (no sample available) issues from numerator. During the study period, 3 199 samples were sequenced and 6 596 skipped. The mean percentage of skipped samples ranged by voivodeship from 22% to 96% in December, 24% to 97% in January, and 46% to 98% in February. With exclusion due to quality/availability, mean percentages of skipped samples decreased for some voivodeships (December: 13-96%; January: 3-97%; February: 0-97%). Quality and availability were not the sole drivers of skipping samples in Poland and should be considered among other reasons when evaluating representativeness of genomic surveillance of SARS-CoV-2. Percentage of skipped samples should be included as an indicator to monitor and improve representativeness in other genomic surveillance systems.

Role: Eftychia conducted data entry, developed STATA code for the calculation of skipped samples, presented results to the group, wrote, and submitted an abstract to ESCAIDE 2022, and wrote the project report.

### *Evaluation of data completeness and data quality of two electronic systems for the surveillance of salmonellosis between 2017-2019 in Poland*

Supervisor: Małgorzata Sadkowska-Todys

Surveillance of salmonellosis in Poland is performed by two electronic case-based systems; an outbreak reporting (all exposed cases) and a case reporting (sporadic and outbreak cases; which meet case definition criteria). To propose system modifications promoting interoperability, we aimed to evaluate completeness and consistency of reporting, data quality and timeliness in two systems for the surveillance of salmonellosis from 2017-2019 in Poland. Data on individual, symptomatic cases linked to outbreaks were obtained from the Registry of Epidemic Outbreaks System (ROE) and the Epidemiological Case Reporting System (SRWE), between 2017-2019. We separately analysed data including demographics, dates for purposes of surveillance, symptoms, laboratory tests, residence address, and course of disease. ROE-IDs are automatically linked to SRWE to identify outbreak cases. To compare completeness between systems we assessed symptomatic case numbers registered at each system. Data quality was evaluated by proportion of missing data and timeliness by calculating delay (days) between reporting to local health department and system registration. 7 530 symptomatic cases were reported in ROE and 7 100 symptomatic cases in SRWE. The number of registered cases differed annually between systems (ROE/SRWE, 2 763/2 613 (2017); 2 403/2 179 (2018); 2 364/2 262 (2019)). The percentage of missing data ranged from 0.03-23.3% and were reported for date of birth, and residence address in both systems; age, date of onset, hospitalisation, and serotype in ROE; ROE-$ID_{person}$, ROE-$ID_{outbreak}$ in SRWE. Timeliness varied between both systems (2017-2019, $median_{ROE}$=4 (1-11)); $median_{SRWE}$=65 (27-120). The number of symptomatic cases from outbreaks differed between systems demonstrating lack of consistency. Missing ROE-IDs prevented identification of cases from outbreaks in SRWE. We recommend wider data exchange between systems and introduction of additional algorithms for automated data consistency checks.

Role: Eftychia developed the analysis plan, conducted data entry, explored data, and identified reporting issues, performed statistical analysis, drafted an abstract which was submitted to ESCAIDE 2023, and wrote the project report.

### *Educational outcome*

Eftychia created a novel approach to evaluate representativeness of genomic surveillance which strengthened her coding and mathematical skills. Having to present complex findings in simple and concise ways, Eftychia also improved her writing skills. She gained valuable insight on the surveillance system in Poland and in particular surveillance of two different infectious diseases, their specific characteristics, and goals. Eftychia also improved her data management skills. For both projects she wrote and submitted abstracts for conferences which further strengthened her communication skills.

# 2. Applied public health research

## OBSER-CO SARS-CoV-2 seroprevalence study

### *Factors associated with changes in SARS-CoV-2 anti-spike 1 IgG antibody levels from March 2021 to April 2022 in adults in Poland*

Supervisors: Małgorzata Sadkowska-Todys, Magdalena Rosińska and Małgorzata Stępień.

SARS-CoV-2 antibodies reflect infection rates and vaccination coverage. We aimed to examine associations between factors and changes in levels of SARS-CoV-2 anti-spike 1 IgG antibodies (anti-S1) in Polish adults from March 2021–May 2022. OBSER-CO is a repeated cross-sectional study with nested panel, assessing seroprevalence at four different time points. Data from panel participants (four rounds) were used. Anti-S1 IgG levels were assessed through a blood test at each round. Additionally, individuals answered questions through a computer-assisted telephone interview. Factors including age, vaccination status, gender, COVID-19 diagnosis, COVID-19 exposure, symptoms, sick leave, and hospitalisation were independent variables. We performed linear and quadratic growth mixed effects models to identify factors associated with changes in anti-S1 IgG levels. Estimates were adjusted for confounders. Overall, anti-S1 IgG levels increased over time. In Round 1, 50% of participants were unvaccinated, decreasing to 8.8% in Round 4. By Round 4, 69% had received a booster dose. Vaccination (1, 2 or 3 doses vs. unvaccinated) was associated with a significant increase in anti-S1 levels (three doses, B coefficient= 270.3, 95% CI 214.3 - 326.6). COVID-19 diagnosis, COVID-19 exposure, and fever were associated with smaller increases in anti-S1 IgG levels over time (i.e., fever, B= 17.7, 95% CI 8.2 - 27.3). Older age, gender, symptoms (dyspnoea, confusion), and sick leave due to respiratory illness were associated with decreases in anti-S1 levels. Overall, vaccination was associated with the biggest increase in anti-S1 levels. To achieve adequate anti-S1 levels vaccination seems to be the most effective approach. Increasing age was associated with decrease in antibodies over time therefore full/booster vaccination should be encouraged in older individuals irrespective of prior infection.

Role: Eftychia wrote a protocol and the project proposal, performed statistical analysis, presented findings to group meetings, wrote, submitted an abstract, and presented a poster at ECCMID 2023.

### *Willingness to vaccinate among adults, and factors associated with vaccine acceptance of COVID-19 vaccines in a nationwide study in Poland between March 2021 and April 2022*

Supervisors: Małgorzata Sadkowska-Todys, Magdalena Rosińska and Małgorzata Stępień.

Poland has one of the lowest cumulative uptakes of primary vaccination in the European Union. Public opinion about COVID-19 vaccination can influence vaccine uptake. We aimed to estimate willingness to vaccinate among vaccinated and unvaccinated participants, and the factors associated with vaccine acceptance in unvaccinated adults between March 2021 and April 2022. Data from four different time points of OBSER-CO were used. Data included willingness to vaccinate in unvaccinated (four rounds), willingness in vaccinated (two rounds; booster), reasons for reluctance to vaccinate, and socio-demographic, health, and behavioural factors. More than 20 000 individuals were interviewed at each round. Separate multivariable logistic regression models were performed at each round to assess associations between several factors and willingness to vaccinate in unvaccinated participants and estimate the effect of different pandemic waves and variants. Between rounds one and four (March 2021-April 2022), in the unvaccinated, willingness to vaccinate declined from 73% to 12%, whereas in the vaccinated, willingness to receive another dose declined from 90% to 53%. Overall, concerns about side effects, effectiveness, and vaccine adverse effects were common but decreased over time. Age, gender, employment, place of residence, COVID-19 diagnosis or exposure, hospitalisation, and participation in social activities were among the factors associated with willingness to vaccinate. However, associations changed over rounds highlighting the influence of different pandemic waves and variants. Findings indicate a declining and multifactorial willingness to vaccinate over time which was significantly influenced by emerging variants. Overall, willingness to vaccinate was hugely impacted by the Omicron variant. Sustained communication about vaccines is necessary to improve vaccine uptake and address the public's concerns and fears.

Role: Eftychia wrote a project proposal and protocol, performed statistical analysis, wrote, and submitted a manuscript to a peer-reviewed journal (under review). Eftychia presented this project during the Vaccinology module for cohort 2021 (February 2023).

### *Mapping viral hepatitis C (HCV) health services in selected prisons in Poland: A pilot study*

Supervisors: Karolina Zakrzewska, Małgorzata Sadkowska-Todys

The first ever health strategy on viral hepatitis elimination was published by WHO in 2016. According to this strategy, 90% of HCV infected people should be diagnosed with HCV and 80% of all eligible patients should have access and receive treatment by 2030. Prisoners, and especially those who inject drugs are in greater risk of HCV infection compared to the general population. In Poland, access to testing and treatment is limited due to limited funding. Even though similar testing and treatment frameworks apply to prisons as the ones for the general population, little is known about HCV care provision within prisons. In this pilot study, we aim to (a) test our research methods (sampling, recruitment, data collection) and (b) to map HCV health services (testing, treatment), identify barriers to testing and treatment as experienced by physicians, and assess the impact of COVID-19 on care provision. We will conduct a mixed methods pilot study, in a selected number of prisons and physicians in Poland. Physicians will be invited to participate by using purposive and snowball sampling techniques. We aim to invite physicians who work in two specific types of prisons in Poland and are involved in HCV care provision within prisons. Overall, we aim to interview at least 15 prison physicians. Questions will be both qualitative and quantitative, focusing on testing and treatment. Findings from this study will be used to guide the design of a nationwide study on HCV health services in prisons. Additionally, identifying and addressing testing and treatment gaps will contribute to the successful elimination of HCV in Poland by 2030.

Role: The fellow wrote the study protocol and drafted the study materials.

### *Educational outcome*

For both OBSER-CO projects Eftychia performed advanced statistical analysis (growth mixed effects modelling, bootstrapping, statistical corrections) which strengthened her data analysis skills. She gained knowledge in different study designs (repeated cross-sectional; mixed methods) and advanced her skills in performing research in the general population. Eftychia presented this research at an international conference and submitted a manuscript to a peer-reviewed journal further strengthening her communication and writing skills. By working on a protocol on HCV in prison settings, Eftychia gained knowledge on HCV health services for prisoners and the intricacies related to designing a study in these settings.

# 3. Teaching and pedagogy

## EAN mini module on Infodemic and Media Management

During the mini-module participants were introduced to the main concepts of infodemic management and media communication. The infodemic management part included a lecture and a practical exercise (case study). The fellow developed the case study (facilitator and participant versions) on infodemic management which was reviewed by other colleagues who were co-organisers of the mini module. Additionally, participants were also given homework before the mini module, consisting of an interactive game and audiovisual materials. Before the case study, participants could also watch a video around COVID-19 disinformation. The target audience was active members of the EPIET alumni network (EAN). Priority was given to current EPIET/EUPHEM fellows. The mini module took place on the 21-22November 2022, at the Public Health Agency in Stockholm, Sweden. The total duration was 1.5 days. The mini-module training materials, and facilitation were positively evaluated by participants.

## Data management in STATA: An Introduction

The aim was to introduce participants to STATA. The training included a lecture and a practical exercise. During the lecture, participants were provided with an introduction to STATA interface, commands for importing excel to STATA, and basic commands on data cleaning, management, descriptive statistics, linear and logistic regression. The practical exercise simulated analysis for an outbreak investigation. A PowerPoint presentation, an excel file (dataset), and a do.file were created for the module. Participants used excel and STATA during the training and if necessary, worked in teams. The target audience of this activity were colleagues at the Department of Epidemiology (NIPH NIH-NRI), with little or no knowledge of STATA. The training took place on the 9 March 2023, at the NIPH NIH-NRI, in Warsaw. It was a one-day training. Facilitation was performed by the fellow. The training was highly rated, and participants were very satisfied by the facilitation and contents.

### *Educational outcome*

By creating and facilitating two different teaching activities, Eftychia learned how to change her teaching style according to the audience. She strengthened her communication and teaching skills and acquired knowledge on new teaching techniques. She gained insight into her personal teaching style and how she can further improve her facilitation skills. Her teaching assignments included lecture, case study design and facilitation, and practical exercises.

# 4. Communication

## 8.1 Publications related to the EPIET fellowship

### *8.1.1 Manuscripts published in peer-reviewed journals*

1. E. Kotronia, M. Rosinska, M. Stepien, M. Czerwinski, M. Sadkowska-Todys. Willingness to vaccinate among adults, and factors associated with vaccine acceptance of COVID-19 vaccines in a nationwide study in Poland between March 2021 and April 2022. [Under Review, Frontiers Public Health].

2. E. Kotronia, K. Zakrzewska, M. Sadkowska-Todys. Mpox outbreak and public health response in Poland, 2022. [In preparation].

3. E. Kotronia, T. Wolkowicz, K. Zacharczuk, Z. Nowacka, M. Sadkowska-Todys. An outbreak of Enteroaggregative Escherichia Coli (EAEC) in a kindergarten in Northern Poland, November-December 2022. [In preparation]

4. E. Kotronia, M. Milczarek, M. Sadkowska-Todys. Data quality and timeliness of two electronic systems for the surveillance of salmonellosis in Poland between 2017-2019. [In preparation; Przegląd epidemiologiczne].

### *8.1.2 Other reports*

1. Outbreak investigation report: A nationwide outbreak of mpox in Poland, 2022. Identifying modes of transmission, co-exposures, and smaller, regional clusters. August-October 2022

2. Outbreak investigation report: An outbreak of Y. Enterocolitica in a kindergarten in Northern Poland, January-March 2023

3. Outbreak investigation report: An outbreak of Enteroaggregative Escherichia Coli (EAEC) in a kindergarten in Northern Poland, November 2022-March 2023

4. Surveillance project report: A simple approach to investigate representativeness of genomic surveillance of SARS-CoV-2 in Poland

5. Surveillance project report: Evaluation of data completeness and data quality of two electronic systems for the surveillance of salmonellosis in Poland between 2017-2019

**Abstracts submitted**
*1. E. Kotronia, M. Rosinska, M. Czerwinski, M. Sadkowska-Todys. A simple approach to evaluate representativeness of genomic surveillance of SARS-CoV-2 in Poland. Abstract [ESCAIDE 2022; Rejected].*
*2. E. Kotronia, M. Sadkowska-Todys. Data quality and timeliness of two electronic systems for the surveillance of Salmonellosis in Poland between 2017-2019. Abstract [ESCAIDE 2023; Rejected].*

## 8.2 Conference presentations

*ECCMID, 15-18 April 2023, Copenhagen. Factors associated with changes in SARS-CoV-2 anti-spike 1 IgG antibody levels from March 2021 to May 2022 in adults in Poland. Poster presentation.*

## 8.3 Other presentations

1. Answering to questions submitted to the NIPH NIH-NRI from public about COVID-19.

2. Presentation of one of the research projects entitled *"Willingness to vaccinate in adults and factors associated with vaccine acceptance in Poland in a nationwide study in Poland between March 2021 and April 2022"* during the Vaccinology module in February 2023.

3. Attended the WHO Technical Consultation on Building a Global Curriculum for Infodemic Management in Belgrade, Serbia on 21-22 March 2023. The fellow was part of the closing remarks panel, and the fellow delivered a five minute speech on the importance of including infodemic management in curricula of field epidemiologists and public health microbiologists.

4. The fellow was an active member of the Interest group on Infodemic Management which was created by fellows of cohort 2021. The fellows held bi-weekly meetings, hosted colleagues who work on infodemic management, co-organised the EAN mini-module of Infodemic and Media Management, and discussed about collaboration on research projects.

# 9. EPIET/EUPHEM modules attended

1. Introductory Course Part 1, 20/09-08/10/2021, online

2. Inject day on Phylogeny, 20/10/2021, online

3. Inject day on Operational Research, 26-27/10/2021, online

4. Inject day on Data Collection and Management, 10-11/11/2021, online

5. Outbreak Investigation Module, 06-10-12/2021, online

6. Multivariable Analysis Module, 14-18/03/2022, online

7. Inject day: Multivariable Analysis Module, 30/03/2022, online

8. Introductory Course Part 2, 20-29/04/2022, Spetses, Greece

9. Rapid Assessment & Survey Methods Module (RAS), 06-10/06/2022, Stockholm, Sweden

10. Project Review Module, 29/08-02/09/2022, Lisbon, Portugal

11. Time series analysis module, 07-11/11/2022, Utrecht, Netherlands

12. Vaccinology Module, 13-17/02/2023, online

13. Biorisk and Quality Management Module, 16-17/03/2023, online

14. Management, Leadership and Communication in Public Health Module, 08-12/05/2023, Stockholm, Sweden

15. Project Review Module, 28/08-01/09/2023, Lisbon, Portugal

# 10. Other training

1. Epidemic Intelligence e-learning course, ECDC Virtual Academy, 17/09-29/10/2021, online (EVA platform)

2. WHO Course: 101 Infodemic Management Course, 02/03-02/09/2022, online (WHO Open)

3. BSAFE Training, United Nations, 23/05/2022, online

4. Public Health Preparedness for Mass Gathering Events, WHO course, 18/05/2022, online

5. Introduction to Go.Data – Field data collection, chains of transmission and contact follow-up, WHO course, 29/06/2022, online (Open WHO)

6. Go.Data training which was conducted by the Go.Data WHO team. 3 half-day sessions on Microsoft Teams. Training was attended by a small group of colleagues working at the NIPH NIH - NRI, 12-19/07/2022, online

7. Mini session on using Git and Github and how to create a project in R while using Github, course organized by c2021 EPIET fellow Liza Coyer, 23/06/2022, online

8. EAN mini module on Introduction to Infodemic and Media Management, 21-22/11/2022, Stockholm, Sweden

9. EAN Webinar on Mobile laboratory in Public Health Interventions, course was co-organized by c2021 EUPHEM fellow Camille Jacqueline and EAN, 04/05/2023, online

# 11. Missions

Not applicable.

# 12. Other activities

1. Attendance at ESCAIDE 2021 Conference, 16-17/11/2021, online
2. Attendance at ESCAIDE 2022 Conference, 23-25/11/2022, Stockholm, Sweden
3. Attendance at ECCMID 2023 Conference, 15-18/04/2023, Copenhagen, Denmark.
4. Participation at in person meetings of the International Health Regulations (IHR) team at the NIPH NIH-NRI in Warsaw, where topics included in the weekly presentation were discussed.
5. Attendance at the weekly meetings (online) where the IHR team of the NIPH NIH-NRI presented a summary of events which took place the previous week.

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