

FINAL REPORT

Gordan Sarajlic

The European Programme for Intervention Epidemiology Training (EPIET), Cohort 2021
CROATIAN INSTITUTE OF PUBLIC HEALTH, Croatia

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 within the European Union (EU) and the 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.

The views expressed in this publication do not necessarily reflect the views of the European Centre for Disease Prevention and Control (ECDC).

Stockholm, November 2023

© European Centre for Disease Prevention and Control, 2023. Reproduction is authorised, provided the source is acknowledged.

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

Gordan Sarajlić, born on 25 June 1988, in Zagreb, Croatia, obtained a degree in Medicine from the University of Zagreb in 2013. After an internship at the 'Sveti Duh' clinical hospital in Zagreb and after passing his State license exam, he worked in PLIVA Croatia as a Drug Safety Associate. In PLIVA, his work included the preparation of risk management plans and periodic safety reports for various drugs. In 2019, Gordan started a medical residency in epidemiology at the Croatian Institute of Public Health where he is employed today. As an epidemiology resident in Croatia, Gordan started the ECDC EPIET training programme (The European Programme for Intervention Epidemiology Training) as a Member State track fellow in September 2021.

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 Manual¹.

1. Epidemiological investigations

1.1. Outbreak investigations

An outbreak of norovirus gastroenterocolitis in a municipal kindergarten in the City of Zagreb, Croatia, 2023

Supervisors: Mirjana Lana Kosanović Ličina, MD, Andrija Stampar Teaching Institute of Public Health, Nika Lazić, MD, Andrija Stampar Teaching Institute of Public Health

Category: Food and waterborne diseases

An outbreak of norovirus gastroenterocolitis occurred in a kindergarten in April 2023 in the City of Zagreb, Croatia. An outbreak investigation team implemented control measures as soon as the signal was received from the kindergarten and an active investigation was initiated. A total of 15 cases were identified through passive and active case finding efforts. Typical viral gastroenterocolitis symptoms and typical illness duration were observed among the cases. The majority of cases were in the same kindergarten class, with sporadic cases in neighbouring classes and amongst kindergarten teachers. No severe clinical presentations were observed and no cases were hospitalised. Norovirus was isolated in four stool samples, three of which were received from children attending the class with the majority of cases. Information gathered from the kitchen and food handlers ruled out the possibility of food being the primary vehicle. A hypothesis that a child or a teacher from the most affected class imported the infection was established and investigated. Active case finding efforts managed to identify one case, in addition to the cases notified directly by the kindergarten. This case developed gastroenterocolitis symptoms first and attended kindergarten while symptomatic.

All parents were notified not to bring their children to kindergarten if their children experience any infectious disease symptom(s). The kindergarten health officer was instructed to prevent contact between children attending different classes and to implement thorough cleaning and disinfection of the premises. In all identified cases, the first symptom(s) occurred in a timeframe of four days and no new cases were notified after this short period. The efforts of the field epidemiology team and the dedicated kindergarten health officer allowed for early outbreak detection and effective outbreak containment.

Role: Lead investigator. The fellow was actively involved in all steps of the outbreak investigation since the first signal was received. Under adequate supervision, the fellow organised and conducted the field visit, constructed the questionnaires for parents and employees, analysed the gathered data, actively and directly communicated with the kindergarten health officer, wrote the outbreak investigation report, and wrote and submitted an abstract to the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) as first author. The abstract was accepted as an online poster to be presented at ESCAIDE 2023.

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>

Educational outcome

The most beneficial outcome for the fellow in this project was getting to see and understand the tasks regarding outbreak investigations of a field epidemiology unit and how it is structured as part of the Croatian health system. The fellow needed to understand and manage the situation with limited resources. This enforced teamwork and effective communication within the team, including delegation of tasks to outbreak investigation team members. Furthermore, the fellow conducted multiple interviews and gathered data through questionnaires which allowed him to further develop his interviewing skills, data management skills and critical thinking. The project also opened the way to develop competencies such as cooperation and planning, as well as analytical skills and organisational sensitivity.

1.2. Surveillance

Evaluation of the national tuberculosis surveillance system in Croatia: assessing tuberculosis under-reporting through an inventory study

Supervisors: Goranka Petrović, MD, Croatian Institute of Public Health

Zvezdana Lovrić Makarić, MD, Croatian Institute of Public Health

Completeness of notifications in the Croatian Tuberculosis Registry was assessed as part of a larger European study in 2019 using capture-recapture analysis for the reporting year 2015. The study included data from the Croatian Tuberculosis Registry, Croatian Mycobacterial Reference Laboratory database and the hospital discharge database of Croatia. The results showed an observed completeness of notifications of 73.9%. In order to provide a body of scientific evidence needed for decision-making in tuberculosis surveillance and vaccination strategies, it is important to continue analysing and assessing the completeness of notifications and the level of possible under-reporting. Therefore, we undertook an inventory study to assess the completeness of tuberculosis reporting in Croatia by calculating the registry-specific coverage rate using nationally representative data for the reporting year 2019.

To determine the completeness of notifications in the tuberculosis registry, we obtained and compared the number of cases notified to national authorities in Croatia and recorded in three different data sources. Comparison was made using the process of record-linkage. By linking the records from multiple different sources, we determined duplicates via a universal identifier and counted the total number of tuberculosis cases and the extent to which they have been reported to the national registry. The final determined case count was 421 and 334 cases had been notified, leading to a calculated coverage of the Croatian Tuberculosis Registry of 79%. These results show improvement compared to the findings from the earlier coverage study, however, there is still room for improvement. Identifying and addressing factors associated with underreporting, and raising awareness of the importance of notifying tuberculosis are essential to ensure effective tuberculosis prevention and control towards its elimination. Raising awareness amongst the participants in tuberculosis surveillance and treatment could improve the surveillance system.

Role: Primary investigator. The fellow was actively involved in all steps of the project since the initial idea was proposed by the project supervisor. The fellow was responsible for the literature search, determining the methodology and aims, writing the protocol, organising and overseeing data extraction, conducting case screening and analysis and writing the final study report. Based on this project and its results, the fellow wrote and submitted an abstract to the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE 2023) as first author.

Educational outcome

During this project, the fellow developed organisational skills needed for coordination, planning and conducting a retrospective epidemiological study. Communication with other departments and stakeholders was a great benefit, as two-way communication and mutual understanding needed to be developed. The fellow was actively involved in discussion and contemplation on the databases appropriate for capture-recapture studies and inventory studies, providing deeper insight into these methodologies and the possibility of utilizing them in future projects. A lot of data management activities and manual work on the dataset made the fellow aware of the importance of recording the steps of analysis and documenting decisions. Also, the project shed new light on the importance of a case definition and the quality of sources of data available in Croatia for disease surveillance purposes.

2. Applied public health research

Survival after hip fracture in the elderly people in Croatia

Supervisors: Ivana Brkić Biloš, MD, Croatian Institute of Public Health

Branko Kolarić, MD, Andrija Stampar Teaching Institute of Public Health, University of Rijeka

Given the public health burden that hip fractures present in the elderly population, and an aging population that will increase the size of the problem, further efforts in prevention and understanding risk factors is needed. Routinely collected Croatian mortality and morbidity statistics show that hip fracture is not only the most common cause of injury-related hospitalisations in elderly people, but also the most common cause among all injury-related deaths. To our knowledge, no survival analysis for hip fracture patients was done in the Croatian population. We undertook a survival analysis using routinely collected data on hospital discharges and mortality related to hip fractures in the elderly people. The study was conducted as a retrospective, population-based cohort study among individuals aged ≥ 65 years using linked secondary health data from hospital discharges in Croatia during 2018 and national mortality records from 1 January 2018 to 31 December 2020. An analysis with up to three years of follow-up was performed with the Kaplan-Meier method. Results pertaining to survivorship and Kaplan Meier curves were calculated and presented for various follow-up times, stratified by sex and by five-year age groups chosen for the study population.

From hospital discharge data, we identified 5 052 incident cases of hip fracture. The overall crude incidence rate of hip fracture was 607/100 000 (355/100 000 in males and 778/100 000 in females). Higher incidence rates were found in females across all five-year age groups, as well as in older age groups. More deaths were observed in older groups. Males had a shorter median survival time than females (538 days versus 1 036 days). As more time elapsed post fracture, the difference in survival was more pronounced. Log rank test confirmed the significance of difference in survivorship between the sexes, as well as between different age groups. Elderly females are more affected by hip fracture in terms of incidence, while men have shorter survival. Results for Croatia are in line with the current knowledge. As hip fracture remains a major public concern in the elderly population, additional efforts need to be put towards prevention of falls and other known risk factors.

Role: Lead investigator. Under the supervision of the project lead, the fellow was actively involved in all steps of the project since the initial idea was proposed by the project lead. The fellow wrote the protocol, conducted the literature search, organised regular meetings with other experts in the field, organised data extraction and assembly of the database, and conducted the descriptive and survival analysis in STATA. Based on the research project and the obtained results, the fellow wrote a manuscript that is planned to be submitted to a peer-reviewed journal. The fellow wrote an abstract for the Croatian Epidemiological Congress, held in May 2023, where he gave an oral presentation on the results of the calculation of incidence of hip fracture in the elderly population of Croatia.

Educational outcome

This research project was in the field of epidemiology of noncommunicable diseases, which was of great benefit for the fellow as this was an opportunity to learn the similarities and differences between applied research in infectious disease and non-infectious diseases. What is more, it was in the field of injuries, which is a more specific context that the fellow will often meet in his line of work. The fellow came to a better and broader understanding of the strategies and logic of data collection in the Croatian public health system, as well as responsibilities and processes behind the data collected routinely and vital statistics. The fellow acquired data management and data analysis skills in STATA.

3. Teaching and pedagogy

Supervisor: Branko Kolarić, MD, Andrija Stampar Teaching Institute of Public Health, University of Rijeka

Case study: An outbreak of gastroenteritis in Kalundborg, Denmark

The fellow conducted this teaching activity regarding the basic concepts of intervention epidemiology and the steps of an outbreak investigation for PHD students. The course coordinator of the course 'Epidemiological research' first gave an introduction and presented the aims and steps of outbreak investigation using a Powerpoint presentation. The case study was then undertaken, coordinated and led by the EPIET fellow. The case study 'An outbreak of gastroenteritis in Kalundborg, Denmark' was chosen based on the assumption of the needs, previous knowledge and expertise of the target audience.

Lectures 'Analytic epidemiology, measures of association and epidemiological study design'

The fellow conducted this teaching activity regarding the basic concepts of analytic epidemiology and epidemiological study design for medical students attending medical studies in English. The fellow gave the lecture with the organisation and support from the course coordinator of the course 'Epidemiology'. The lecture took place at the Department of Social Medicine and Epidemiology of the Faculty of Medicine at The University of Rijeka in Croatia in June 2022. The target audience were fifth year medical students attending the compulsory course 'Epidemiology' at the Faculty of Medicine at the University of Rijeka.

Practical 'direct and indirect age standardisation'

The fellow conducted this teaching activity regarding methods of direct and indirect age standardisation for fifth year medical students attending medical studies in English. The EPIET fellow facilitated the practical (exercise) with the organisation and support from the course coordinator of the course 'Epidemiology' and the teaching assistant responsible for this practical in the academic year 2021/2022. The practical took place on-line, via the application Microsoft Teams in June 2022. The time devoted to the practical was three hours and was meant for fifth year medical students attending the compulsory 'Epidemiology' course at the University of Rijeka in Croatia, Department of Social Medicine and Epidemiology of the Faculty of Medicine.

Educational outcome

The teaching activities contributed greatly to the fellow's skills and knowledge in understanding and explaining epidemiological concepts that can be abstract to some. The fellow gained experience in finding a way to make complicated topics easy to understand, but at the same time not leave out important concepts. This activity was also useful for developing communication skills. The online delivery of the practical provided a chance to think of ways how to improve active participation of the students.

4. Communication

4.1 Publications related to the EPIET fellowship

4.1.1 Manuscripts published in peer-reviewed journals

Manuscript titled *Survival after hip fracture in the elderly population of Croatia* is planned for submission to Croatian Medical Journal by the end of the fellowship. The manuscript is based on the research project undertaken by the fellow and obtained results.

4.1.2 Reports

The final study report based on the research done in the field of communicable disease surveillance has been finalised in July 2023. (*Evaluation of the national tuberculosis surveillance system in Croatia: Assessing tuberculosis under-reporting through inventory studies in Croatia - retrospective analysis of existing databases*).

An outbreak investigation report was written in April 2023, based on the conducted investigation of an outbreak of norovirus in a kindergarten in the City of Zagreb, Croatia.

4.2 Conference presentations

1. European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), November 2023; Barcelona, Spain. *Timely outbreak signal detection – the role of a kindergarten health officer in a norovirus outbreak investigation in a kindergarten in Zagreb, Croatia, March 2023* (online poster)
2. EPIET Project Review Module, August 2023, Lisbon, Portugal. *Timely outbreak signal detection – the role of a kindergarten health officer in a norovirus outbreak investigation in a kindergarten in Zagreb, Croatia, March 2023* (oral presentation)
3. Croatian Epidemiological Congress, May 2023, Osijek, Croatia. *Incidence of hip fracture in the elderly population of Croatia in 2018 using public health reported data* (oral presentation)

5. EPIET modules attended

1. Introductory Course part 1, Sep 20 - Oct 8 2021, virtual
2. Outbreak Investigation, Dec 6-10 2021, virtual
3. Multivariable Analysis, Mar 14-18 2022, virtual
4. Mid-term project review, Apr 20- 22 2022, Spetses, Greece
5. Introductory Course part 2, Apr 25-29 2022, Spetses, Greece

6. Rapid Assessment and Survey Methods, Jun 6 - 10 2022, Stockholm, Sweden
7. Project Review Module, Aug 29 - Sept 2 2022, Lisbon, Portugal
8. Time Series Analysis, Nov 7-11 2022, Bilthoven, The Netherlands
9. Vaccinology, Feb 13-17 2023, virtual
10. Biorisk and Quality Management, Mar 16-17 2023, virtual
11. Management, Leadership and Communication in Public Health, May 8-12 2023, Stockholm, Sweden
12. Project Review Module, Aug 28 - Sep 1 2023, Lisbon, Portugal

6. Other activities

1. Attending European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2021, 2022 and 2023.
2. Post-graduate specialist study EPIDEMIOLOGY at Zagreb School of Medicine, Zagreb University (academic year 2021/2022)
3. Lab visits at Croatian Institute of Public Health:
 - Unit for Respiratory Viruses, Unit for Enteroviruses, Unit for Serological Diagnostics of Viral and Zoonotic Diseases
 - Unit for Urinary and Reproductive Tract Infections
 - Unit for Gastrointestinal Infections with national salmonella laboratory
 - Unit for preparation of microbiological culture and growth media
 - Unit for microbiological specimen collection
 - Unit for tuberculosis and the national and supra-national diagnostic laboratory
 - Department for Bacteriology
4. Continuous work and support on ECDC's Healthcare professionals vaccine effectiveness study in Croatia (Nov 2021-Dec 2022)
5. Continuous work and support on EU joint action project JADECARE (Joint Action on implementation of digitally enabled integrated person-centred care) (Nov 2021-Jul 2022)
6. Field research activities as part of Child obesity surveillance initiative in Croatia (World Health Organisation, coordination by CIPH) (Feb 2022-Mar 2022)
7. Continuous work and support on EU joint action project PERCH (PartnERship to Contrast HPV)

Acknowledgements

Tanja Charles, Robert Koch Institute
Achim Dörre, Robert Koch Institute
Ivana Brkić Biloš, Croatian Institute of Public Health
Zvezdana Lovrić Makarić, Croatian Institute of Public Health
Petra Čukelj, Croatian Institute of Public Health
Mario Šekerija, Croatian Institute of Public Health
Pero Ivanko, Croatian Institute of Public Health
Ivan Pristaš, Croatian Institute of Public Health
Sandra Mihel, Croatian Institute of Public Health
Nataša Antoljak, Croatian Institute of Public Health
Bojana Mahmutović, Croatian Institute of Public Health
Nika Lazić, Andrija Stampar Teaching Institute of Public Health
Branko Kolarić, Andrija Stampar Teaching Institute of Public Health, University of Rijeka
Maja Ilić, Croatian Institute of Public Health
Mirjana Lana Kosanović Ličina, Andrija Stampar Teaching Institute of Public Health
Camille Jacqueline
Catarina Krug
Christina Merakou
Eftychia Kotronia
Corrado Minetti
Liza Coyer
Tatiana Garcia Vilaplana