

MediPIET Summary report of work activities

Petar Đurić

Serbia, Cohort 5 (2022)

Background

About MediPIET

The Mediterranean and Black Sea Programme for Intervention Epidemiology Training (MediPIET) aims to enhance health security in the Mediterranean and the Black Sea region by supporting capacity building for prevention and control of natural or man-made threats to health posed by communicable diseases. It is a competency-based **in-service 2-year fellowship** during which selected fellows conduct projects and field investigations at a MediPIET Training Site in their home country and attend MediPIET modules.

Since mid-2021, MediPIET is implemented by ECDC as a part of the [EU Initiative on Health Security](#). You can find more information about the programme at: <https://www.ecdc.europa.eu/en/training-and-tools/training-programmes/fellowships/medipiet>

Pre-fellowship short biography

Petar Đurić is a medical doctor employed at the National Public Health Institute of Serbia, in the Department of Analysis, Planning, and Healthcare Organization. He is currently a resident in social medicine and a PhD candidate in public health at the University of Belgrade's Faculty of Medicine within the School of Public Health and Health Management. Furthermore, he holds a Master of Arts in Teaching and Education. He is interested in epidemiological data application in healthcare organisation based on health needs assessment.

Fellowship

On September 26, 2022, Petar started his MediPIET fellowship at the National Public Health Institute of Serbia 'Dr. Milan Jovanović Batut', Belgrade, Serbia. This report summarizes the work performed during the fellowship.

National supervisors: Prof. Verica Jovanović, MD, MSc, PhD.

Mitra Drakulović, MD, MSc, PhD.

Scientific coordinators: Nana Mebonia, Natalie Girin.

Fellowship projects

1. Surveillance

Setting up a new surveillance system for Dengue in Serbia, 2024

Introduction: In the EU/EEA, a competent Dengue virus (DENV) vector (*Aedes mosquito*) has become established during the past decades. Meanwhile, several Dengue (DEN) outbreaks have been reported in EU countries. An autochthonous transmission is expected in the presence of the vector and humans infected by DENV. Therefore, ECDC recommended establishing the DEN surveillance system in all countries with documented vector presence to detect cases and areas affected by DENV transmission and apply prevention and control measures.

Methods: Based on evidence from the literature, nationwide DEN surveillance is established as an enhanced seasonal activity during the expected DENV vector activity. It will be supported with entomological surveillance and vector control activities.

Results: Enhanced surveillance system in humans during the highest DENV transmission possibility (August 1 – November 30) and passive surveillance out of that period. Human data originates from healthcare facilities and the National Reference Laboratory and will be transferred to the Nomenclature of Territorial Units for Statistics level 3 public health institutes (PHI-3s). From the PHI-3, together with the case investigation form filled out by the epidemiologist who interviewed cases in the field, data will be shared in the paper form and by e-mail with the National Public Health Institute of Serbia's (NPHIS) Surveillance Department.

Conclusions: The next step is to engage relevant stakeholders to create a mutual data-exchange portal to enable real-time situation analyses. Based on risk assessment, surveillance evaluation results, and periodic SWOT analyses, the surveillance system will be adjusted in order to achieve its objectives.

Role and outputs: Principal investigator: Petar Đurić, MD, MSc

Fellow's roles and responsibilities within the complex process of the surveillance system setting-up were: literature review and needs assessment, engaging relevant stakeholders (organizing meetings, communication), developing training materials, conducting trainings with senior epidemiologists from the NPHIS, creating the National Guide for the Dengue surveillance system implementation in Serbia, developing the case investigation form, establishing the data flow algorithm between stakeholders.

Supervisor(s): Prof. Verica Jovanović, MD, MSc, PhD, Mitra Drakulović, MD, MSc, PhD

Status: Finished

2. Outbreaks

West Nile virus infection outbreak investigation, Serbia, 2023

Introduction: On July 15, 2023, the National Public Health Institute of Serbia (NPHIS) received information that a 58-year-old man from Sombor had been hospitalised with the meningeal syndrome and tested positive for the WNV in serum and cerebrospinal fluid.

Methods: Epidemiologists from the NPHIS and NUTS-3 level Public Health Institute (PHI-3) conducted an outbreak investigation using a standardised case investigation form and the European Union case definition. The working case definition was: a person living in Serbia experiencing at least one out of the three following criteria: fever, encephalitis, meningitis, or acute flaccid paralysis from 01/06/2023 – 18/10/2023. We calculated Incidence rates (IR) per 100 000 population by sex, age group, and region. We used univariate logistic regression to calculate Incidence rate ratios (IRR) with a 95% Confidence Interval to estimate differences by sex, age groups, and region. We investigated *Culex pipiens* mosquitoes for the WNV presence and described meteorological data on average monthly temperature and precipitation in Serbia from June to October 2023.

Results: Between July 15 and October 18, 2023, 92 WNVI cases were identified across 15 districts of Serbia. The overall WNVI incidence rate at the national level was 1.38 per 100 000 population. The incidence rate was higher in men than in women. The highest number of WNVI cases was in the South Backa (26.1%) and Belgrade City (25.0%) NUTS-3. Among WNVI cases, 78 were classified as WNNDs (84.8%). Males were more likely to develop severe WNND form.

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WNVI cases older than 70 are 18 times more likely to develop WNND than the 0-49 age group. Vector control was conducted in the area of 500 meters around the case's household. From May to August 2023, *C. pipiens* was found in all 17 Belgrade municipalities. In July-October 2023, the highest average monthly temperature was in Belgrade City (26.0° C) during July, and the highest average monthly precipitation in June in Toplica (238.8 mm).

Conclusions: The WNVI cases in the Serbian 2023 outbreak mainly affected men and populations older than 50, especially in Northern Serbia and Belgrade City. After the case detection, intensified field interventions were performed to decrease the vector number. Continually estimating environmental data and WNV circulation in animals and humans is needed. Identifying groups at a higher risk of severe disease can help implement more targeted prevention and control interventions in the community.

Role and outputs: Principal investigators: Petar Đurić, MD, MSc, Mitra Drakulović, MD, MSc, PhD,

The fellow was involved in all ten steps of an outbreak investigation. Some activities (such as project proposal writing, data collection, descriptive analysis, risk communication, community engagement, and infodemic management) were performed in parallel with the ongoing outbreak, and the analytical part, concluding, and writing the outbreak investigation report was finalised after the outbreak.

Supervisor(s): Prof. Verica Jovanović, MD, MSc, PhD, Mitra Drakulović, MD, MSc, PhD.

Status: Finished.

3. Research

1. Mpox cases in Serbia, 2022

Background: On July 23, 2022, the World Health Organization (WHO) declared the mpox multi-country outbreak as a Public Health Emergency of International Concern. This study aimed to identify the epidemiological and clinical characteristics of confirmed mpox cases reported in Serbia in 2022.

Methods: The mpox WHO case definition was used. Incidence rates (IRs) and incidence rate ratios (IRRs) by age groups and Nomenclature of Territorial Units for Statistics level 3 (NUTS-3) with 95% Confidence Intervals (CIs) were calculated.

Results: Between June and October 2022, 43 laboratory-confirmed cases were reported. All of them were unvaccinated males, with the mean age of 34 (± 7.4) years. Out of the total, 72.1% cases were men who have sex with men, who reported sexual intercourse either with multiple or unknown partners ($p < 0.01$). Fifteen cases (34.9%) lived with HIV, mostly in the age-group of 30-39 ($p = 0.012$). People living in Belgrade City NUTS-3 were six times more likely to get infected compared with people living in the South Backa (IRR: 6.03, 95% CI: 1.47-25.53).

Conclusions: In Serbia, mpox mainly affected men who have sex with men aged 30-39 and living in urban areas. Health promotion and vaccine implementation should be prioritised in populations with higher risk.

Role and outputs:

Petar prepared the project proposal accepted by the Institutes' Ethical Committee and analysed research data, with significant support from colleagues from the Institute's Centre for Informatics and Biostatistics in Health Care. After data analysis, he prepared a manuscript draft which was revised by country supervisors, co-authors, the frontline coordinator, and ECDC's scientific board. This manuscript has been submitted to a peer-reviewed journal.

Supervisor(s): Prof. Verica Jovanović, MD, MSc, PhD, Mitra Drakulović, MD, MSc, PhD.

Status: Finished*

**Within this project, the fellow covered the following steps: Data analysis, Data interpretation, Scientific Report/Manuscript writing and submitting.*

2. Knowledge, risk perception, attitudes and practices of Health Centre's general medical doctors in Belgrade towards the West Nile Virus Infection (WNVI)

Role and outputs:

Petar has prepared the project proposal that was accepted by the NPHIS's Ethical Committee. Afterward, he created an investigation instrument (a questionnaire), that the Institute's Ethical Committee approved. All of the investigation steps are explained in detail within the project protocol. After the fellowship, the data collected will be analyzed, and a scientific report or manuscript will be prepared as an output.

Supervisor(s): Prof. Verica Jovanović, MD, MSc, PhD, Mitra Drakulović, MD, MSc, PhD

Status: Finished*

**Within this project, the fellow covered the following steps: Project Proposal and Project protocol preparation, research instrument (questionnaire) design, and data collection. A scientific report will be done after the fellowship.*

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Scientific communication

Conference presentations

- **Djurić P**, Jovanovic V, Plavska D, Drakulovic M, Medarevic A, Rakic U, Mebonia N. Mpox in Serbia – What do we know now? (2023) 55th Days of Preventive Medicine. Niš, Serbia;
- Jovanovic V, **Djurić P**, Drakulovic M, Plavska D, Jovanovic S, Medarevic A. Epidemiological and clinical characteristics of Mpox Cases in Serbia in 2022. Eur J Public Health. 2023 Oct 24;33(Suppl 2): ckad160.1267. doi: 10.1093/eurpub/ckad160.1267. PMID: PMC10596283. [Presented at the European Public Health Conference, EPHC 2023]
- **Djurić P**, Jovanovic V, Drakulovic M, Despot M, Malinic J, Beljin A, Protic J, Divljakovic A, Milosavljevic S, Mebonia N. Serbia multidisciplinary approach for surveillance and risk identification – The “One Health” information for action. Eur J Public Health. 2024 Nov;34(Suppl_3).280. doi: 10.1093/eurpub/ckae144.280.Text [Presented at the European Public Health Conference, EPHC 2024]

Publications and outputs

Fellow prepared and submitted a manuscript from the first research project entitled as ‘Mpox cases in Serbia, 2022’.

- **Djurić P**, Jovanović V, Drakulović M, Plavša D, Malinić J, Medarević A, Protić J, Mebonia N. Mpox cases in Serbia, 2022. Unpublished material, to be published.*

* Submitted to the *Multidisciplinary Digital Publishing Institute (MDPI) Infectious Diseases Reports*.

Status: Finished

4. Teaching activities

Supervisor(s): Prof. Verica Jovanović, MD, MSc, PhD, Mitra Drakulović, MD, MSc, PhD

Title: The One Health Approach in understanding epidemiological and public health importance and surveillance of Dengue in the Republic of Serbia.

The training was performed at the NPHIS for young public health professionals directly involved in epidemiological surveillance, public health microbiology, healthcare organisations, and other relevant activities. The fellow was the only lecturer, and he provided education based on the topic's relevance to Serbia and the whole European region. The training was developed under the tutoring of country supervisors and frontline coordinator. The training lasted for 2.5 hours and was divided into three main sections:

- Lecture: The One Health Approach in the vector-borne disease surveillance.
- Lecture: Epidemiological and clinical characteristics of Dengue in Europe and globally.
- Lecture (L) and practical group work (GW):
 - L: Dengue Surveillance system implementation in Serbia
 - GW: Case study: A Dengue imported case in Serbia.

Before and after the training, participants filled out a pre-and post-test and an evaluation survey to provide feedback on the training.

Status: Finished

5. Other activities

- The European Public Health Conference, Lisbon, 2024 – A workshop organized by scientific coordinators and fellows from cohorts 2022 and 2023, entitled as **Building Resilience: Strengthening European public health workforce through ECDC Fellowship Programs**.
- Fellow presented one of his MediPIET subprojects within the presentation: **Serbia multidisciplinary approach for surveillance and risk identification – The ‘One Health’ information for action**. (mentioned above)

Status: Finished

MediPIET modules attended

- Introductory Course Module, 26.09-07.10.2022, Spetses, Greece, attended face-to-face,
- Operational Research Inject Days, 08.11-10.11.2022, attended online,
- R Intro Course, 28.11-01.12.2022, attended online,
- Outbreak Investigation Module, 05.12-09.12.2022, Berlin, Germany, attended face-to-face,
- Qualitative Research Inject Days, 31.01.2023. and 03.02.2023, attended online,
- CBRN Awareness and Mitigation Module, 13.02-17.02.2023, Petrovac, Montenegro, attended face-to-face,
- Vaccinology Inject Day, 29.03.2023, attended online,

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- Multivariable Analysis Module, 22.05-26.05.2023, Frankfurt, Germany, attended face-to-face
- Rapid assessment and survey methods + Mass Gathering Module, 19.06-23.06.2023, Stockholm, Sweden, attended face-to-face,
- Project Review Module 2023, 28.08-01.09.2023, Lisbon, Portugal, attended face-to-face,
- Time Series Analysis and GIS Module, 11.12-15.12.2023, Rome, Italy, attended face-to-face,
- One Health Module, 03.06-07.06.2024, Belgrade, Serbia, attended face-to-face,
- Project Review Module, 26.08-30.08.2024, Lisbon, Portugal, attended face-to-face.

Personal conclusions of fellow

As a young public health professional with limited experience, this fellowship has provided me with invaluable opportunities to comprehensively understand the importance of infectious disease prevention and control, not only within my own country but also at a regional level. Since the systematic collection, analysis, and interpretation of epidemiological data are essential for organising healthcare systems and evaluating their performance, this programme has taught me how to utilise and interpret such data from various perspectives. It has also enabled me to enhance my practice by fostering collaboration with colleagues from diverse areas of expertise, all with the shared goal of preserving and improving community health.

The friendships and connections I have formed over the past two years hold great value for me personally and professionally. I have had the opportunity to learn something new from each of my colleagues, enriching my competencies and broadening my perspective. Furthermore, the professional network I have built through this experience will empower me to contribute to the shared mission of protecting the entire European region from public health threats in the future.

Acknowledgements

I would like to take this opportunity to express my deepest and warmest gratitude to my frontline scientific coordinators, Prof. Nana Mebonia and Natalie Girin, my country supervisor, Prof. Verica Jovanović, and my country co-supervisor, Dr. Mitra Drakulović for their continuous motivation, immense and selfless support, willingness to share their knowledge with me, and guidance in shaping every segment of this portfolio. Despite my formal education in teaching and education, they have demonstrated to me how to inspire individuals to embark on the complex process of learning, building, and developing their competencies.

A special and heartfelt thanks to my colleagues from my Department and all other colleagues who supported me in persevering through this fellowship. A special thanks goes to my family and friends for their unwavering support.