





MediPIET Summary report of work activities

Ines CHERIF

Tunisia, 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 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 has been implemented by ECDC as a part of the <u>EU Initiative on Health Security</u>. You can find more information about the programme at: <u>https://www.ecdc.europa.eu/en/training-and-tools/training-programmes/fellowships/medipiet</u>.

Pre-fellowship short biography

Ines holds a medical degree and a specialisation diploma in Preventive and Community Medicine from Tunisia, obtained in May 2022. Since January 2023, she has been working as an assistant professor in preventive and community medicine at the Pasteur Institute of Tunis and at the Faculty of Medicine of Tunis/University Tunis El Manar. Since the beginning of her residency, she has had the opportunity to work on the Tunisian Health Examination Survey (data analysis, dissemination of the results), the cancer registry in Northern Tunisia (incidence, trend, prediction and burden of diseases), and on national COVID-19 surveillance. In addition, she has participated in the coordination of several research studies, with a special focus on influenza vaccination and COVID-19.

Fellowship

In September 2022, Ines Cherif started her MediPIET fellowship at the Pasteur Institute of Tunis, Tunisia under the guidance of the MediPIET Training Site at the National Observatory of New and Emerging Diseases. This report summarises the work performed during her fellowship.

National supervisor: Pr Jihene BETTAIEB **Scientific coordinator**: Ms. Natalie GIRIN.

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Fellowship projects

1. Surveillance

Low sensitivity of the tuberculosis surveillance system: a capture-recapture study, Tunis, Tunisia, 2022

Background: Despite the rising trend in extra-pulmonary tuberculosis (TB) in Tunisia, no evaluation of the paper-based TB surveillance system has been conducted since its implementation in 1969. We aimed to estimate the sensitivity of the current system among pulmonary and extra-pulmonary cases diagnosed in 2022 in the Tunis region.

Methods: We used a capture-recapture method with two-sources: mandatory notifications and TB treatment records from outpatient TB treatment facilities. Duplicates were identified based on name/surname, age, gender, and date of diagnosis. Total number of cases was estimated by using the Chapman modification of the Lincoln–Petersen estimator for the capture-recapture method and sensitivity by using the estimated total number of cases as the denominator. To assess independency of sources, we calculated the correlation coefficient (r) between data sources sensitivities by municipality.

Results: In 2022, 59 TB cases were notified to the regional health directorate of Tunis (incidence :5.4/100 000 population) and 363 TB cases were registered in the TB treatment records (incidence :39/100 000). We identified 27 duplicates between the two data sources. The estimated total number of TB cases was 779 (95% CI: [662–896]) (incidence: 72/100 000 (95% CI: [62–83])). The estimated sensitivities were 8% (95% CI: [7–9]) for mandatory notifications and 47% (95% CI: [40–55]) for treatment records. The combined sensitivity of both systems was 61% (95% CI: [46–88]) for extra-pulmonary TB, 47% (95% CI: [37–66])) for pulmonary TB and 51% (95% CI: [44–60]) for all cases. Data sources sensitivities in each municipality were not significantly correlated (r=0.63, p=0.17) suggesting that the sources were independent.

Conclusions: We observed important under-reporting of TB cases in Tunis which underestimates the disease burden and hampers the implementation of tailored control measures. Actions are urgently needed to increase the sensitivity of TB surveillance through the sensitisation/training of healthcare workers and the development of an electronic system.

Role and outputs: Ines was the principal investigator and wrote the protocol of the study. She was responsible for data collection, development of the data entry form and the data cleaning and analysis. She presented the findings of this study at ESCAIDE 2023 (poster).

Supervisor: Pr Jihene BETTAIEB.

2. Outbreaks

Multidrug-resistant *Acinetobacter baumannii* outbreak in intensive care units at a university hospital in Tunisia

Background: In recent years, *Acinetobacter baumanii* has been considered as a 'red-alert human pathogen' causing large healthcare-associated outbreaks, mainly in intensive care units (ICU). We aimed to describe the steps of the investigation of a multidrug resistant (MR) outbreak of *Acinetobacter baumannii* (*A. baumannii*) in the surgical ICU of the University Hospital of Sahloul.

Methods: On 15 January 2024, the surgical ICU of the University Hospital of Sahloul contacted the Department of Prevention and Security of Care at the hospital to notify them of five hospitalised patients with isolated multidrug-resistant (MDR) *A. baumannii* complex. A team from the Prevention and Security of Care Department began an investigation to identify the mode of transmission and initiate the appropriate control measures.

Results: In total, nine patients with the same strain and the same *A. baumanii* antibiotic resistance profile were hospitalised in the surgical unit of the ICU. They were admitted to the hospital between December 2023 and January 2024. The synoptic table showed that there was an overlap of hospitalisation periods. A site visit to the ICU identified some deficiencies in the application of hygiene measures. Immediate actions were undertaken to control the outbreak (namely the reinforcement of hand hygiene practices, the implementation of strict contact and isolation precautions, and the promotion of antimicrobial stewardship).

Conclusion: Given the shortcomings identified in hygiene practices among healthcare personnel within the ICU and the successful management of the outbreak through the reinforcement of standard infection control measures, carriage of the germ by healthcare workers was the most probable source of transmission.

Role and outputs: Co-investigator in the outbreak investigation team. Ines was involved in the data collection, the outbreak data analysis and the audit of infection control and prevention practices.

Supervisor: Pr Jihene BETTAIEB.

3. Research

Tunisian paediatrici'ns' attitudes and practices toward COVID-19 immunisation and other vaccines not included in the Tunisian National Immunisation Schedule, July to October 2023

Background: Paediatricians are among the most trusted sources of vaccine information for parents. Therefore, it is important to understand their attitudes toward vaccines not included in the National Immunisation Schedule (NIS), particularly the COVID-19 vaccine. We aimed to describe the attitudes and practices of Tunisian paediatricians regarding non-NIS vaccines, specifically the COVID-19 vaccination for children during the period July–October 2023, and to identify factors associated with their willingness to recommend the COVID-19 vaccine.

Methods: We conducted a national cross-sectional study among Tunisian paediatricians working in both the private and public sector between July and October 2023. We used simple random sampling to select paediatricians from the national chamber of physicians list. We interviewed consenting respondents in person on their attitudes and practices towards vaccines that are not included in the NIS, with a particular focus on the childhood COVID-19 vaccination. We calculated prevalence with 95% confidence intervals (95%CIs) and adjusted odds ratios (aOR) using multivariable logistic regression.

Results: Of 330 paediatricians contacted, 192 (58%) responded (mean age: 51 ± 12.9 years; 43% were male). Among the respondents, tue majority (89.1%, 95% CI:[84.6–93.5]) said that they recommend other vaccines which are not part of the NIS, mainly the rotavirus vaccine (56.7%) and the influenza vaccine for children with chronic illness (53.8%) and 41% [34–48] declared their willingness to recommend COVID-19 vaccination for children. The odds of paediatricians willing to recommend the childhood COVID-19 vaccination was higher among those who believed that this vaccine reduces school absenteeism (aOR=2.3 [1.1–5.1]) and among those with high confidence in the Ministry of Health recommendations regarding COVID-19 vaccination (aOR=6.1 [2.2–16.9]).

Conclusion: More than half of the paediatricians in Tunisia recommend other vaccines that are not part of the NIS, such as the rotavirus and influenza vaccines for children with chronic diseases, but were hesitant towards the COVID-19 vaccine during the period July–October 2023. Involving paediatricians in the decision-making process for childhood vaccination strategies is therefore crucial.

Role and outputs: Ines was the principal investigator in this research. She wrote the protocol, developed the questionnaire and the data entry form on epi-info, performed some data collection and data entry, performed the data analysis and wrote the first draft of the manuscript. Ines submitted an abstract for ESCAIDE 2023 (rejected). She prepared a manuscript that was submitted to the International Journal of Environmental Research and Public Health.

Supervisor: Pr Jihene BETTAIEB.

4. Scientific communication

Conference presentation: ESCAIDE. Barcelone, Spain. November 2023. (poster presentation).

<u>Cherif I</u>, Gharbi R, Mlaouah M, Kharroubi G, Temmi H, Rzigui H, Mansouri A, Maazaoui L, Gzara A, Bettaieb J. **Low** sensitivity of the tuberculosis surveillance system: a capture-recapture study, Tunis, Tunisia, 2022.

Publication

<u>Cherif I</u>, Gharbi R, Kharroubi G, Affes W, Bettaieb J. **Tunisian Paediatricians' attitudes and practices towards COVID-19 immunisation and other vaccines not included in the Tunisian National Immunisation Schedule, July to October 2023** (submitted to the International Journal of Environmental Research and Public Health).

Teaching activities

Ines Cherif was actively involved in various workshops and academic activities throughout 2023 and 2024:

ECDC workshop on the rapid risk assessment in collaboration with ECDC staff from Preparedness and Response Support/Communication.

Location: Tunis, Tunisia

Date: 24–26 January 2023

Role: Co-facilitator

Details: Ines was involved in the group work: rapid risk assessment (RRA) on Ebola virus disease transmission in Tunisia from an African country based on the ECDC RRA tool, in addition to risk communication.

Workshop: Fundamentals of SPSS for scientific research

Location: Institut Pasteur de Tunis, Tunisia

Date: 6-8 March 2023

Role: Co-animation

Details: Ines was involved in the co-animation of a three-and-a-half-day workshop on the fundamentals of Statistical Package for the Social Sciences (SPSS) for scientific research. This course was mainly practical, using a virtual database created by the course organisers (Dr Ines CHERIF, Dr Ghassen KHARROUBI). Participants used this database to generate descriptive and analytical results. The target audience was Institut Pasteur de Tunis' personnel (researchers, PhD students, medical doctors, laboratory technicians).

Continuous Professional Development (CPD) training course 'Severe Viral Pneumonia in Adults: Epidemiology, Diagnosis, Treatment, and Prevention'

Location: Faculty of Medicine of Tunis, Tunisia

Date: 20 April 2024

Role: Co-animation

Details: Ines was involved in the preparation of a case study on a severe SARS-CoV-2 infection in a patient with chronic diseases, particularly the part related to the risk factors of infection and the preventive measures. She also participated in the elaboration of the pre-test questions. The target audience was the medical residents of the Faculty of Medicine of Tunis.

Workshop: 'How to prepare a poster/oral scientific communication'

Location: Razi Hospital, Manouba, Tunisia

Date: 24 April 2024

Role: Animation

Details: Ines prepared a presentation on how to prepare a poster or oral scientific communication. She also prepared a pre-test using Slido. The target audience was the residents specialising in psychiatry. The workshop was held at Razi Hospital, Manouba, Tunisia in collaboration with the Association of Young Doctors and Residents in Psychiatry.

Lecture: 'The evaluation of a diagnostic test'

Location: Faculty of Medicine of Tunis, Tunisia

Date: 3 January 2024

Role: Animation

Details: Ines prepared the course materials for this lecture (Powerpoint slides and exercises). The target audience was the students enrolled in the Masters of Science: Applied Human Biology and Health.

Lecture: 'Public health surveillance'

Location: Online Date: 14 March 2024

Role: Animation

Details: Ines prepared the course materials for this lecture. The target audience was the students enrolled in the Masters of Family Medicine.

International assignments

Training on the analysis of qualitative data

Background: In order to assess the acceptability and utility of the TB surveillance system in Tunisia, we conducted a qualitative study based on semi-structured in-depth interviews with health authorities and healthcare workers. In order to have a deeper understanding of qualitative data analysis techniques, a short, international exchange visit was undertaken to the Centre for International Health Protection at the Robert Koch Institute.

Aim of the assignment: Training on the analysis of the qualitative data of the study: Evaluation of the tuberculosis surveillance system in Tunisia.

Methodology followed: The assignment was 1–5 July 2024 at the Centre for International Health Protection - The Evidence-based Public Health Unit (ZIG2). I had the opportunity to meet with experts in the field of qualitative research and to review the qualitative studies conducted by RKI, along with the analysis plan.

Results of assignment: During this assignment, I gained a deeper understanding of qualitative data analysis methodology, especially the rapid assessment procedures and how to work on our study data.

Conclusions and recommendations: My experience was highly rewarding as it familiarised me with qualitative data analysis techniques. The team was incredibly supportive.

Hosting country and institute: Robert Koch Institute, Germany.

Supervisors: Pr Jihene BETTAIEB, Ms. Natalie GIRIN, Colleagues from the Centre for International Health Protection - The Evidence-based Public Health Unit (ZIG2).

5. Other activities

- **PhD in Health Sciences:** Ines is pursuing a PhD that focuses on measurement of the spread of the SARS-CoV-2 and antibody kinetics.
- **Kinetics of SARS-CoV-2 antibodies following natural infection**: Ines participated as a co-investigator in a longitudinal study monitoring SARS-CoV-2 antibodies responses following natural infection. These responses are crucial for understanding immunity and guiding vaccination strategies. She was involved in data collection supervision, creation of the data entry mask, data cleaning, data analysis, and co-writing of the manuscript which was published in the Libyan Journal of Medicine.
- **Evaluation of the national tuberculosis surveillance system in Tunisia:** Ines contributed to a mixedmethods research project aiming to evaluate the Tunisia's national tuberculosis surveillance system. She was involved in writing the research protocol. The data collection is currently ongoing.
- Supervision of co-fellow's dissertation: Ines is supervising Emna Mziou's dissertation on **Knowledge of Tunisian travelers concerning malaria and prophylactic measures**.
- *Shigella sonnei* **nationwide outbreak:** Ines contributed to the development of the protocol for an analytical study to investigate a nationwide outbreak of *Shigella sonnei* in Tunisia during 2022–2023.

6. Publications (manuscripts/abstracts)

- <u>Cherif I</u>, Kharroubi G, Darragi I, El Benna S, Gharbi A, Baccouche A, et al. Dynamics of SARS-CoV-2 antibodies after natural infection: insights from a study on Pasteur Institute of Tunis employees. Libyan J Med. 31 Dec. 2024;19(1):2348233.
- Rejeb SB, Kouki N, Elfekih S, <u>Cherif I</u>, Khouni H. Prognostic significance of tumor suppressor protein p53 in prostate cancer [Valeur pronostique de la protéine p53 dans le cancer de la prostate]. Tunis Med. 2024;102(02):111-5.
- Ben Mahmoud IT, Ben Said A, Berguiga S, Houij R, <u>Cherif I</u>, Hamdi A, et al. Incidence and risk factors associated with development of oxalipatin-induced acute peripheral neuropathy in colorectal cancer patients. J Oncol Pharm Pract. March 2023;29(2):311-8.
- Kharroubi G, <u>Cherif I</u>, Ghawar W, Dhaouadi N, Yazidi R, Chaabane S, et al. Incidence and risk factors of SARS-CoV-2 infection among workers in a public health laboratory in Tunisia. Arch Virol. Feb. 2023;168(2):69.
- Toukabri I, Ben Said A, Hamdi A, Aloulou A, Ben Ayed W, <u>Cherif I</u>, et al. Prevalence and risk factors of trastuzumab induced cardiotoxicity in Tunisian HER2-positive breast cancer patients. J Oncol Pharm Pract. April 2023;29(3):613-8.
- Ben Abdallah K, Hamzaoui L, Mahmoudi M, <u>Cherif I</u>, Ben Mohamed A, Yakoubi M, et al. Predictive factors of difficult biliary cannulation: An experience of a Tunisian tertiary center. Heliyon. Dec. 2022;8(12):e12526.

Abstracts

- <u>Cherif I</u>, Kharroubi G, Darragi I, Souissi C, Ben Ahmed M, Bettaieb J. Cinétique d'acquisition des anticorps du SARS-CoV-2 suite à une infection naturelle, Tunis, Tunisia. Congrès International Francophone Épidémiologie et Santé publique 'Les nouvelles transitions épidémiologiques', 10-12 July 2024, Limoges, France. Abstract published in Journal of Epidemiology and Population Health, Volume 72, Supplement 3, July 2024, 202657 DOI: 10.1016/j.jeph.2024.202657
- Mziou E, <u>Cherif I</u>, Kharroubi G, Kammoun E, Aounallah SI, Bettaieb J. Connaissances et pratiques de la population générale vis-à-vis du paludisme, Tunisia. Congrès International Francophone Épidémiologie et Santé publique 'Les nouvelles transitions épidémiologiques', 10-12 July 2024, Limoges, France. Abstract published in Journal of Epidemiology and Population Health, Volume 72, Supplement 3, July 2024, 202659 DOI: 10.1016/j.jeph.2024.202659
- Gharbi R, <u>Cherif I</u>, Kharroubi G, Affes W, Bettaieb J. Vaccination antigrippale chez les pédiatres en 2022-2023, Tunisie. Congrès International Francophone Épidémiologie et Santé publique 'Les nouvelles transitions épidémiologiques', 10-12 July 2024, Limoges, France. Abstract published in Journal of Epidemiology and Population Health, Volume 72, Supplement 3, July 2024, 202649. DOI:10.1016/j.jeph.2024.202649.

MediPIET modules attended

- 1. Introductory Course, 26 September-14 October 2022, Spetses, Greece, face-to-face
- 2. Inject days on Operational Research module, 8-10 November 2022, online
- 3. Outbreak investigation module, 5-9 December 2022, Berlin, Germany, face-to-face
- 4. Qualitative Research inject days, 31 January and 3 February 2023, online
- 5. Vaccinology inject day, 29 March 2023, online
- 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, Stochholm, Sweden, face-to-face
- 9. Project Review Module, 28 August-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.

Personal conclusions of fellow

This fellowship provided an excellent opportunity for me to deepen my understanding of field epidemiology and to practice the concepts learned throughout the fellowship's assignments. I also had the privilege of visiting the Centre for International Health Protection at the Robert Koch Institute for a short period which greatly enhanced my knowledge of qualitative research methodology. In addition, one of the strengths of this fellowship was the networking opportunities provided, which allowed fellows to exchange ideas, experiences, and best practices, and opened the door for future collaborations.

Acknowledgements

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