

MediPIET Summary report of work activities

Lusine Boryan

Armenia, Cohort 5 (2022)

Background

1. 1. 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](https://www.ecdc.europa.eu/en/training-and-tools/training-programmes/fellowships/medi Piet). You can find more information about the programme at: <https://www.ecdc.europa.eu/en/training-and-tools/training-programmes/fellowships/medi Piet>

2. 2. Pre-fellowship short biography

Lusine is a medical doctor specialising in epidemiology and preventive medicine. Since 2001, she has worked at the Department of Epidemiology of Communicable Diseases at the National Center for Disease Control (NCDC) in Yerevan, Armenia. Her responsibilities included analysing surveillance data on sexually transmitted infections (STIs) and other infectious diseases from outpatient facilities and hospitals, publishing epidemiological reports, and contributing to public health decision-making. Since 2017, she has also worked at the National Center for Dermatology and Sexually Transmitted Infections (NCD&STI), where she was responsible for monitoring and managing nosocomial infections.

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Fellowship

On 26 September 2022, Lusine started her MediPIET fellowship at the National Center for Disease Control and Prevention, in Yerevan, Armenia. This report summarises the work performed during the fellowship.

National supervisors: Dr Lilit Avetisyan (2022), Dr Romella Abovyan (2022–2025)

Scientific coordinator: Dr Pawel Stefanoff

Fellowship projects

3. Surveillance

Evaluation of the surveillance system of syphilis in Armenia. (2013–2022)

Introduction: In 2016, the Ministry of Health established sanitary rules and hygienic norms for the prevention of sexually transmitted infections (STIs). The syphilis surveillance system is managed by two institutions: National Center for Disease Control (NCDC), responsible for aggregated notifications of all STIs, and the National Center for Dermatology and Sexually Transmitted Infections (NCD&STI), which summarises all available information on syphilis cases diagnosed in Armenia. A comparison of NCDC and NCD&STI data from 2013 to 2022 revealed discrepancies and unexpected differences. This evaluation aims to identify these gaps, propose solutions, and assess the legislative framework to improve the system's efficiency.

Methods: We assessed the syphilis surveillance system by reviewing legal frameworks, reporting forms, and conducting a survey of 89 respondents (August–October 2024). Information flow between two electronic systems—ARMED (clinical data) and EIDSS (epidemiological data) was analysed, along with case definitions, data analysis, and feedback mechanisms. We assessed the system simplicity and acceptability by describing the system processes and surveying data providers. We assessed representativeness by comparing annual cases reported to NCDC and NCD&STI during 2013–2022. We assessed surveillance timeliness by estimating the delay between symptom onset and first notification among patients hospitalised in NCD&STI in 2020–2021. Finally, we reviewed the characteristics of the Armenian syphilis surveillance with STI experts from the Dutch National Institute for Public Health and the Environment (RIVM) in Bilthoven and discussed its strengths, weaknesses, opportunities and threats.

Results: Armenia uses two systems for health data management: ARMED (clinical) and EIDSS (epidemiological). NCDC does not have access to ARMED, and syphilis reporting lacks a specific case definition, with only aggregated STI data reported. Multiple reporting forms complicate surveillance, and private laboratory results are often missing. A survey of 89 respondents found the system complex and confusing, pointing to low acceptability and low utilisation of various reporting forms. Furthermore, only a small percentage of respondents actively used feedback from NCDC and NCD&STI. The analysis of 523 medical records showed delays in seeking medical care (median: 9 days, mean: 118.9 days, standard deviation: 1854.8 days). While the median suggests short delays for most cases, the high mean and extreme standard deviation indicate significantly prolonged diagnosis in some cases. We found important discrepancies in reporting to NCDC and NCD&STI, indicating very low representativeness of the current system. In 2013–2022, 899 STI infections were notified to NCDC, compared with 1462 syphilis cases diagnosed and reported to NCD&STI. Physicians notified to NCDC as few as 0 cases in 2013, 2015 and 2019, and as many as 351 STI infections in 2016. Reporting to NCD&STI was more consistent, as it varied from 55 cases in 2013 to 117 cases in 2020, followed by a dramatic increase in diagnosed syphilis cases in 2021–2022. The SWOT analysis indicated that although the STI surveillance is well integrated with existing law, it has several limitations, such as multiple reporting forms, no standardised guidelines for case definitions, diagnostics, treatment, or contact tracing, including mandatory syphilis screening for pregnant women.

Conclusion: The syphilis surveillance system in Armenia is fragmented, with two main institutions, NCDC and the NCD&STI Center, not collaborating routinely and two separate data management systems that do not share data. Additionally, the substantial discrepancy in the number of cases notified to both systems highlight significant gaps in data reporting and accessibility, emphasising the urgent need for standardised and uniform reporting protocols. Delays in seeking medical care, likely driven by barriers such as limited access to counselling or financial constraints, present critical challenges that must be addressed. To address these challenges, targeted interventions are needed, including improved guidelines for case definitions, risk groups, a standard laboratory diagnostic algorithm for all laboratories, treatment protocols, and contact tracing, along with organised training and simplified reporting tools.

Role and outputs: Principal investigator. Lusine wrote the protocol, analysed surveillance data, developed and analysed the survey questionnaire and prepared the final report.

Supervisor: Romella Abovyan

Status: Completed

4. Outbreaks

Outbreak of Salmonella enteritidis among schoolchildren in Yerevan, Armenia on July 25th, 2023

Background: An outbreak of *Salmonella Enteritidis* affected 52 people attending an excursion to Dilijan on June 25, 2023. Four family members, who did not attend, received food leftovers. Of the 52 interviewed, 40 (77%) met the case definition, showing symptoms like abdominal pain, nausea, vomiting, diarrhoea, and fever. Sixteen individuals were hospitalised. The investigation aimed to identify the source and prevent further infections.

Methods: We conducted a retrospective cohort study of 56 excursion participants and their family members who ate the food. Data were collected from attendees' addresses and phone numbers and analysed using R software. Risk ratios (RRs) and 95% confidence intervals (95% CI) were calculated, with Poisson regression used for adjusted RRs. Variables with a p-value <0.20 in univariable analysis were included in the models.

Results: Of the 52 interviewees, 40 developed gastrointestinal symptoms between 27 June and 2 July 2023 (attack rate 77%). The highest number of cases occurred on 28 June, and the last case was reported on 2 July. The risk of illness among those who ate the capital salad was nearly four times higher than those who did not (RR 3.57, 95% CI 1.67–7.61). After adjustment in the multivariable analysis, capital salad remained the only significant factor. Laboratory tests of 42 specimens identified *Salmonella Enteritidis* in 23 samples. Faecal sampling from the food handler was not possible.

Conclusions: Capital salad was the most likely cause of the outbreak, likely due to contamination during preparation or improper storage. We recommend training food handlers on safe food preparation and serving practices.

Role and outputs: Principal Investigator. Lusine was involved in every stage of the outbreak investigation, adapting the official outbreak investigation questionnaire, performing data entry, analysing the data, preparing the final report, and sharing the findings with interdisciplinary teams.

Supervisor: Romella Abovyan

Status: Completed

5. Research

Knowledge, attitudes and practices towards syphilis infection among physicians in Armenia

Background: The diagnosis of new cases of syphilis is not reliable in Armenia. In 2022, 29% cases were diagnosed as latent, 8.1% as late latent, 21% as secondary, and 1% as congenital syphilis. We aimed to assess the knowledge, attitudes and practice of syphilis diagnosis and prevention among primary care physicians (PCPs) to inform early identification of primary cases.

Methods: Between December 2023 and February 2024, we conducted a cross-sectional survey among physicians working in outpatient clinics. We randomly selected 24 clinics located in six regions. Then we sent an online questionnaire to physicians randomly selected from employee registries. We assigned 1 or 2 points to correct answers, and 0 points to incorrect or unknown answers, and classified scores as 0-<30% (Poor), 30-<70% (Moderate) and >70% (Good). We compared the scores between groups using non-parametric tests (Wilcoxon, Kruskal-Wallis, Spearman correlation tests).

Results: Of 413 physicians contacted, 345 (83%) responded; 74% were female; median age was 46 years; 188 (54%) had >16 years work experience; 163 (47%) worked as general practitioners. Respondents had moderate knowledge on risk groups (56%), symptoms (49%) and poor knowledge on disease transmission (8%). Knowledge did not improve with the number of years of practice ($p=0.31$). As for practice, respondents could easily interpret laboratory results (86%) but expressed difficulty to prescribe additional laboratory tests based on clinical symptoms (51%) and struggled with reporting diagnosed syphilis cases (66%). Regarding attitudes, participants expressed positive opinions on pregnancy termination decisions (65%). Respondents' knowledge did not correlate with their practice ($r=0.23$) and attitude ($r=0.25$) scores.

Conclusion: Knowledge of primary care physicians was not positively associated with improved practice and attitude of syphilis diagnosis and prevention. This highlights the need to both improve healthcare workers' post-graduate education and implement an efficient screening program to detect and treat asymptomatic, late latent, congenital infections as well as preventing complications, transmission, and reinfection.

Role and outputs: Principal investigator. Lusine wrote the study protocol, collected data, cleaned the dataset, analysed data, and wrote the manuscript for a peer-reviewed journal. She also presented the results at ESCAIDE 2024.

Supervisor: Pawel Stefanoff, Hovhannes Hovhannisyanyan

Status: Completed

6. Scientific communication

Conference presentations

Boryan L., Hovhannisyan H., Palozyan G., Abovyan R. **Physicians' knowledge and practices on syphilis diagnosis and prevention in Armenia**, European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 19–21 November 2024, Stockholm, Sweden (Poster presentation).

Publications and outputs

Boryan L, Hovhannisyan H, Palozyan G. Knowledge, Attitudes, and Practices Associated with Syphilis Infection Among Physicians in Armenia. *Venereology*. 2025; 4(2):6. Available at: <https://doi.org/10.3390/venereology4020006>

7. Teaching activities

Course on Current Issues in the Prevention of Healthcare-Associated Infections (HAIs)

Lusine led a full-day, face-to-face training session on the course organised by the National Center for Disease Control in Yerevan on July 17–18, 2023. The target audience were hospital epidemiologists and nurses from medical care and service organisations responsible for detecting, registering, treating, analysing, and reporting healthcare-associated infections (HAIs). The session began with an icebreaker and a pre-test to assess participants' baseline knowledge. This was followed by presentations and discussions covering the structure and classification of HAIs, standard definitions of HAIs and principles of storage, disinfection, and sterilisation of medical devices. On the second day, a post-test and a debate allowed participants to evaluate the course's effectiveness and discuss its relevance to their professional roles. Lusine's role was to design and lead the full-day training session, where she was responsible for delivering presentations, facilitating discussions, and overseeing both the pre- and post-tests. She also guided the debate session, ensuring that participants engaged with the material effectively and critically evaluated the course's relevance to their professional roles. Additionally, Lusine contributed to the overall structure of the course, ensuring it addressed the key aspects of healthcare-associated infections (HAIs) and the necessary protocols for their detection, registration, treatment, analysis, and reporting.

8. International assignments

Improvement of the Armenian Surveillance system of syphilis based on examples of good practices used in the Netherlands

Epidemiological data from the National Center for Dermatology and Sexually Transmitted Infections (NCD&STI) under the Ministry of Health of Armenia indicate that the STI surveillance system is insufficient, particularly for syphilis. As part of her MediPIET fellowship, Lusine undertook the evaluation of the syphilis surveillance system in Armenia. In relation to this project, from July 17 to 21, Lusine visited the Dutch Institute of Public Health (RIVM). The purpose of the visit was to learn about the Dutch STI surveillance and collect good practices and solutions that could be applied to improve the Armenian syphilis surveillance system. She met experts in the Dutch STI surveillance system and key stakeholders. She learned about the Dutch approach to the syphilis surveillance and prevention. During the visit, she presented the Armenian system and discussed its Strengths, Weaknesses, Opportunities and Threats, with the input from Dutch experts. Lusine included the results of the SWOT analysis in her surveillance report and proposed recommendations for the improvement of the syphilis surveillance in Armenia.

Hosting country and institute: National Institute of Public Health (RIVM), Bilthoven, the Netherlands

Supervisors: Birgit van Benthem, Barbara Schimmer, Laura Kayaert, Eline op de Coul

9. Other activities

Boryan L., Hovhannisyan H., Palozyan G., Abovyan R. **Physicians' knowledge and practices on syphilis diagnosis and prevention in Armenia**, European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 19–21 November 2024, Stockholm, Sweden (Poster presentation).

10. MediPIET modules attended

1. Introductory Course, 26 September to 14 October 2022, Spetses, Greece, face to face
2. Inject days on Operational Research, 8–10 November 2022, virtual
3. Outbreak investigation module, 5–9 December 2022, Berlin, Germany, face to face
4. Qualitative Research inject days, 31 January and 3 February 2023, virtual

5. Vaccinology inject day, 29 March 2023, virtual
6. CBRN module, 13–17 March 2023, Petrovac, Montenegro, face to face
7. Multivariable analysis module, 22–26 May 2023, Frankfurt, Germany, face to face
8. Rapid Risk assessment module, 19–23 June 2023, Stockholm, Sweden, face to face
9. Project Review Module, 28 August to 1 September 2023, Lisbon, Portugal, face to face
10. Time Series Analysis, 11–15 December 2023, Rome, Italy, face to face
11. One Health approaches to field epidemiology, 3–7 June 2024, Belgrade, Serbia, face to face
12. Project Review Module, 26–30 August 2024, Lisbon, Portugal, face to face

11. Personal conclusions of fellow

Referring to my experience with the MediPIET fellowship, I am deeply grateful for the skills, knowledge, and insights I have gained in field epidemiology. The program's comprehensive training, which combined theoretical modules, case studies, and hands-on learning, exceeded my expectations and significantly strengthened my expertise in outbreak investigation, communicable disease surveillance, and epidemiological research.

One of the most rewarding aspects of this fellowship was the opportunity to collaborate with professionals from different countries, broadening my perspective on the diverse challenges faced in public health. Engaging with colleagues from MediPIET, EPIET, EUPHEM, and PAE fostered meaningful exchanges of ideas, experiences, and best practices, creating a strong sense of community that will continue to support my professional growth.

Additionally, I had the privilege of visiting the National Institute of Public Health (RIVM) in Bilthoven, the Netherlands, where I gained deeper insights into the STI surveillance system. This experience enriched my understanding of surveillance methodologies and provided valuable knowledge that I aim to implement in my country.

12. Acknowledgements

I would like to express my sincere gratitude to my mentors, supervisors, and colleagues at my training site for their invaluable guidance and encouragement throughout this fellowship. I am also deeply grateful to the MediPIET program and ECDC coordinators for their unwavering support. A special thank you to everyone who contributed to my learning journey and helped me achieve the program's objectives. I am especially thankful to my scientific coordinator, Pawel Stefanoff, whose expertise, mentorship, and constant support have been instrumental in my growth. Lastly, I extend my heartfelt appreciation to my Cohort 5 colleagues and the ECDC team for sharing their experiences and creating unforgettable memories over the past two years.