MenMap
The Meningitis & Septicemia Mapping Network

MenMap Network Bulletin

Issue 3

Meningitis and Septicemia Mapping (MenMap) Network - First Year Bulletin

2023 / 2024

About MenMap and Its Importance

The Meningitis and Septicemia Mapping Network (MenMap) initiative was launched to combat the burden of bacterial meningitis in the Eastern Mediterranean Region (EMR). It aims to enhance disease surveillance through innovative diagnostic tools and collaborative networks. By uniting healthcare systems in Jordan, Egypt, and Iraq, MenMap empowers stakeholders with reliable data to guide public health interventions while addressing critical gaps in meningitis control.

Why These Countries?

Epidemiological Gaps

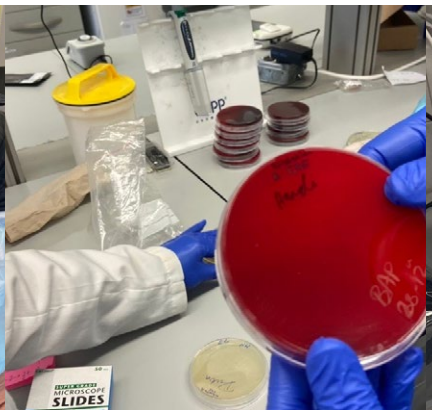
Limited data on bacterial meningitis hinder understanding of disease patterns and risk factors.

Regional Impact

Cross-border health threats in the EMR necessitate coordinated surveillance and interventions.

Healthcare Challenges

Cost of molecular (PCR) testing, weak laboratory diagnostic capacity, and immunization gaps contribute to preventable meningitis cases.



How MenMap Addresses These Needs

MenMap enhances surveillance systems, strengthens laboratory capacity through advanced diagnostics and training, and provides evidence to support vaccine policies. Aligned with the WHO Roadmap to Defeat Meningitis by 2030, it fosters regional collaboration and builds a scalable model for combating meningitis.

This bulletin is a record of our network progress during a year of data collection and analysis. It not only celebrates key achievements but also provides insights into lessons learned and challenges overcome, offering a roadmap for continued success.

Wrapped in a Year

2024 was influential for the MenMap project, marking significant achievements in bacterial meningitis surveillance across Egypt, Iraq, and Jordan.

Key Accomplishments

Providing access to bacterial meningococcal Polymerase Chain Reaction (PCR) diagnostics for **16 sentinel hospitals.**

Training **93 healthcare professionals:**

35 from Iraq **30** from Jordan **28** from Egypt

Harmonizing **data collection** protocols across participating sites.

The project's work is already bridging critical gaps in available data, particularly in its success in identifying *Streptococcus pneumoniae (S. pneumoniae)* as the leading pathogen causing bacterial meningitis.

Key Statistics

3
Countries Involved

16
Hospitals Participating

93
Healthcare Professionals Trained

2,104
Suspected Cases Enrolled

191 (9%)
Confirmed Cases

<1 Year
Top Age Group Affected, represents 35.5% of total cases

90%
Of Confirmed Cases were Caused by *Streptococcus pneumoniae*

Snapshots from Across Our Network

MenMap's efforts across Jordan, Egypt, and Iraq have resulted in significant progress. Below are key highlights from each country's achievements.

1. Jordan

MenMap's initiative in Jordan engaged 4 sentinel hospitals situated in 4 major cities, achieving, achieving a significant number of enrolled cases. Princess Rahma Pediatric Hospital in Irbid contributed notably to the surveillance efforts. The <1 year (infants) age group constituted the majority of cases, highlighting the importance of focusing on this vulnerable population.

It's worth noting that this project is the first of its kind in the country to comprehensively address bacterial meningitis.

Total Cases Enrolled: 855 (Figure 1)

Gender Distribution: Female: 340 cases (39.76%), Male: 515 cases (60.23%) (Figure 2)

Top Age Group: < 1 year (63.62% of enrolled cases) (Figure 3)

Positive Cases Across Sentinel Hospitals: 27 (3.16%) confirmed (*S. pneumoniae* leading across all age groups) (Figure 4)

Figure 1: Suspected vs Confirmed Meningitis Cases by Hospital Name in Jordan (December 2023-November 2024)

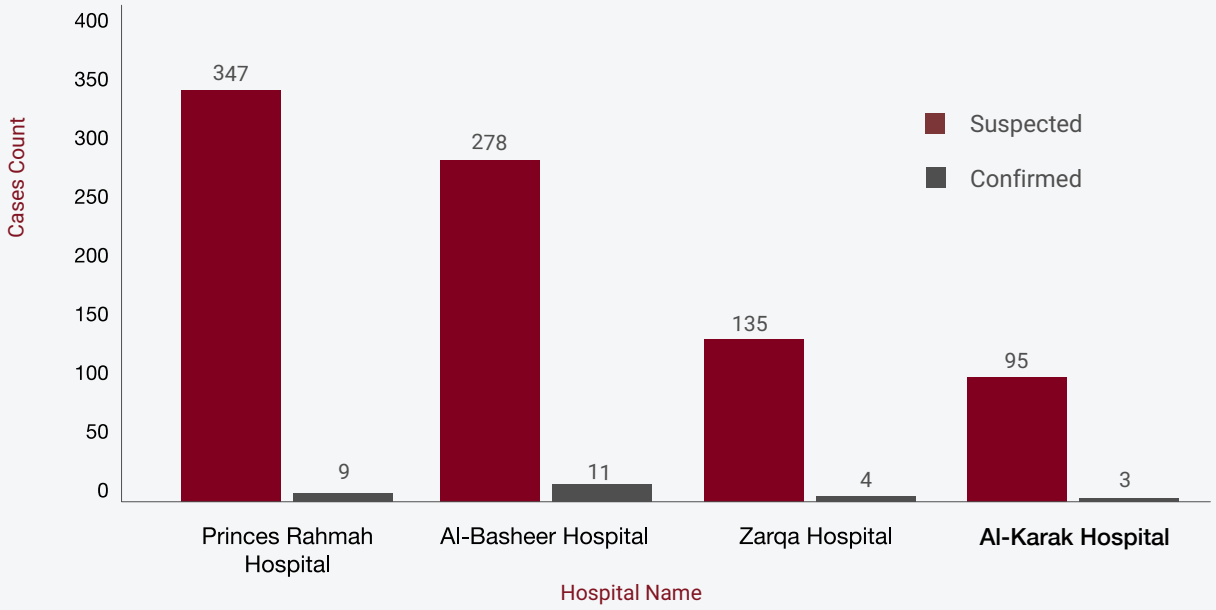


Figure 2: Gender Distribution of Enrolled Meningitis Cases in Jordan (December 2023-November 2024)

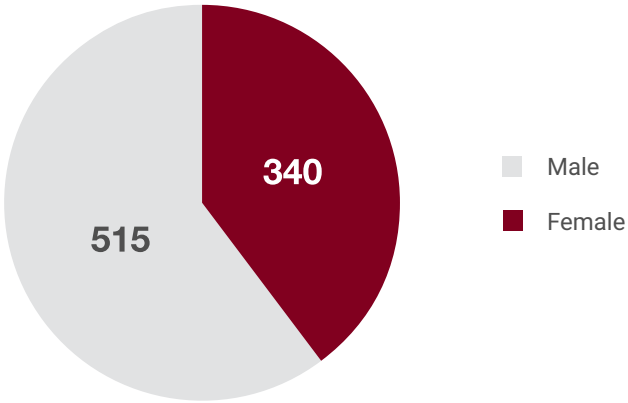


Figure 3: Percentage of Enrolled Meningitis Cases According to Age Group in Jordan (December 2023-November 2024)

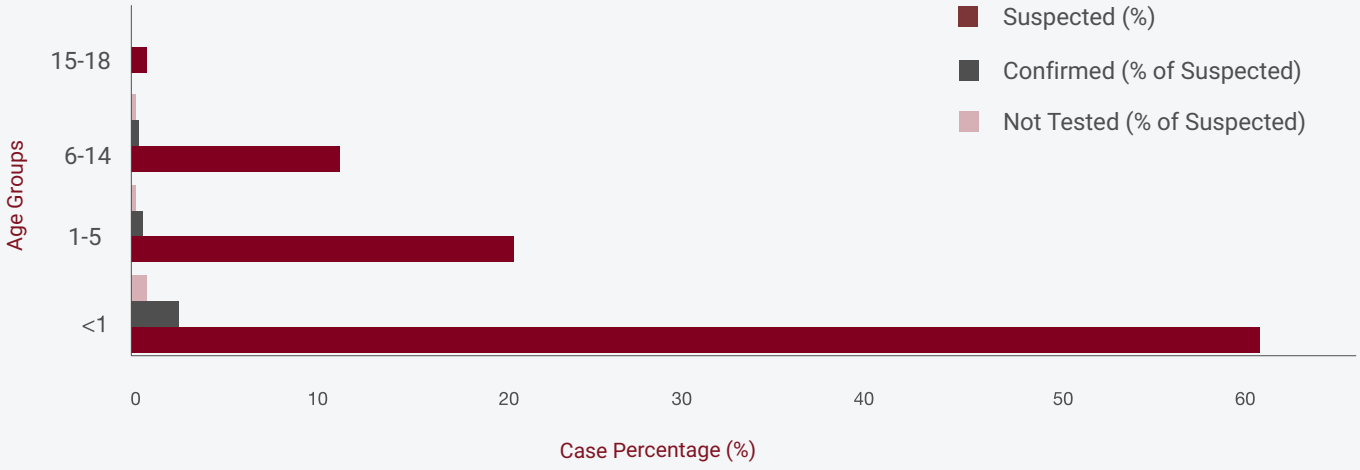
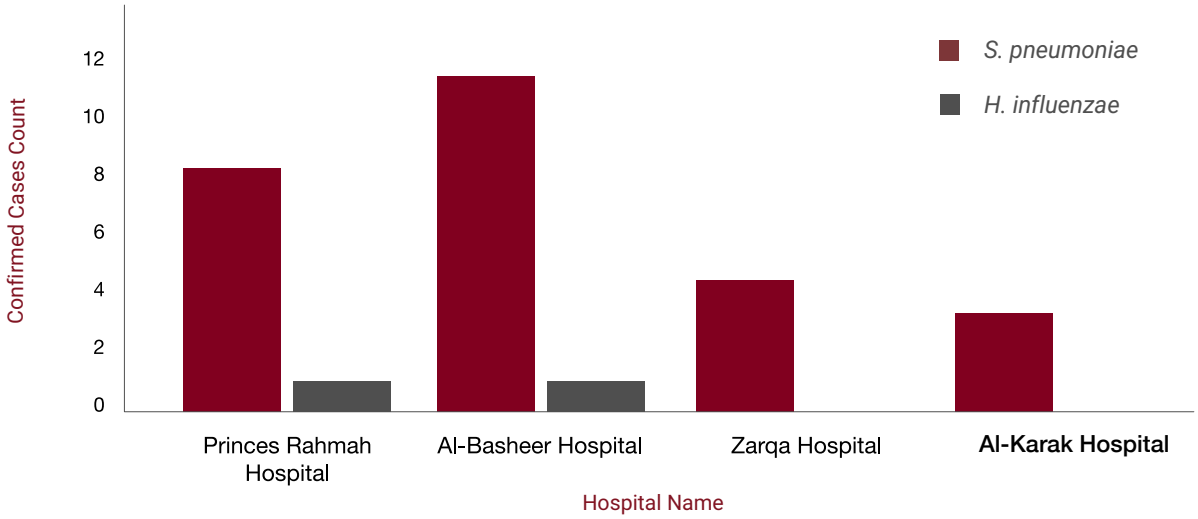


Figure 4: Laboratory-Confirmed Meningitis Cases by Pathogen Across Hospitals in Jordan (December 2023-November 2024)



2. Egypt

MenMap's initiative in Egypt engaged four sentinel hospitals, with Abbasia Fever Hospital in Cairo leading in case enrollments, accounting for 66.1% of the total cases. The 6–14 years age group had the highest proportion of suspected cases, comprising 40.2% of the total, thus highlighting the need for targeted interventions in this demographic.

Total Cases Enrolled: 316 (Figure 5)

Gender Distribution: Female: 145 cases (45.88%), Male: 171 cases (54.11%) (Figure 6)

Top Age Group: 6-14 years (40.18% of enrolled cases) (Figure 7)

Positive Cases Across Sentinel Hospitals: 43 (13.61%) confirmed (*S. pneumoniae* leading across all age groups) (Figure 8)

Figure 5: Suspected vs Confirmed Meningitis Cases by Hospital Name in Egypt (December 2023-November 2024)

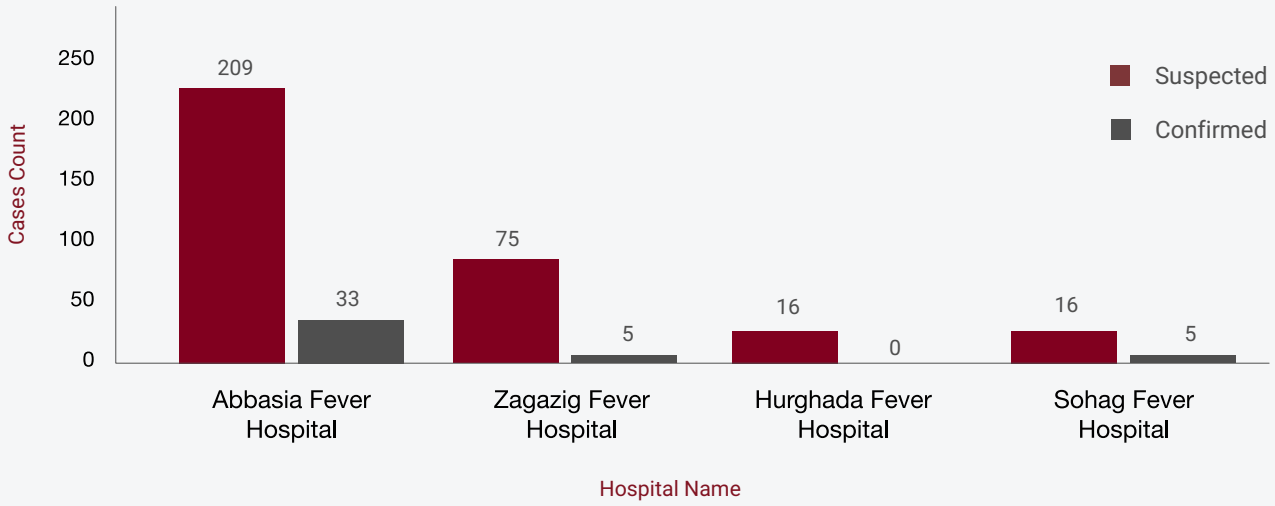


Figure 6: Gender Distribution of Enrolled Meningitis Cases in Egypt (December 2023-November 2024)

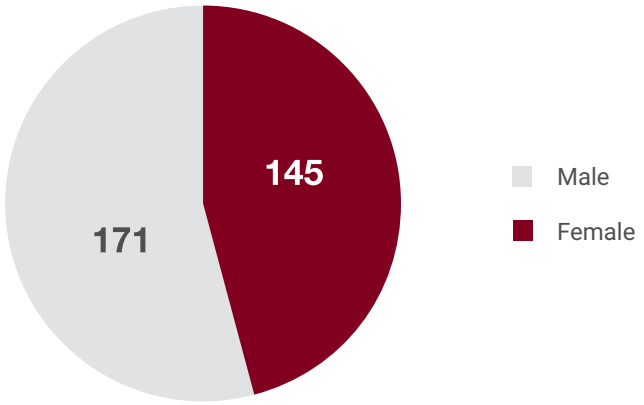


Figure 7: Percentage of Enrolled Meningitis Cases According to Age Group in Egypt (December 2023-November 2024)

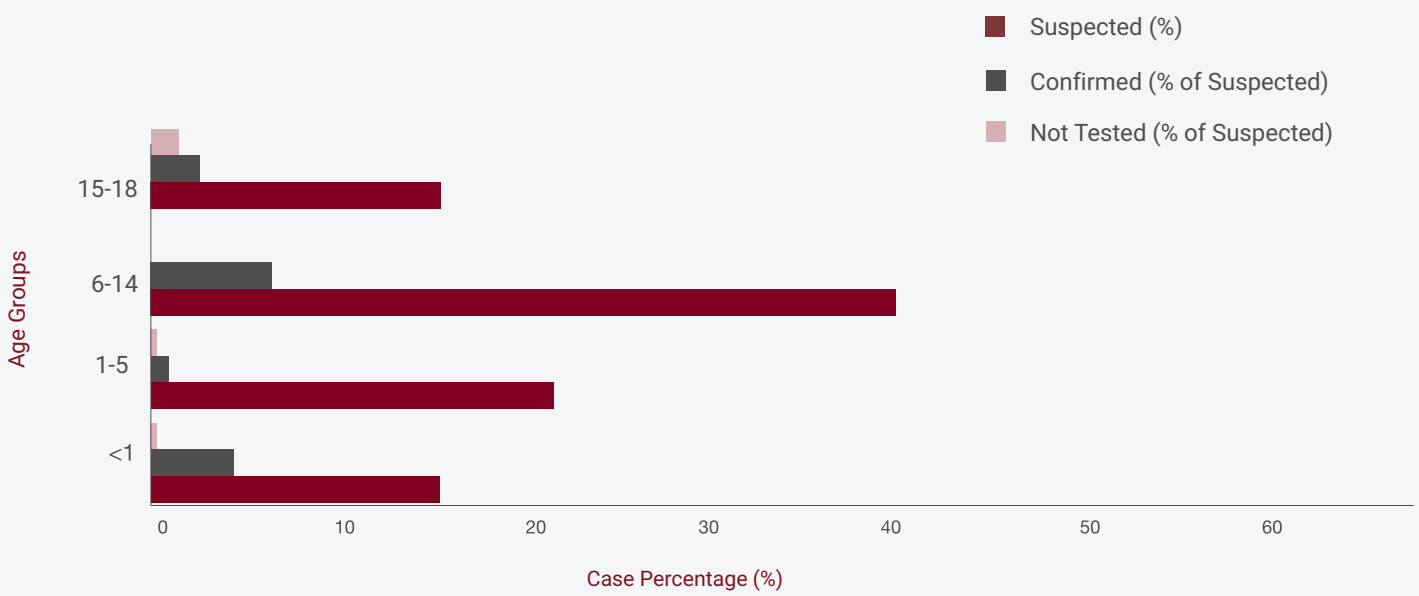
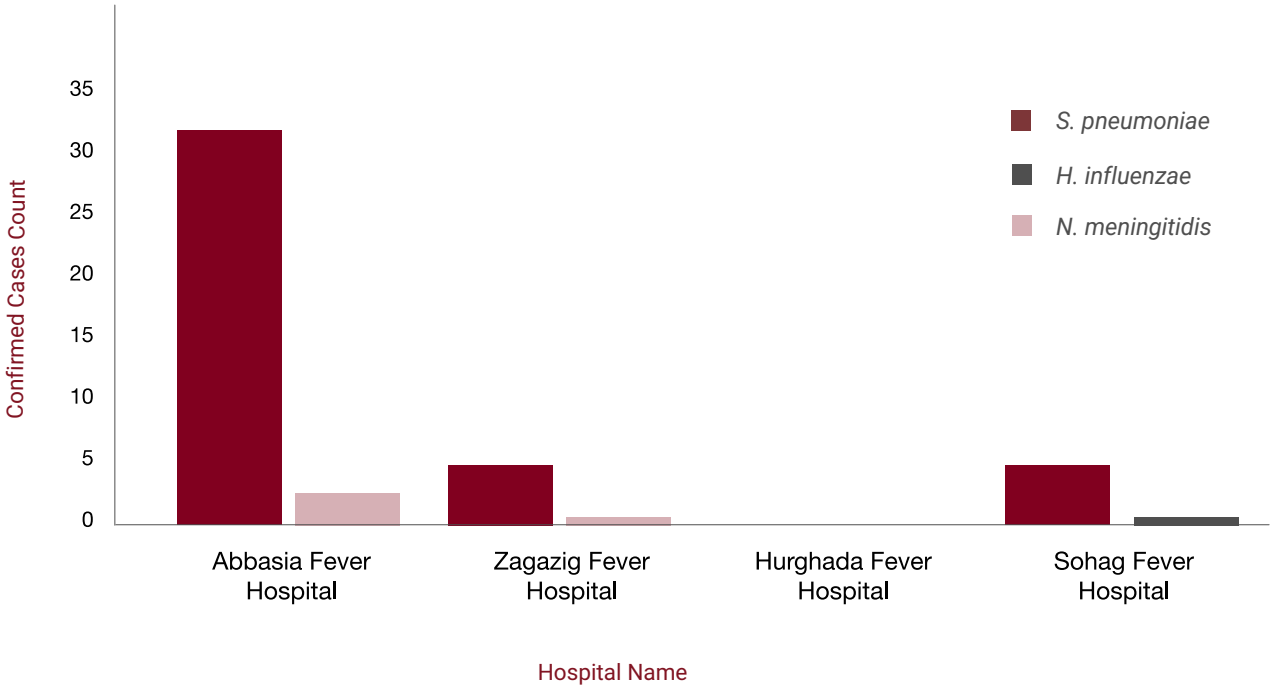


Figure 8: Laboratory-Confirmed Meningitis Cases by Pathogen Across Hospitals in Egypt (December 2023-November 2024)



3. Iraq

MenMap's initiative in Iraq engaged eight sentinel hospitals, with Central Pediatric Hospital in Baghdad leading in case enrollments, accounting for 33.3% of the total cases. The 1–5 years age group had the highest proportion of suspected cases, comprising 39.1% of the total, highlighting the need for targeted interventions in this demographic.

Total Cases Enrolled: 933 (Figure 9)

Gender Distribution: Female: 416 cases (44.58%), Male: 517 cases (55.41%) (Figure 10)

Top Age Group: 1-5 years (39.12% of enrolled cases) (Figure 11)

Positive Cases Across Sentinel Hospitals: 121 (12.96%) confirmed (*S. pneumoniae* leading across all age groups) (Figure 12)

Figure 9: Suspected vs Confirmed Meningitis Cases by Hospital Name in Iraq (December 2023-November 2024)

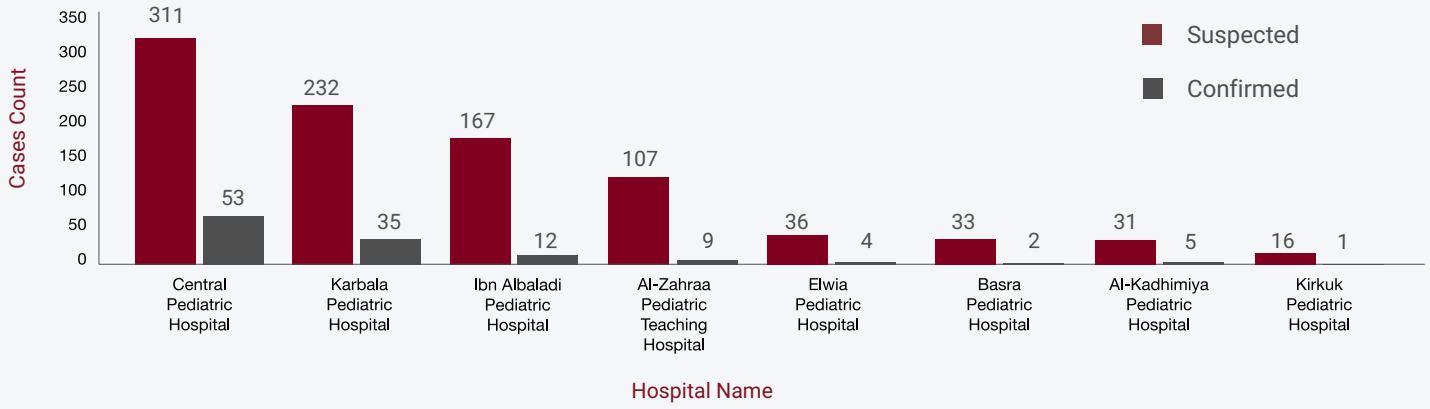


Figure 10: Gender Distribution of Enrolled Meningitis Cases in Iraq (December 2023-November 2024)

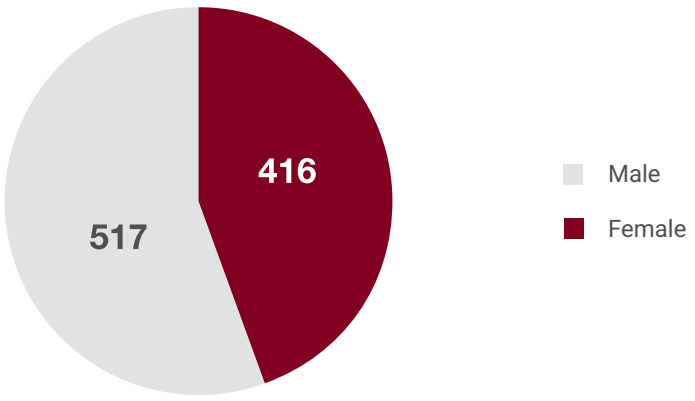


Figure 11: Percentage of Enrolled Meningitis Cases According to Age Group in Iraq (December 2023-November 2024)

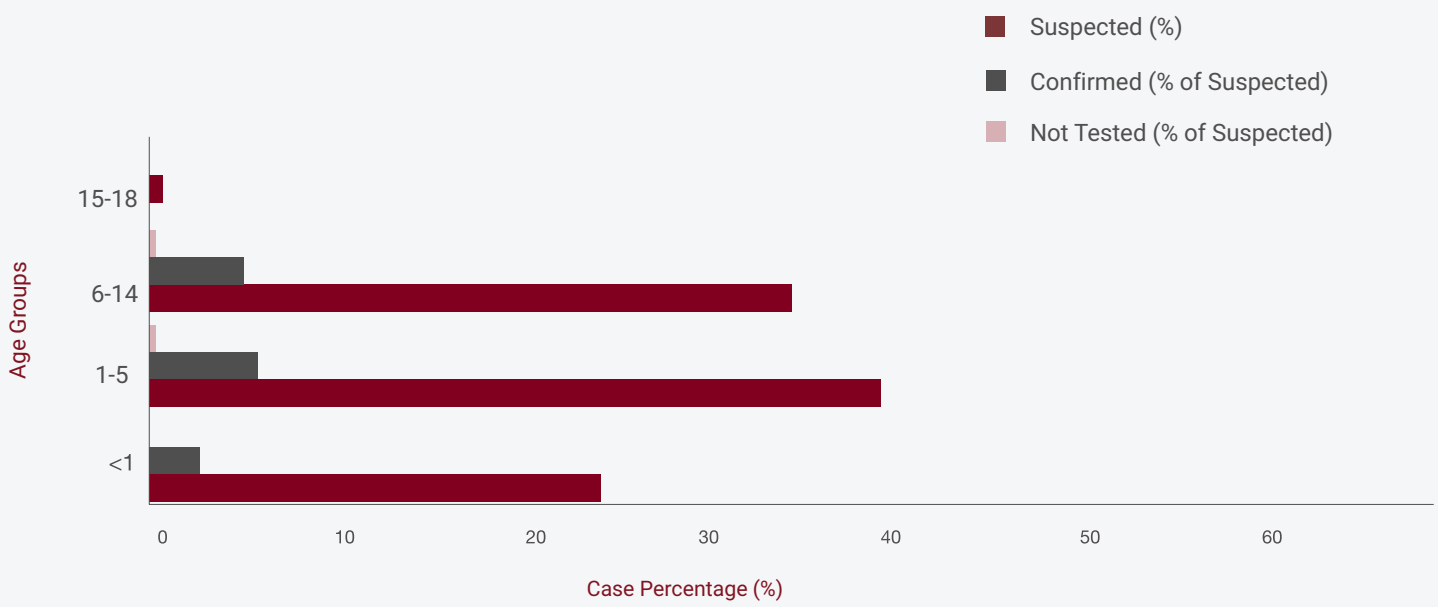
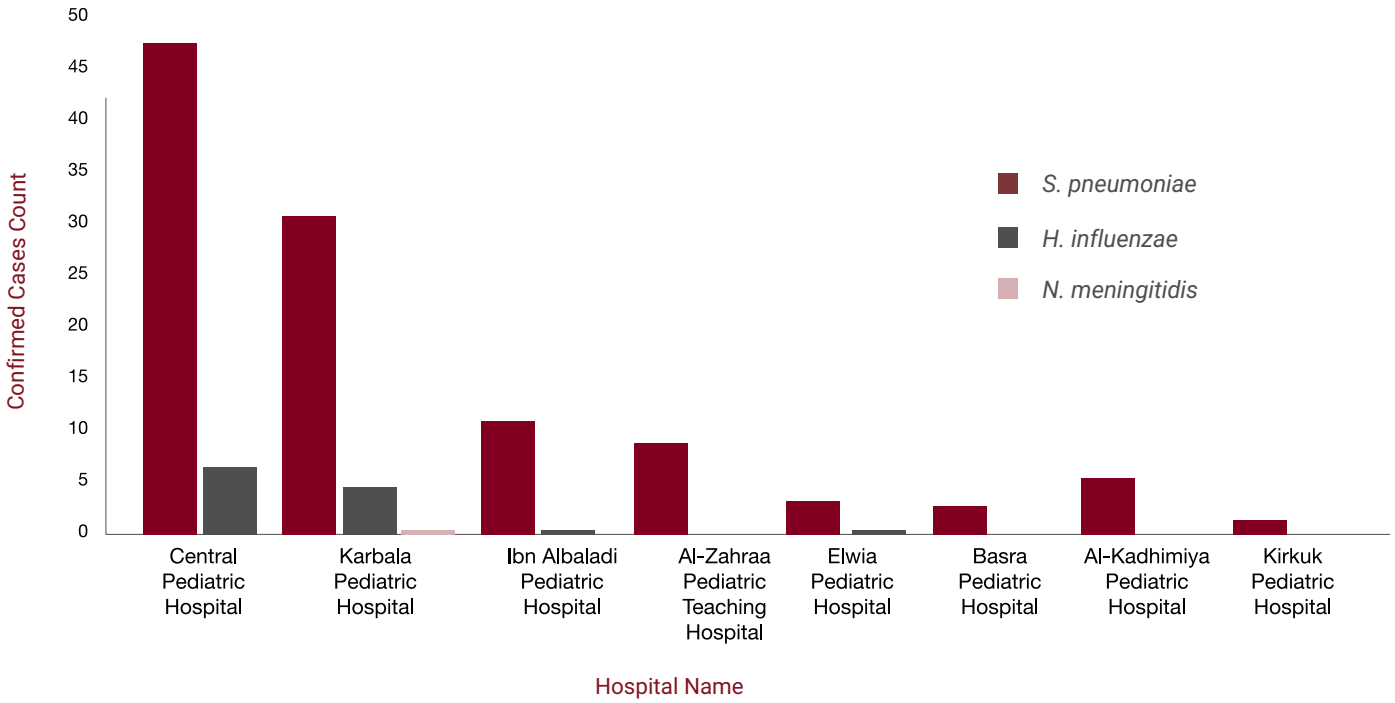


Figure 12: Laboratory-Confirmed Meningitis Cases by Pathogen Across Hospitals in Iraq (December 2023-November 2024)



External Quality Assessment (EQA) Highlights

In order to standardize and improve diagnostic accuracy for bacterial meningitis pathogens, the Eastern Mediterranean Public Health Network (EMPHNET) supported Institute Pasteur, as part of the MenMap Network, in conducting External Quality Assessments (EQA) across laboratories in Jordan, Egypt, and Iraq.

Process

Three panels, each consisting of seven lyophilized samples, were distributed to the participating laboratories. These labs conducted PCR and serogrouping analyses, adhering to standardized guidelines to ensure accuracy.

Outcome

The EQA revealed significant results, with participating laboratories attaining an overall 86% accuracy rate in species identification and 80% accuracy in genogrouping identification. These outcomes align with European laboratory standards, thus highlighting improved laboratory capacities to deliver consistent and reliable results.

The EQA allowed for the exploration of areas for further improvement, helping to identify gaps, refine methodologies, and strengthen diagnostic and surveillance systems.

Strengthening Partnerships Through Engagement

In 2024, the MenMap initiative placed a strong emphasis on regional collaboration to advance bacterial meningitis surveillance and diagnostic capacities. Through a combination of committee meetings, hands-on workshops, and a dedicated session at the Eighth EMPHNET Regional Conference, MenMap fostered partnerships and built momentum toward achieving its goals.

The Scientific and Steering Committees played a major role in driving this progress. Five committee meetings were held throughout the year, serving as critical platforms to review operations, analyze data, and plan future strategies. These meetings facilitated in-depth discussions on challenges in meningitis surveillance across Iraq, Egypt, and Jordan, and identified areas for improvement. Updates on data collection tools and project milestones were shared, and participants exchanged lessons learned, fostering a collaborative approach to enhancing surveillance and laboratory capacities.

Workshops and training sessions were another cornerstone of MenMap's efforts. A key highlight was the PCR diagnostic workshop hosted at the WHO Collaborating Center for Reference and Research on Bacterial Pathogens at the American University of Beirut (AUB) in Lebanon. This workshop equipped nine laboratorians with advanced diagnostic skills, enabling them to ensure improved diagnostic accuracy.

Additionally, training sessions for 93 healthcare professionals focused on strengthening surveillance and case reporting techniques, empowering participants to contribute effectively to the initiative's goals.

The Eighth EMPHNET Regional Conference provided a high-profile platform for MenMap to showcase its achievements and foster broader collaboration. A dedicated session titled “MenMap in the Region: Advancing Meningitis Surveillance and Laboratory Capacities” highlighted key milestones, such as the implementation of PCR diagnostics and extensive capacity-building efforts. Discussions during the conference also explored the global and regional epidemiology of bacterial meningitis and the transformative role of genomic tools like multi-locus sequence typing (MLST) and

whole-genome sequencing in disease surveillance. The session also underscored the importance of multi-sectoral collaboration, involving healthcare systems, NGOs, and the private sector.

Expert panels featuring representatives from Jordan, Egypt, and Iraq shared their insights and experiences, offering valuable perspectives on surveillance and diagnostic strategies. The conference concluded with actionable recommendations aimed at unifying protocols, enhancing diagnostic tools, and expanding genomic surveillance efforts to align with the WHO's "Defeating Meningitis by 2030" goal.

I am very pleased to have participated in this workshop, especially as it includes a distinguished group of experts who possess a wealth of valuable knowledge. Sharing information in this context is crucial, particularly regarding bacterial diagnostics, with a focus on meningitis bacteria. Although diagnostic methods are similar across countries, each has its own approaches and procedures. In Iraq, the Central Public Health Laboratory (CPHL) is dedicated to this knowledge, and continuous learning is the key to the future. I am very eager to learn from the experiences of other countries. We hope to participate in more workshops like this because knowledge is the most important tool in developing our capabilities, whether in our own country or neighboring ones."

- CPHL/Iraq Director, Dr. Hussein Alwan Hasan

As a significant outcome of these engagements, a regional framework for data harmonization and standardized reporting protocols was established. This framework not only strengthened cross-border collaboration but also laid a strong foundation for sustained progress in meningitis surveillance and diagnostics across the region.

Through these concerted efforts, MenMap has reaffirmed its commitment to building robust partnerships and fostering a united approach to combating bacterial meningitis in the Eastern Mediterranean Region.

Spotlight on Success: Inspiring Achievements

Total Cases Enrolled: 2,104

Country with the Highest Number of Enrolled Cases: Iraq with 933 cases (44.34%) (Figure 13)

Gender Distribution: Female 901 cases (42.82%), Male 1203 cases (57.18%) (Figure 14)

Top Age Group: < 1 year (35.55% of enrolled cases) (Figure 15)

Positive Cases Across Region: 191 (9.08%) confirmed (*S. pneumoniae* leading across all age groups) (Figure 16)

Figure 13: Suspected vs Confirmed Meningitis Cases Across the Three Countries (December 2023-November 2024):

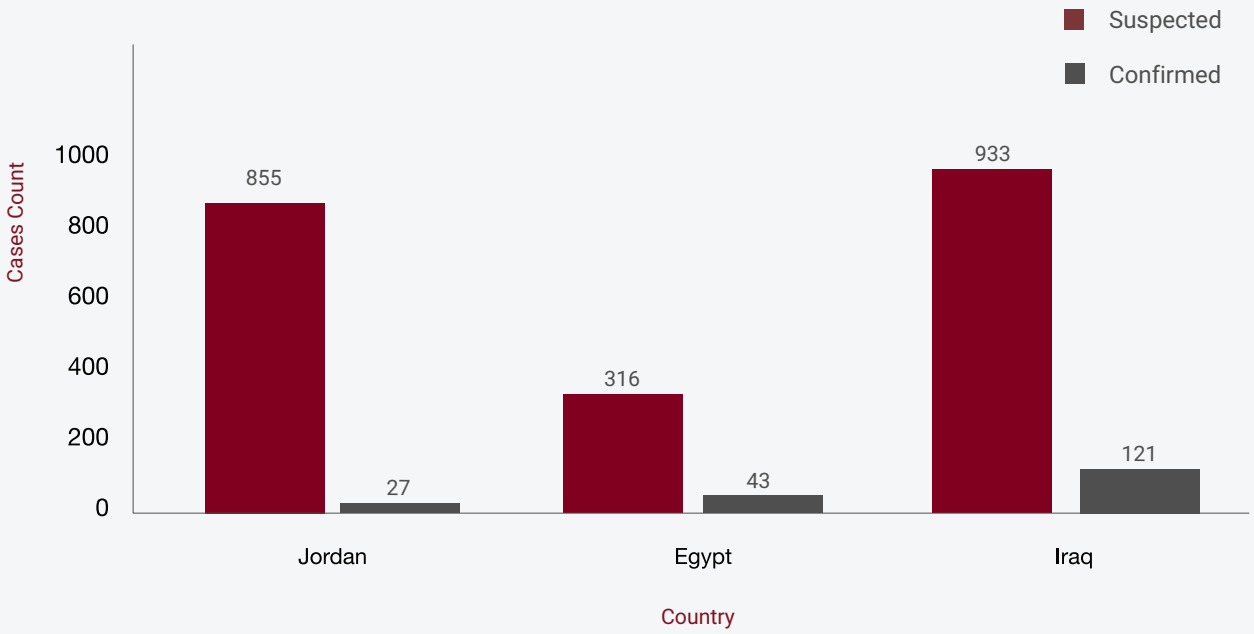


Figure 14: Gender Distribution of Enrolled Meningitis Cases in the Three Countries (December 2023-November 2024)

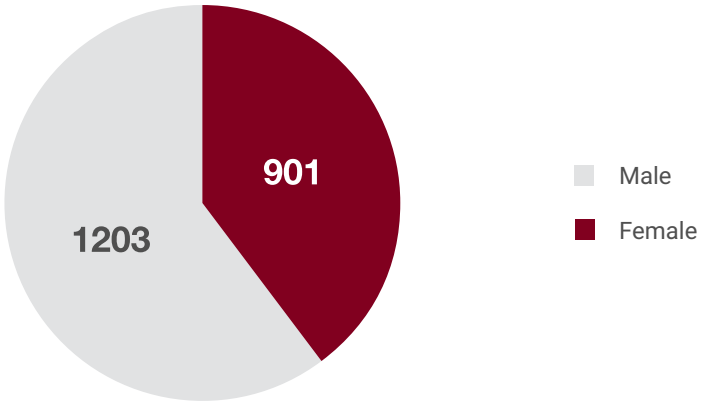


Figure 15: Percentage of Enrolled Meningitis Cases According to Age Group in the Three Countries (December 2023-November 2024)

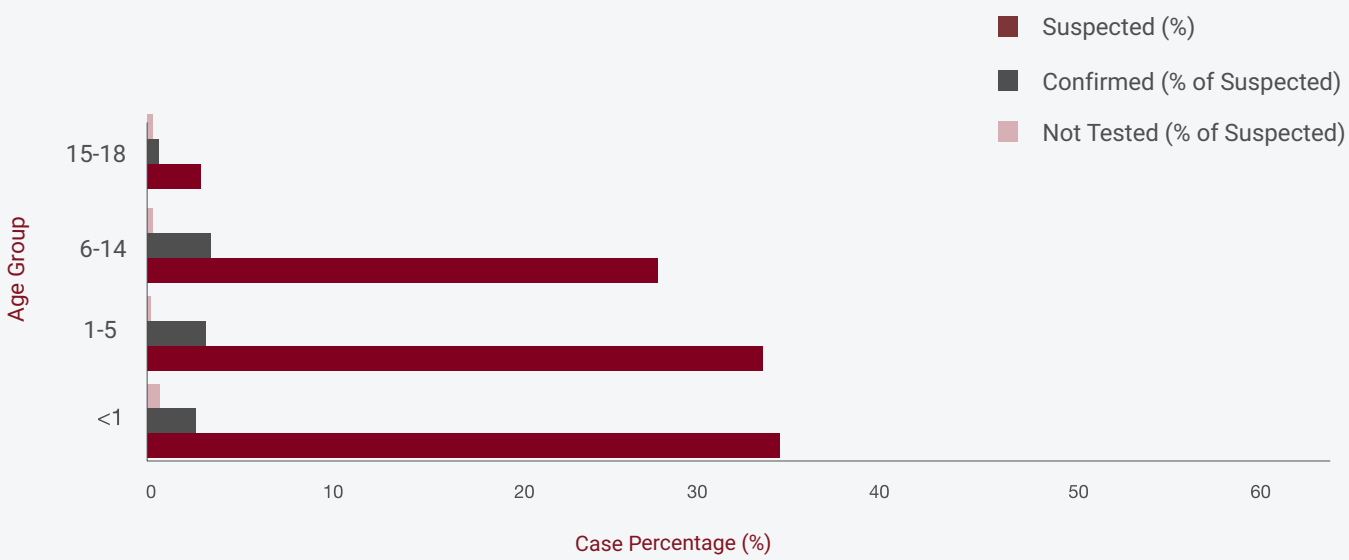
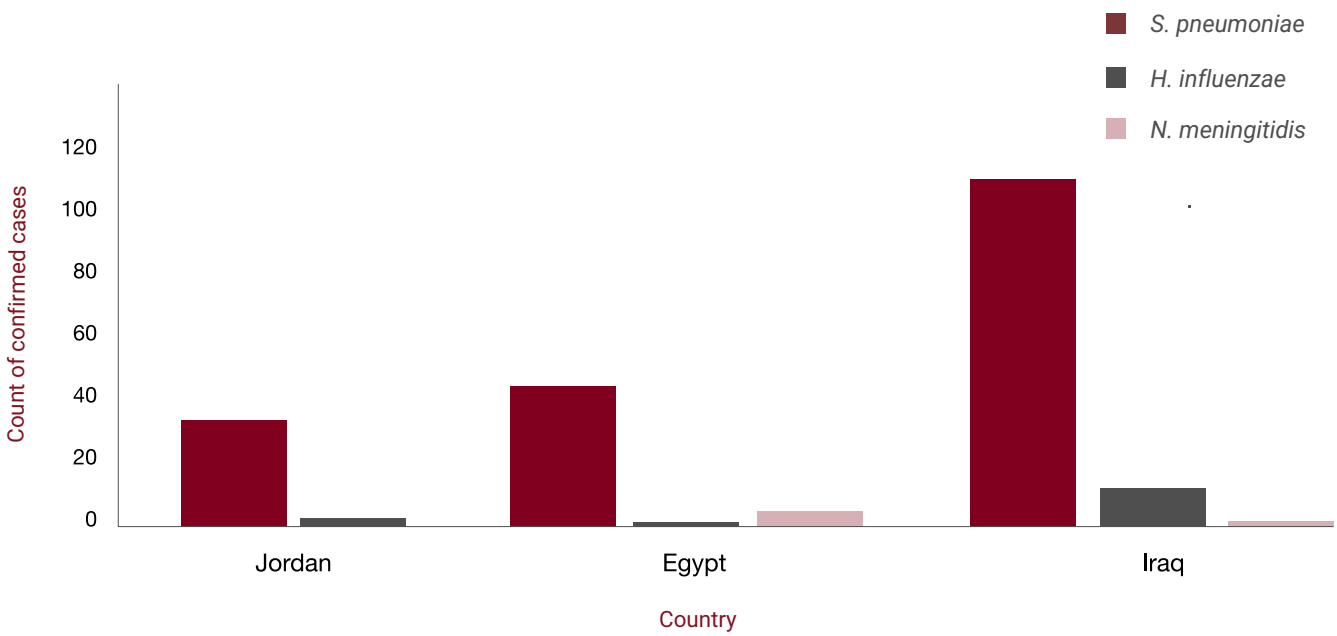


Figure 16: Laboratory-Confirmed Meningitis Cases by Pathogen Across the Three Countries (December 2023-November 2024)



Navigating Barriers: Challenges and Lessons Learned

As MenMap reflects on 2024, the journey reveals both the obstacles faced and the lessons that have guided progress. Honest self-assessment has been critical in understanding the challenges encountered, the strategies employed to address them, and the insights gained for future improvement.

Challenges Faced

Throughout the year, MenMap experienced several significant challenges, including:

- **Missing Vaccination Records:** Limited access to patients' vaccination history created gaps in analyzing the impact of immunization on disease incidence.
- **Pre-admission Use of Antibiotics**: A notable number of patients had taken antibiotics before hospitalization, masking symptoms and complicating diagnosis.
- **Data Entry and Documentation Issues:** Errors during data transfer introduced inconsistencies, requiring extensive validation efforts.

Lessons Learned

Each challenge presented an opportunity to grow and adapt, resulting in valuable takeaways for enhancing future efforts:

- **Comprehensive follow-up mechanisms** are critical for addressing data gaps effectively.
- **Adjustments in data collection protocol**s can enhance case identification.
- **Continuous staff training** ensures consistency, accuracy, and quality across all project activities.
- **Building resilient infrastructure** is crucial for creating sustainable surveillance systems.

Looking Ahead

The inaugural year of 2024 has showcased the transformative potential of coordinated public health initiatives. As MenMap moves forward, the focus remains on reinforcing case definitions to improve confirmed-to-suspected case ratios, maintaining objective measures, and continuing data collection efforts. Year 1 serves as a foundation for further success, combining best practices with targeted improvements to achieve even greater efficiency and accuracy.

MenMap is committed to learning, evolving, and to driving change. With these lessons in hand, the path forward is one of strengthened collaboration, innovation, and determination to meet public health challenges head-on.