

MediPIET Summary report of work activities

Abass Jouny

Lebanon, Cohort 5 (2022)

Background

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, two-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 on [ECDC's website](#).

2. Pre-fellowship short biography

Before joining the fellowship, Abass earned an official technical license in Management Information Systems, followed by a diploma in Big Data Technologies and GeoAI. As an IT specialist in the Epidemiological Surveillance Unit at the Lebanese Ministry of Public Health, he contributed to building and maintaining platforms for communicable disease surveillance using the District Health Information System 2 (DHIS2). Abass also developed external dashboards and conducted GIS-based analyses to support public health decision-making.

Fellowship

On 10 September 2022, Abass Jouny started his MediPIET fellowship at the Ministry of Public Health – Epidemiological Surveillance Unit, Lebanon. This report summarises the work performed during the fellowship.

National supervisor: Dr. Nada Ghosn

Scientific coordinators: Emily White Johansson, Pawel Stefanoff

Fellowship projects

3. Surveillance

Integrating DHIS2 and R for Comprehensive Cholera Surveillance in Lebanon – Daily surveillance report

Introduction: Cholera re-emerged in Lebanon in 2022–2023 after decades of absence, creating an urgent need for a strong surveillance system to guide outbreak control. DHIS2 was adopted as the national platform for case-based tracking and daily reporting. While DHIS2 provided timely data collection, challenges remained regarding data completeness, adherence to standard case definitions, geographical accuracy, and documentation of laboratory results. We aimed to integrate DHIS2 with R-based analytics to improve data quality, standardise case classification, and enhance spatial and laboratory analyses during the cholera outbreak.

Methods: To strengthen analysis and ensure data quality, we exported DHIS2 data directly into R through an Application Programming Interface (API). This allowed automated cleaning, standardisation, and reclassification of cases based on national case definition criteria. We reconstructed epidemic curves according to clinical and laboratory outcomes. We produced maps to assess spatial concordance between reporting facilities and patient residences, as well as to display incidence rates and rapid diagnostic test (RDT) coverage.

Results: A total of 8 095 cases were reported, including 580 classified as confirmed. After reclassification, 468 cases (5.8%) were confirmed by culture, 3 239 cases (40.0%) met the clinical definition of suspected cholera, 453 cases (5.6%) did not match the case definition, and 3 935 cases (48.6%) were unclassifiable due to missing clinical data. Laboratory data showed that 5.8% of cases were culture positive, 2.2% were RDT positive, and 65.1% had no documented testing. Spatial analysis demonstrated that most cases sought care in healthcare facilities located in their governorate of residence, though discrepancies emerged in some districts, particularly urban and border areas.

Conclusions: Integrating DHIS2 with R improved case classification, outbreak visualisation, and geographical accuracy. This combined approach enhanced the timeliness and reliability of cholera surveillance in Lebanon and provides a practical model for strengthening disease surveillance systems globally.

Role and outputs: As Principal Investigator, Abass developed the surveillance protocol and tracker programme in DHIS2, established the API integration with R for automated data processing, conducted descriptive and spatial analyses, and designed dynamic national reports. Abass created a final surveillance report and a FlexDashboard in R for real-time data visualisation and reporting. He drafted the manuscript.

Supervisor: Dr. Nada Ghosn

Status: Completed

4. Outbreaks

Food-borne outbreak following a scout event in Baabda, Lebanon, February 2024

Introduction: On 24 February 2024, an outbreak of gastroenteritis occurred among attendees of a one-day scout event, including catered lunch and dinner. The investigation aimed to identify the source of contamination and develop recommendations.

Methods: We conducted a retrospective cohort study among attendees. We defined cases as attendees who developed nausea, vomiting, or diarrhoea within 72 hours after the event. We calculated food-specific attack rates (AR), relative risks (RR), and 95% confidence intervals (CI). We used binomial multivariable regression analysis to adjust for confounding. The food safety authority inspected the catering service facilities for food handling practices and hygiene standards. We collected stool samples from selected patients for culture.

Results: Of the 820 attendees, we interviewed 488 individuals (response rate: 60%); 238 (49%) were female, 302 (62%) were 10–15 years old and 215 reported illness (AR: 44%). Predominant symptoms were nausea (60%) and vomiting (58%). The risk of illness was significantly higher among those who ate the catered dinner (RR: 20.86; 95% CI: 3.0–145.1) vs the lunch. Respondents who consumed chicken (RR: 4.56; 95% CI: 2.44–8.50), rice (RR: 1.49; 95% CI: 1.22–1.82) and salad (RR: 1.29; 95% CI: 1.04–1.59) had increased risk of meeting the case definition. Eating the full portion of chicken was associated with higher risk (RR: 2.55; 95% CI: 1.79–3.83) vs eating a small portion. After adjustment, only consumption of chicken (aRR: 8.34) and rice (aRR: 1.87) remained significant. All stool sample cultures were negative. Inspections uncovered expired items, inadequate storage and hygiene shortcomings.

Conclusions: The primary vehicle of the outbreak was the chicken with rice served during the dinner. We recommended implementing a protocol for routine food sampling after preparation by catering services to ensure food safety at events. Furthermore, we recommended regular inspections and oversight of catering services to maintain high standards of food hygiene.

Role and outputs: As Principal Investigator, Abass led the outbreak investigation alongside the Epidemiological Surveillance Unit team. He developed the study protocol and case definition, designed data collection tools (questionnaire and data extraction forms), analysed the data, coordinated with environmental health teams for inspections and laboratory analysis, prepared the outbreak report for the Ministry of Public Health, shared with MediPIET, and prepared an abstract for the ESCAIDE conference.

Supervisor: Dr. Nada Ghosn

Status: Completed

5. Research

Estimating Pfizer-BioNTech COVID-19 vaccine effectiveness: a negative case-control study in SARI surveillance sentinel sites, Lebanon, June 2022 to December 2023

Introduction: The Pfizer-BioNTech mRNA COVID-19 vaccine has been pivotal in reducing severe outcomes of SARS-CoV-2 infection. This study aimed to evaluate its real-world effectiveness in preventing severe acute respiratory infections (SARI) caused by SARS-CoV-2 among hospitalised patients in Lebanon, where socio-economic challenges impact healthcare access.

Methods: We conducted a negative case-control study among hospitalised SARI patients at sentinel surveillance sites between June 2022 and December 2023. Cases were defined as SARS-CoV-2 PCR-positive SARI patients, and controls as PCR-negative SARI patients. We included patients 18 years old and above who had been hospitalised for 24 hours or more in SARI sentinel sites, and for whom a respiratory specimen was collected within 48 hours of admission and tested for COVID-19. We excluded patients who did not give informed consent, who had unknown vaccination status or were vaccinated with other COVID-19 vaccines, had prior SARS-CoV-2 infection, had contraindications to COVID-19 vaccination, or had COVID-19-specific symptoms during the study period. All consenting participants were interviewed by phone to collect data on vaccination status, demographics, and clinical outcomes. Vaccine effectiveness (VE) was calculated as $VE = (1 - \text{adjusted odds ratio}) \times 100$, with adjustment for potential confounders using multivariable logistic regression.

Results: Among 128 participants (31 cases, 97 controls), 52% were partially vaccinated with the Pfizer-BioNTech vaccine. Adjusted analysis showed an odds ratio of 2.05 (95% CI: 0.83–6), corresponding to a vaccine effectiveness (VE) of -104.6% (95% CI: -430; 16.7) among partially vaccinated individuals. The negative VE likely reflected waning immunity, delayed booster doses, and unmeasured natural immunity. Limitations included a small sample size, missing data on vaccination timing, and socio-economic barriers.

Conclusions: Despite unexpected VE results, the study highlights the importance of timely booster doses and robust vaccination strategies in resource-constrained settings. Future research with larger datasets is essential to refine VE estimates and guide public health interventions.

Role and outputs: As Principal Investigator, Abass contributed to the study design and protocol development, facilitated data collection by coordinating with the surveillance team and SARI surveillance sites, cleaned the data and conducted analyses using R, and drafted the final report.

Supervisor: Dr. Nada Ghosn

Status: Completed

6. Scientific communication

Conference presentations

Jouny A, White Johansson E, Baaklini M, Abou Fayad A, Ghosn N. Investigation of a cholera outbreak in Lebanon after three decades cholera-free, 2022 [Poster presentation]. Presented at: ESCAIDE 2023; November 2023, Stockholm, Sweden.

Publications and outputs

Jouny A, Sweidan H, Baaklini M, Ghosn N. Integrating DHIS2 and R for Enhanced Cholera Surveillance in Lebanon: A Case Study on Improving Data Quality and Public Health Decision-Making. This Manuscript was submitted to MDPI Data.

Abiad F, Abubakar A, Hilal N, Ghalayini W, Ghosn N, Feghali R, **Jouny A**, et al. Descriptive Epidemiology of the 2022–2023 Cholera Outbreak in Lebanon and Lessons Learned in the Context of a Humanitarian Emergency Situation. *Open Forum Infectious Diseases*; 12(8): 428. Available at: <https://doi.org/10.1093/ofid/ofaf428>

7. Teaching activities

Performing COVID-19 rapid antigen test in school settings

On 13 December 2022, Abass delivered a one-day training session held at the Lancaster Tamar Hotel in Baabda, Lebanon. The audience for this training was nurses working in private and public schools. Abass prepared all training materials, including lectures and interactive exercises. During the session, he delivered a series of lectures covering COVID-19 case definitions, personal protective equipment (PPE) protocols, and rapid antigen testing. The lectures were followed by hands-on exercises performed in groups of two (one acting as the healthcare worker, the other as the patient): conducting nasopharyngeal swabbing, using rapid antigen tests, and completing documentation procedures. In addition, Abass delivered a lecture on cholera and its situation in Lebanon. He evaluated the effectiveness of the training session by observing and interacting with the audience during practical sessions. According to his observations, most participants could perform the rapid antigen test and document its results correctly. However, some needed direct corrections for swabbing techniques.

8. International Assignments

Exchange of experts on Legionella surveillance (Greece, 29–30 May 2023)

On 29 and 30 May 2023, Abass participated in site visits to the Greek National Reference Laboratory and surveillance units, where he learned about the Greek surveillance systems, laboratory diagnostics, and prevention strategies for *Legionella*. The exchange included expert presentations and interactive discussions, which provided insights into Greece's mandatory notification system and laboratory techniques, including PCR and culture methods. The experience highlighted the value of collaboration between countries and organisations such as ECDC, and the lessons learned will help Lebanon adapt laboratory practices, water quality monitoring, and notification systems to strengthen its public health response to *Legionella*.

Hosting country and institute: National Public Health Organization, Athens, Greece

Supervisor: Dr. Nada Ghosn

Automation of surveillance procedures for infectious diseases (Germany, 1–5 July 2024)

From 1 to 5 July 2024, Abass attended a mission at the Robert Koch Institute in Germany focused on exploring advanced tools for automating surveillance, particularly the SignalDetectionTool Shiny app. He took part in hands-on demonstrations, workshops, and debugging sessions that integrated DHIS2 data with anomaly detection methods, as well as discussions on syndromic surveillance and emergency operations. The mission provided practical experience in applying automated approaches to outbreak detection and highlighted best practice in real-time data monitoring from emergency departments. The knowledge gained will support the integration of automated tools into Lebanon's surveillance system, improving accuracy, timeliness, and outbreak detection capabilities.

Hosting country and institute: Robert Koch Institute, Berlin, Germany

Supervisor: Alexander Ulrich

9. Other activities

- Participated in the Information For Action (IFA) Refresher Data Training, 15–17 October 2022, Amman, Jordan
- Graduated from the Geo-Artificial Intelligence (GeoAI) and Big Data programme, University of Balamand and Esri Lebanon, June to September 2023, Lebanon
- Represented Lebanon at the Regional Meeting on Integrated Disease Surveillance and DHIS2, 14–18 May 2023, Cairo, Egypt
- Participated in the course on Epidemic Intelligence and Rapid Risk Assessment, 12–16 February 2024, Stockholm, Sweden
- Prepared two abstracts for the DHIS2 annual conferences in 2023 and 2025 in Oslo, Norway. Both abstracts were accepted, but Abass could not participate due to lack of funds.
- Submitted successfully an abstract for the EMPHNET Regional Conference 2024 in Amman, Jordan. He could not present because the conference was cancelled due to regional conflict.
- Climate change and Health Fellowship, February to June 2025, University of Balamand, Lebanon
- R Training on Time Series Analysis, RMD and Shiny, August 2025, Applied EPI

10. MediPIET modules attended

1. Introductory Course, 26 September to 7 October 2022, Spetses, Greece, attended face to face.
2. Inject days on Operational Research, 8–10 November 2022, virtual.
3. Introduction to R/Stata, 28 November to 1 December 2022, virtual.
4. Outbreak Investigation module, 5–9 December 2022, Berlin, Germany, attended face to face.
5. Qualitative Research inject days, 31 January and 3 February 2023, virtual.
6. CBRN Awareness and Mitigation module, 13–17 February 2023, Petrovac, Montenegro, attended face to face.
7. Vaccinology inject day, 29 March 2023, virtual.
8. Multivariable Analysis module, 22–26 May 2023, Frankfurt, Germany, attended face to face.
9. Rapid Assessment and Survey Methods module, 19–23 June 2023, Stockholm, Sweden, attended face to face.
10. Project Review module 2023, 28 August to 1 September 2023, Lisbon, Portugal, attended face to face.
11. Time Series Analysis and GIS module, 11–15 December 2023, Rome, Italy, attended face to face.
12. One Health module, 3–7 June 2024, Belgrade, Serbia, attended online.
13. Project Review module, 26–30 August 2024, Lisbon, Portugal, attended face to face.

11. Personal conclusions of fellow

During my fellowship, I gained valuable expertise in applied epidemiology, which significantly complemented my background as an IT specialist. The fellowship provided me with opportunities to enhance my technical skills while acquiring a deeper understanding of public health. The various modules, particularly those focused on outbreak investigation, surveillance, and statistical analysis, were instrumental in broadening my knowledge and strengthening my analytical capabilities. The research projects and other assignments, including the vaccine effectiveness study and the cholera surveillance system, were especially impactful, as they allowed me to apply theoretical concepts to real-world challenges. One of the most rewarding aspects of the fellowship was the opportunity for international assignments, particularly my experience at the Robert Koch Institute. This assignment provided unique insights into emergency preparedness and response in mass gathering events, as well as invaluable networking opportunities with global public health professionals. Overall, the MediPIET fellowship has been an exceptional journey, blending academic rigour with practical experiences. It has not only enhanced my professional competencies in epidemiology, but also empowered me to bridge the gap between IT and public health to drive impactful outcomes.

12. Acknowledgements

I would like to express my heartfelt gratitude to my coordinators, Pawel Stefanoff and Emily White Johansson, and my supervisor, Dr. Nada Ghosn, for their unwavering support and guidance throughout this fellowship. Their mentorship has been invaluable in helping me achieve my goals. I also extend my sincere thanks to Zeina Farah, Lina Chaito and other colleagues, who generously shared their expertise and experiences, greatly enriching my learning journey. A special acknowledgment goes to the co-investigators who collaborated on the outbreak investigation and contributed significantly to its success. My appreciation also goes to the entire team at the Epidemiology Surveillance Unit, whose dedication and support were instrumental to the completion of the required deliverables. Finally, I extend my heartfelt thanks to my colleagues from Cohort 5 and the team at ECDC for sharing their experiences and creating memorable moments over the past two years.