MenMap
The Meningitis & Septicemia Mapping Network

# Meningitis and Septicemia Mapping (MenMap) Network – Second Year Bulletin

2024/2025

About MenMap

The Meningitis and Septicemia Mapping (MenMap) Network 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.

About this Bulletin

This annual epidemiological bulletin presents a consolidated overview of Year 2 surveillance findings from the MenMap Network, covering the period December 2024 to November 2025. The bulletin summarizes suspected and laboratory-confirmed bacterial meningitis cases reported through MenMap sentinel hospitals in Jordan, Egypt, and Iraq, alongside key implementation milestones achieved during the second year of the project.

Building on the foundation established in Year 1, Year 2 focused on sustaining high-quality, case-based surveillance while strengthening laboratory standardization, cross-country coordination, and data-driven interpretation. Throughout the reporting period, MenMap operated across diverse epidemiological and operational contexts, adapting to site-level adjustments and logistical constraints while maintaining continuity of surveillance activities. The findings presented are derived from routinely collected sentinel surveillance data. In addition to epidemiological findings, this bulletin highlights selected surveillance and network-level milestones, including developments in laboratory capacity, sentinel site implementation, and regional coordination. Together, these elements provide context for interpreting the surveillance findings and illustrate the continued evolution of the MenMap Network in support of meningitis control efforts across the EMR.
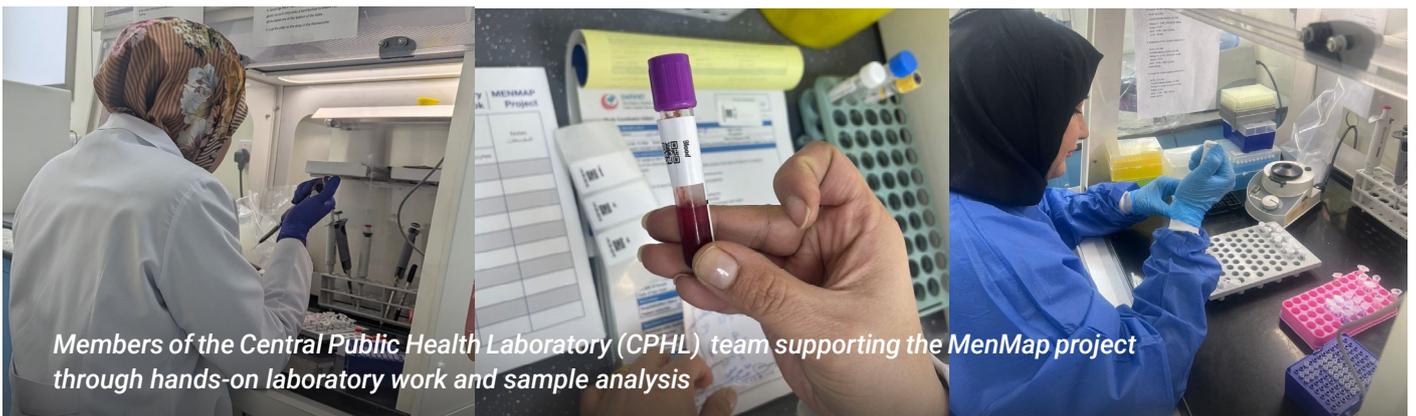
Members of the Central Public Health Laboratory (CPHL) team supporting the MenMap project through hands-on laboratory work and sample analysis

1. Overview of Meningitis Case Counts and Trends

1.1 Total Cases Overview

Between December 2024 and November 2025, the MenMap Network recorded the following key surveillance outputs across Jordan, Egypt, and Iraq:

1,881

suspected meningitis cases were reported across the three participating countries.

123

cases **(6.5%)** were laboratory-confirmed via PCR testing

Streptococcus pneumoniae

was the predominant pathogen, accounting for **107** of **123** confirmed cases **(87.0%)**.

Iraq

reported the largest number of suspected cases, contributing **771** of **1,881** suspected cases **(41.0%)**.

Egypt

contributed the highest proportion of laboratory-confirmed cases, with **63** of **123** confirmed cases **(51.2%)**.

Infants aged <1 year

represented the most affected age group among suspected cases, accounting for **673** of **1,881** cases **(35.8%)**.

All laboratory-confirmed cases

were hospitalized, underscoring the clinical severity of confirmed bacterial meningitis cases captured through sentinel surveillance.

As of the end of November 2025, MenMap has documented a cumulative total of **3,985 suspected meningitis cases** and **314 laboratory-confirmed cases** since surveillance activities began in December 2023.

The MenMap Network team at the 17th EMGM Congress, presenting Year 1 achievements and regional findings

1.2 Case Counts by Country (*Jordan*, *Egypt*, *Iraq*)

Jordan

During Year 2 (December 2024 to November 2025), MenMap surveillance in Jordan was implemented continuously across four sentinel hospitals: Al-Basheer Hospital, Al-Karak Public Hospital, Zarqa Hospital, and Princess Rahma Pediatric Hospital. Surveillance operations remained stable throughout the reporting period, with uninterrupted case enrollment and laboratory testing activities.

A total of **507 suspected meningitis cases** were enrolled during Year 2. Among these, **24 cases (4.7%)** were laboratory-confirmed via PCR, including *Streptococcus pneumoniae* and Neisseria meningitidis cases. *Streptococcus pneumoniae* remained the predominant pathogen among confirmed infections.

Key Statistics

Total Cases Enrolled: 507 (Figure 1)

Gender Distribution: Female: **215** cases (**42%**), Male: **292** cases (**58%**) (Figure 2)

Most Affected Age Group: <1 year has reported the highest in both suspected **(325, 64.1%)** and confirmed (13, 54.2% of confirmed cases) (Figure 3)

Pathogen Distribution Among Confirmed Cases: 24 (4.7%) confirmed cases, including **19** *S. pneumoniae* **(79%)**, **3** *H. influenzae* **(13%)**, and **2** *N. meningitidis* **(8%)**. Among confirmed cases, **8** had a history of Hib vaccination (Figure 4)

One death was reported among laboratory-confirmed cases in Jordan. The case was attributed to *S. pneumoniae* infection; however, the direct cause of death could not be conclusively verified based on available clinical information.

Year-over-Year Comparison:

Compared with Year 1, Jordan experienced a moderate decline in the number of suspected cases, while the number of laboratory-confirmed cases increased during Year 2. This resulted in a higher positivity rate, suggesting improved case detection and laboratory confirmation within the sentinel surveillance system rather than an increase in disease burden. Year 2 findings indicate strengthened surveillance performance in Jordan, with sustained case-based reporting, high laboratory testing coverage, and improved identification of confirmed bacterial meningitis cases across participating hospitals.

Figure 1: Suspected vs Confirmed Meningitis Cases by Hospital Name in Jordan (Dec 2024-Nov 2025)
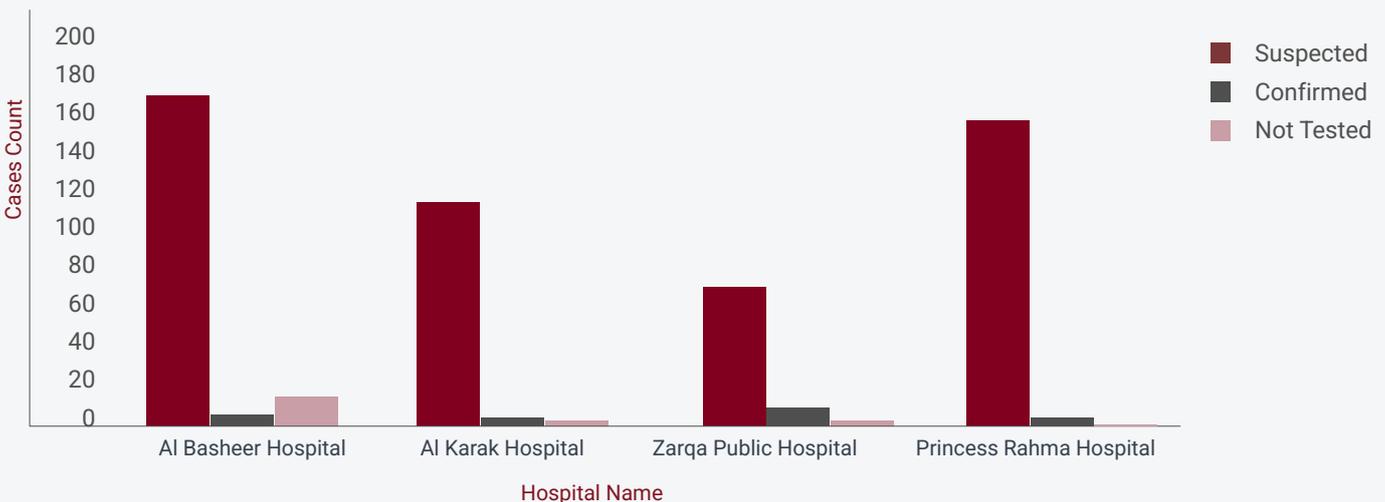
Figure 2: Gender Distribution of Enrolled Meningitis Cases in Jordan (Dec 2024-Nov 2025)
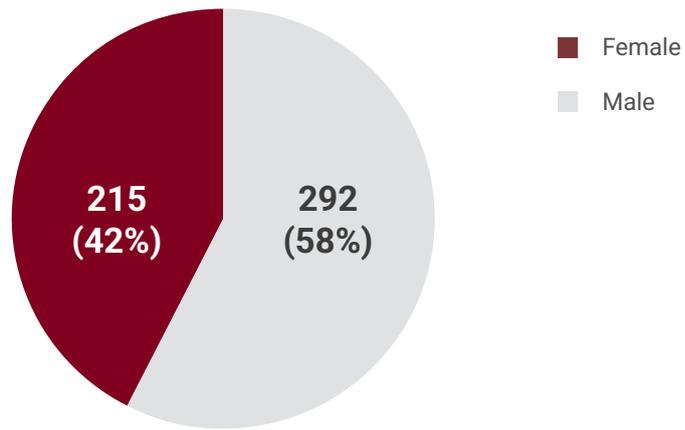

Female
Male

215 (42%)
292 (58%)

Figure 3: Percentage of Enrolled Meningitis Cases According to Age Group in Jordan (Dec 2024-Nov 2025)

Suspected (%)
Confirmed (% of Suspected)
Not Tested (% of Suspected)

Age Group

- 15 - 18: 1.8 / 1.3
- 6 - 14: 10.1 / 15.6
- 1 - 5: 3.2 / 3.2 / 18.7
- <1: 3.7 / 4.0 / 64.1

Case Percentage (%)
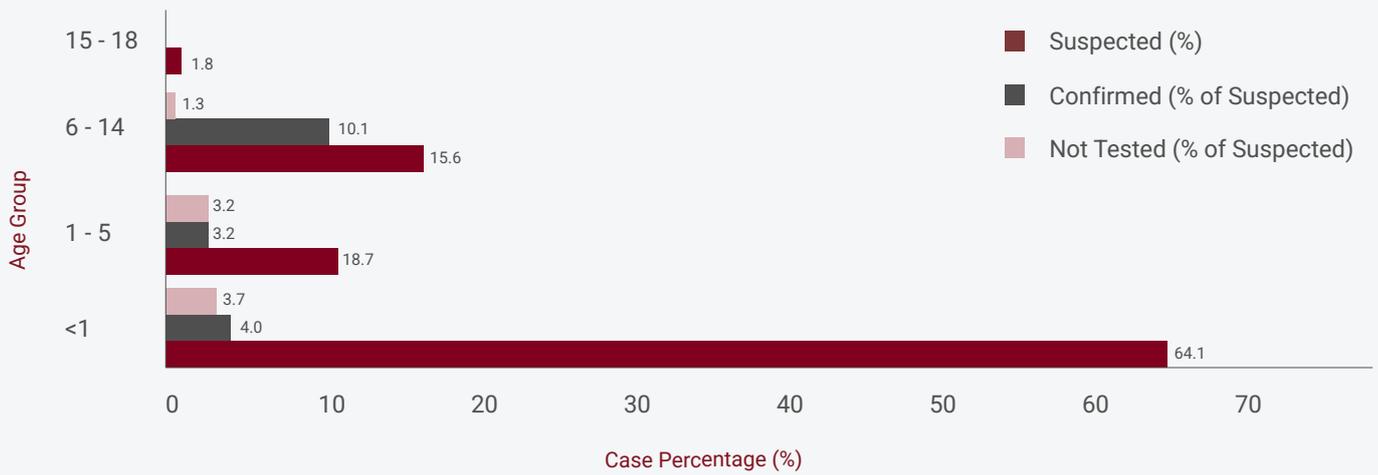
Figure 4: Pathogen Distribution in Laboratory-Confirmed Cases in Jordan (Dec 2024-Nov 2025)

S. pneumoniae
H. influenzae
N. meningitidis

2 (8%)
3 (13%)
19 (79%)
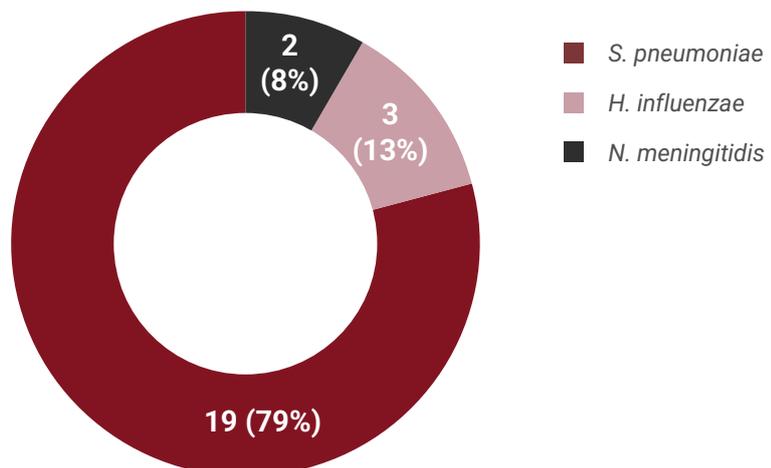
Egypt

During Year 2 (December 2024 to November 2025), MenMap surveillance activities in Egypt were conducted across participating sentinel hospitals, with adjustments to the sentinel site composition implemented during the reporting period to optimize case capture and surveillance performance. Despite these changes, surveillance activities continued without interruption, and case enrollment remained consistent throughout the year.

A total of **603 suspected meningitis cases** were reported in Egypt during Year 2. Among these, **63 cases (10.4%)** were laboratory-confirmed via PCR, representing the highest proportion of confirmed cases among the three participating countries. Confirmed infections were attributed to *S. pneumoniae*, N. meningitidis, and H. influenzae, with *S. pneumoniae* remaining the predominant pathogen.

Key Statistics

Total Cases Enrolled: 603 (Figure 5)

Gender Distribution: Female: **251 cases (41.6%)** Male: **352 cases (58.4%)** (Figure 6)

Most Affected Age Group: 6–14 years has reported the highest number of cases in both suspected (**237, 39.3%**) and confirmed cases (**32, 50.8%** of confirmed cases) (Figure 7)

Pathogen Distribution Among Confirmed Cases: 63 (10.4%) confirmed cases, including **52** *S. pneumoniae* (**82.5%**), **9** *N. meningitidis* (**14.3%**), and **2** *H. influenzae* (**3.2%**). Among confirmed cases, **30** had a history of Hib vaccination and **17** had received meningococcal vaccine (Figure 8)

One death was reported among laboratory-confirmed cases in Egypt. The infection was attributed to *S. pneumoniae*, however, the direct cause of death could not be conclusively verified based on available clinical information.

Year-over-Year Comparison:

Compared with Year 1, Egypt demonstrated an increase in the number and proportion of laboratory-confirmed meningitis cases during Year 2, while overall suspected case enrollment remained broadly comparable. This pattern coincided with adjustments to the sentinel site composition implemented during Year 2, which were intended to optimize case capture and enhance surveillance efficiency. The observed increase in confirmation proportion is therefore likely influenced by improved sentinel site performance, strengthened laboratory practices, and more targeted case enrollment, rather than a true increase in disease burden. These findings highlight Egypt's continued progress in case verification and pathogen detection, reinforcing its role as a major contributor to the MenMap network's laboratory-confirmed data outputs.

Figure 5: Suspected vs Confirmed Meningitis Cases by Hospital Name in Egypt (Dec 2024-Nov 2025)
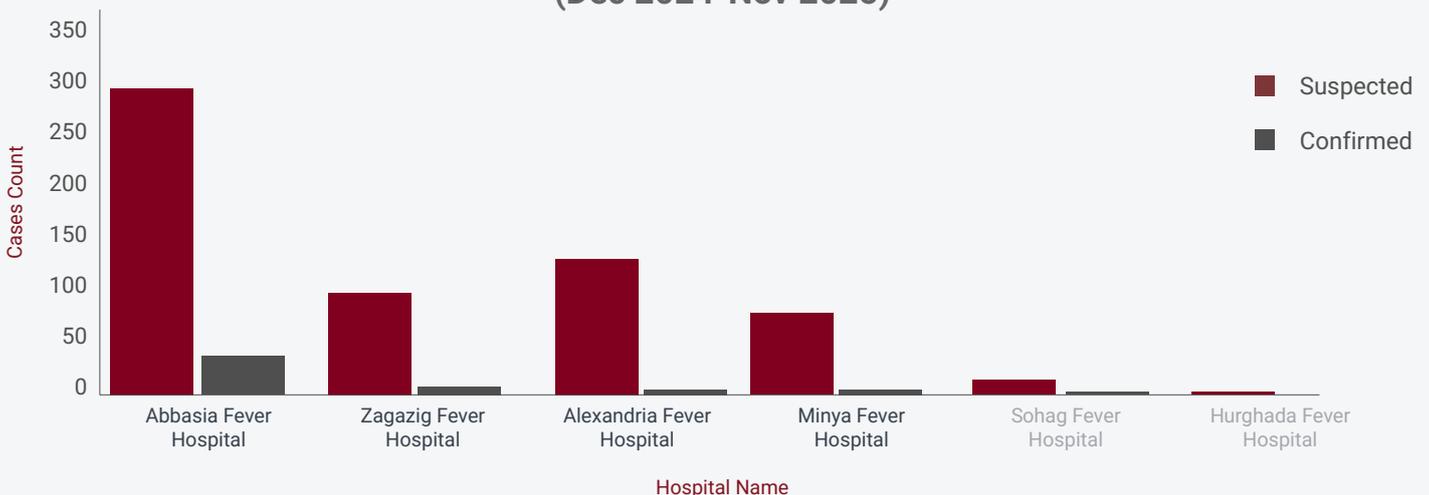
Figure 6: Gender Distribution of Enrolled Meningitis Cases in Egypt (Dec 2024-Nov 2025)
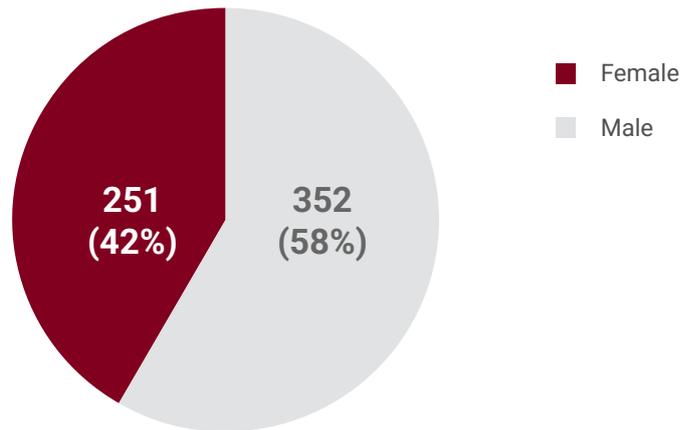

- Female: 251 (42%)
- Male: 352 (58%)

Figure 7: Percentage of Enrolled Meningitis Cases According to Age Group in Egypt (Dec 2024-Nov 2025)

Legend:
- Suspected (%)
- Confirmed (% of Suspected)
- Not Tested

Age Group	Suspected (%)	Confirmed (% of Suspected)	Not Tested
15 - 18	13	12.8	
6 - 14	39.3	13.5	
1 - 5	30	5	0.6
<1	17.7	12.1	

X-axis: Case Percentage (%)
Y-axis: Age Group
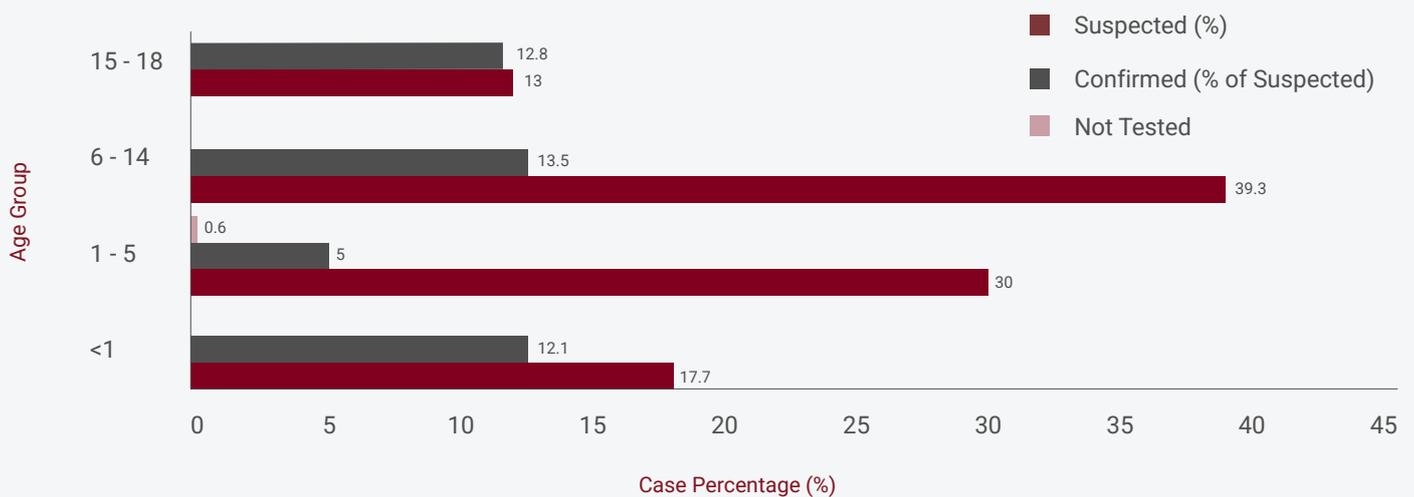
Figure 8: Pathogen Distribution in Laboratory-Confirmed Cases in Egypt (Dec 2024-Nov 2025)

- *S. pneumoniae*: 52 (83%)
- *N. meningitidis*: 9 (14%)
- *H. influenzae*: 2 (3%)
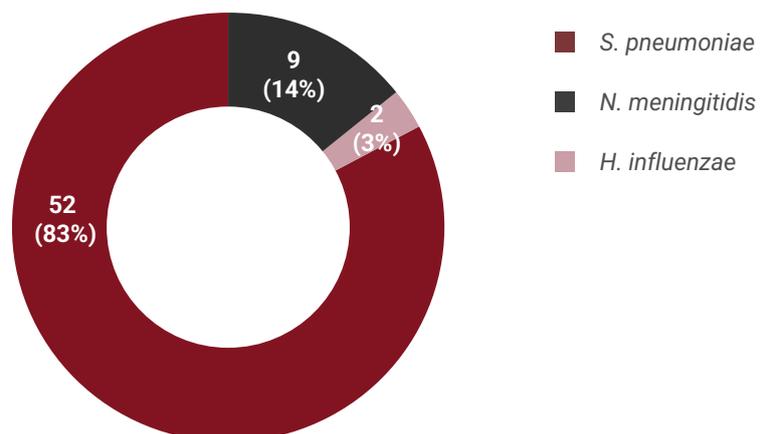
Iraq

During Year 2 (December 2024 to November 2025), MenMap surveillance activities in Iraq were implemented across seven sentinel hospitals: Central Pediatric Hospital, Al-Zahraa Pediatrics Teaching Hospital, Basra Pediatric Hospital, Elwia Pediatric Hospital, Ibn Al-Balady Pediatric Hospital, Karbala Pediatric Hospital, and Kirkuk Pediatric Hospital. Surveillance operations were temporarily placed on hold during part of the second quarter of Year 2 due to operational and logistical challenges, with activities resuming thereafter across the same sentinel sites.

A total of **771 suspected meningitis cases** were reported in Iraq during Year 2, representing the largest share of suspected cases among the three participating countries. Among these, 36 cases (4.7%) were laboratory-confirmed via PCR, all of which were attributed to *S. pneumonia*. No confirmed cases of *N. meningitidis* or *H. influenzae* were identified in Iraq during the reporting period.

Key Statistics

Total Cases Enrolled: 771 (Figure 9)

Gender Distribution: Female: **354** cases **(45.9%)**, Male: **417** cases **(56.8%)** (Figure 10)

Most Affected Age Group: 1−5 years has reported the highest number of cases in both suspected **(308, 39.9%)** and confirmed (**15, 41.7%** of confirmed cases) (Figure 11)

Pathogen Distribution Among Confirmed Cases: 36 (4.7%) confirmed cases, all attributed to *S. pneumoniae* **(100%).** Among confirmed cases, **8** had a history of Hib vaccination, **3** had received PCV13, and **3** had received MenACWY vaccine (Figure 12)

No deaths were reported among laboratory-confirmed meningitis cases in Iraq.

Year-over-Year Comparison:

Compared with Year 1, the total number of suspected cases reported in Iraq during Year 2 remained broadly comparable. However, the number and proportion of laboratory-confirmed cases declined, a pattern that should be interpreted considering the temporary suspension of surveillance activities during the second quarter, as well as contextual operational constraints affecting case flow and specimen referral. Year 2 findings from Iraq highlight the resilience of the MenMap surveillance system, with successful resumption of activities following the hold period and continued detection of confirmed pneumococcal meningitis cases through standardized PCR testing.

Figure 9: Suspected vs Confirmed Meningitis Cases by Hospital Name in Iraq (Dec 2024-Nov 2025)

Figure 10: Gender Distribution of Enrolled Meningitis Cases in Iraq (Dec 2024-Nov 2025)

Legend:
- Female
- Male

Female: 354 (46%)
Male: 417 (54%)

Figure 11: Percentage of Enrolled Meningitis Cases According to Age Group in Iraq (Dec 2024-Nov 2025)

Legend:
- Suspected (%)
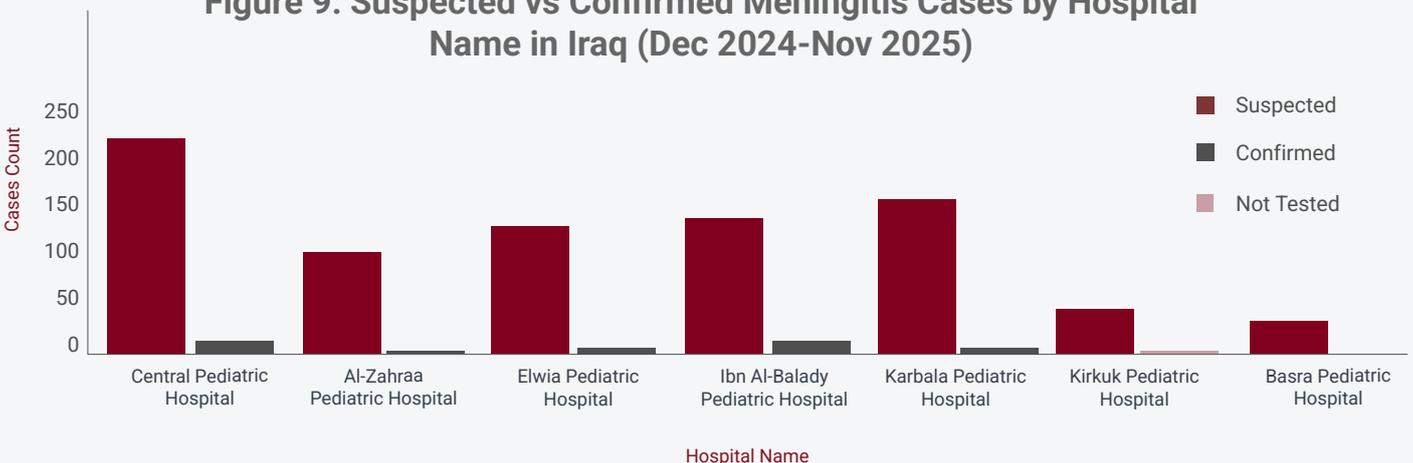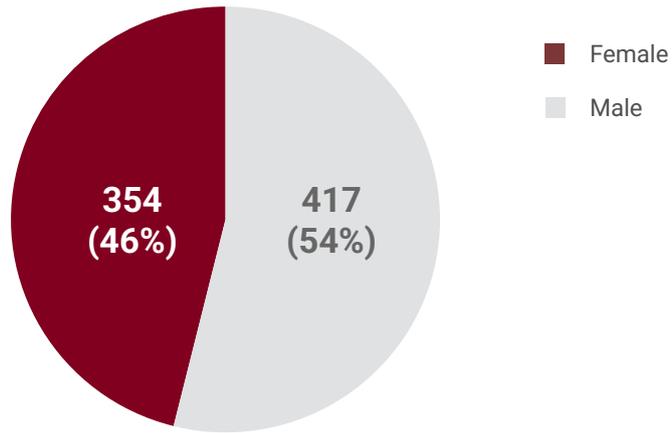- Confirmed (% of Suspected)
- Not Tested (% of Suspected)

Age Group	Suspected (%)	Confirmed (% of Suspected)	Not Tested (% of Suspected)
15 - 18	0.6		
6 - 14	28.2	4.2	0.9
1 - 5	39.9	4.9	1.3
<1	31.3	5.4	1.2

X-axis: Case Percentage (%)
Y-axis: Age Group
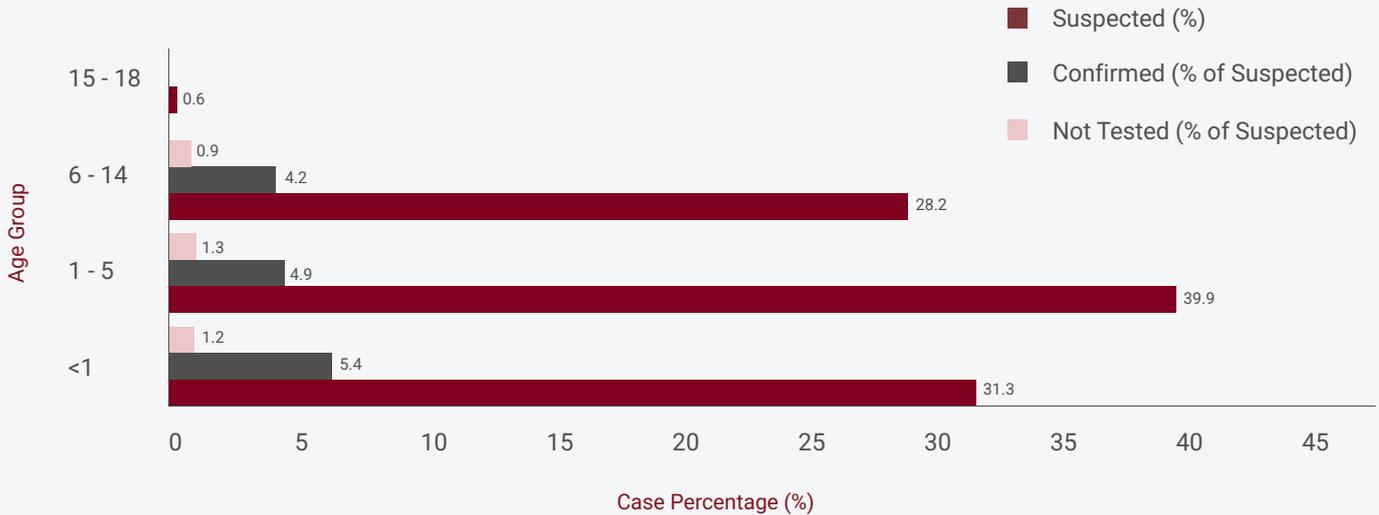
Figure 12: Pathogen Distribution in Laboratory-Confirmed Cases in Iraq (Dec 2024-Nov 2025)

Legend:
- *S. pneumoniae*

36 (100%)
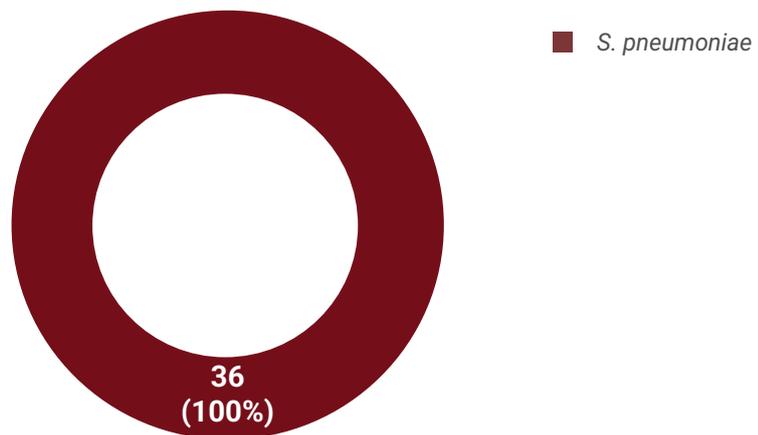
1.3 Temporal Trends within the Year

Across the December 2024 to November 2025 study period, MenMap surveillance data from Jordan, Egypt, and Iraq demonstrated fluctuating monthly patterns in both suspected and laboratory-confirmed meningitis cases, reflecting a combination of seasonal variation, operational factors, and pathogen-specific dynamics.

Figure 13: Temporal Distribution of Suspected and Confirmed Meningitis Cases (Dec 2024-Nov 2025)
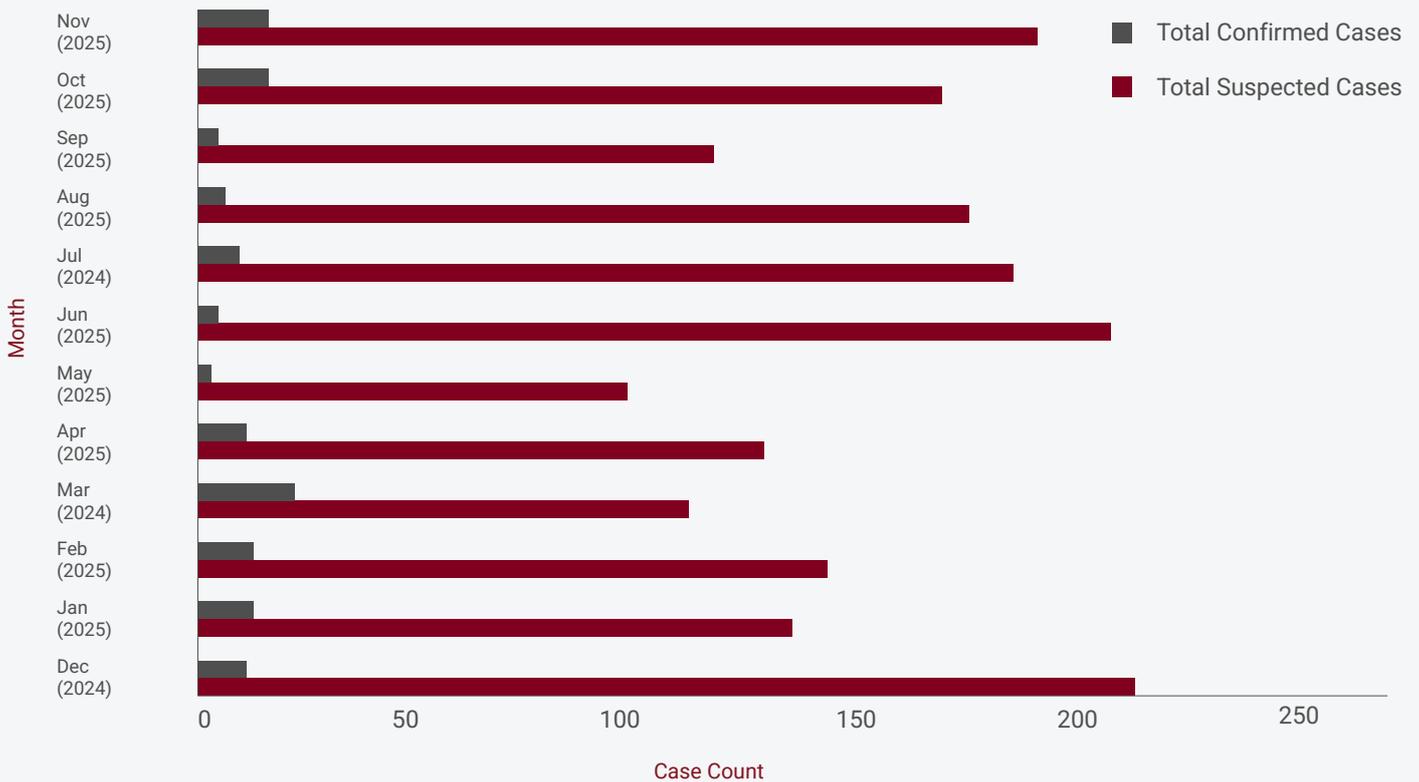

Figure 13 illustrates the monthly distribution of suspected and confirmed meningitis cases across the network. Suspected case enrollment was highest at the beginning of the study year in December 2024 (213 cases), followed by a gradual decline through May 2025 **(98 cases)**. A secondary increase was observed during the summer months, peaking again in June 2025 **(206 cases)**, before fluctuating at moderate levels through November 2025 **(187 cases).**

In contrast, laboratory-confirmed cases showed a less uniform pattern. Confirmations peaked in March 2025 **(19 cases)**, despite lower suspected case enrollment during that month, and again toward the end of the study year in October and November 2025 **(16 cases each).** These peaks were primarily driven by *S. pneumoniae*, which remained the dominant pathogen throughout the study period.

Pathogen-specific trends revealed that *S. pneumoniae* accounted for the majority of confirmed cases in every month, with notable increases in March, October, and November 2025 **(15 cases each)**. *N. meningitidis* cases were detected intermittently, with small clusters observed in March, April, August, and October 2025, while *H. influenzae* was detected sporadically at low frequency, without sustained temporal clustering.

A temporary decline in suspected and confirmed case enrollment was observed during March–May 2025, coinciding with a surveillance hold in Iraq due to operational challenges. This period should therefore be interpreted cautiously, as reduced case counts likely reflect interrupted surveillance activities rather than true reductions in disease occurrence.

Country-specific observations indicate that:

Jordan

demonstrated relatively stable monthly reporting throughout the study year, contributing consistently to both suspected and confirmed case counts.

Egypt

contributed a substantial proportion of confirmed cases during months with elevated confirmation peaks, particularly toward the end of the study period, reflecting strong laboratory confirmation capacity.

Iraq

showed reduced reporting during the documented surveillance hold period, followed by recovery in case enrollment after surveillance activities resumed.

Overall, the temporal patterns observed during Year 2 highlight the importance of continuous surveillance, contextual interpretation of operational disruptions, and pathogen-specific monitoring to support meaningful interpretation of meningitis trends across the MenMap Network.

1.4 Cross-Period Performance Snapshot (Year 1 vs Year 2)

A comparison of full Year 1 and full Year 2 surveillance performance across the MenMap Network indicates notable shifts in case enrollment, laboratory confirmation, and overall positivity, reflecting a combination of epidemiological, operational, and surveillance-maturity factors.

Table 1: Comparison of Key Surveillance Indicators between Year 1 and Year 2

Indicator	Year 1	Year 2	Change (%)
Total Suspected Cases	2,104	1,881	▼ 10.6%
Total Confirmed Cases	191	123	▼ 35.6%
Positivity Rate (%)	9.1%	6.5%	▼ 28.6%

As shown in Table 1, Year 1 recorded **2,104 suspected** meningitis cases, of which **191** were laboratory-confirmed (positivity: **9.1%**). In contrast, Year 2 reported **1,881 suspected** cases and **123 confirmed** cases, corresponding to a lower overall positivity rate of **6.5%.** This reflects a reduction in both suspected and confirmed case counts, alongside a proportional decline in positivity.

Quarterly analysis indicates that the largest divergence between the two years occurred during the third quarter (Q3). While Q3 of Year 1 recorded **521 suspected** and **29 confirmed** cases (positivity: **5.6%**), Q3 of Year 2 reported a higher number of suspected cases **(566)** but fewer confirmed cases **(22)**, resulting in a lower positivity rate (**3.9%**). A secondary divergence was observed in Q2, when Year 2 experienced markedly lower-case counts, coinciding with the temporary suspension of surveillance activities in Iraq.

Country-level contributions further contextualize these trends. Egypt remained the primary contributor to laboratory-confirmed cases in both years, particularly during Year 2, reflecting sustained laboratory confirmation capacity. Jordan demonstrated a relatively stable surveillance profile across both years, with consistent suspected case reporting and a relative increase in confirmed cases during specific quarters of Year 2. In contrast, Iraq showed notable reductions in suspected and confirmed cases during Year 2 Q2 and Q3, followed by recovery in the latter part of the year, consistent with the documented surveillance hold.

Overall, the observed decline in positivity during Year 2 should not be interpreted as reduced surveillance efficiency. Rather, it likely reflects more targeted case enrollment, improved adherence to case definitions, and strengthened laboratory confirmation practices, alongside genuine seasonal and contextual influences. The introduction of PCV13 into Jordan's national immunization program during Year 2 Q3 occurred late in the study period and is unlikely to have materially influenced the annual comparison, though its impact warrants monitoring in subsequent years.

2. Key Surveillance and Network Milestones in Year 2

Beyond the epidemiological findings, Year 2 of the MenMap initiative was characterized by a series of surveillance and network-level milestones that supported the quality, continuity, and interpretability of the data presented in this bulletin.

Strengthening a Multi-Country Surveillance Platform

During Year 2, MenMap demonstrated increased stability as a coordinated multi-country surveillance platform operating across Jordan, Egypt, and Iraq. Building on the foundations established in the first project year, participating countries consistently applied standardized case definitions, laboratory protocols, and reporting tools, supporting continuity of data collection and comparability of surveillance findings across settings.

Sustained Laboratory Confirmation and Pathogen Detection Capacity

PCR-based laboratory confirmation remained a core component of MenMap surveillance throughout Year 2, enabling reliable identification of bacterial pathogens across participating countries. This capacity was supported by targeted PCR-related training and technical support provided to laboratory teams, helping to ensure consistent application of molecular testing protocols and maintain diagnostic quality over time.

Adaptive Surveillance in Response to Operational Challenges

Year 2 data highlighted the network's capacity to adapt to operational constraints while preserving overall surveillance integrity. A temporary suspension of surveillance activities in Iraq during part of the year led to reduced case reporting during that period, followed by a structured resumption of activities. This experience underscored the importance of flexibility, coordination, and clear communication mechanisms in sustaining surveillance across diverse operational contexts.

Strategic Optimization of Sentinel Surveillance Sites

Targeted refinements to sentinel site composition were implemented in Egypt during Year 2 to enhance surveillance efficiency and case capture. These adjustments were associated with an increased proportion of laboratory-confirmed cases and demonstrate the value of periodic review and optimization of sentinel surveillance configurations to improve data quality and system performance.

Advancing Regional Collaboration and Network Maturity

Through continued coordination, shared governance mechanisms, and regional engagement, MenMap further strengthened its role as a collaborative platform for invasive bacterial disease surveillance in the Middle East and North Africa. Year 2 marked an important step toward greater technical maturity and sustainability, reinforcing the network's ability to generate high-quality surveillance data to support evidence-informed meningitis prevention and control efforts.

Looking Ahead

As Year 2 concludes, MenMap's surveillance findings provide a consolidated evidence base on bacterial meningitis trends across participating countries. The data generated through this initiative offer insights that can inform future surveillance planning and meningitis prevention and control efforts in the EMR.

Field teams at sentinel sites in Egypt

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