

Epidemiological situation, weeks 1 - 53

In 2021, a total of 3,077 suspect cases were reported from MenAfriNet districts conducting case-based surveillance, with the largest number of cases reported from Burkina Faso. Specimens were collected from 90% of suspect cases, and 16% of suspect cases were confirmed (Table 1). Specimens referenced in this bulletin refer to CSF, but include 61 blood samples from Mali. Case-based meningitis surveillance data from 2021 was not submitted by Togo for inclusion in this annual bulletin. Data sources used in this bulletin include provisional, non-validated national case-based meningitis surveillance data.

Table 1. Epidemiological situation, weeks 1-53

	Burkina Faso	Mali	Niger	Chad	Togo	Total
Characteristics	N (%)					
Demographics						
Population under Surveillance	21,478,529	13,765,297	23,591,981	718,480	4,597,464	64,151,751
Districts submitting data†	56/70 (80)	15/33 (45)	21/72 (29)	4/4 (100)	NR	96/179 (54)
Aggregate suspected cases*	1641	529	1577	223	243	4213
MenAfriNet suspected cases	1829	167	993	88	NR	3077
Deaths [∞]	59	0	36	0	NR	95
Laboratory[§]						
Specimens collected	1674 (90)	164 (98)	850 (86)	88 (100)	NR	2776 (90)
Specimens received at NRL	1155 (63)	154 (92)	457 (46)	87 (99)	NR	1943 (63)
Specimens analyzed by PCR or culture [¥]	1085 (59)	156 (93)	457 (46)	73 (83)	NR	1771 (58)
Specimens analyzed with gram stain	1460 (80)	157 (94)	23 (2)	31 (35)	NR	1671 (54)
Probable bacterial meningitis**	144 (8)	0 (0)	0 (0)	0 (0)	NR	144 (5)
Confirmed bacterial meningitis	200 (11)	16 (10)	243 (24)	33 (38)	NR	492 (16)

Abbreviation: CSF, cerebrospinal fluid; NRL, National Reference Lab; PCR, Polymerase Chain Reaction (real-time), NR, not reported

† MenAfriNet districts submitting case-based data (denominator = Total number of MenAfriNet districts performing case-based surveillance)

* Data source: Weekly district-level aggregate reports of clinically defined meningitis cases and meningitis-related deaths

[∞] Deaths listed as outcome in case-based data

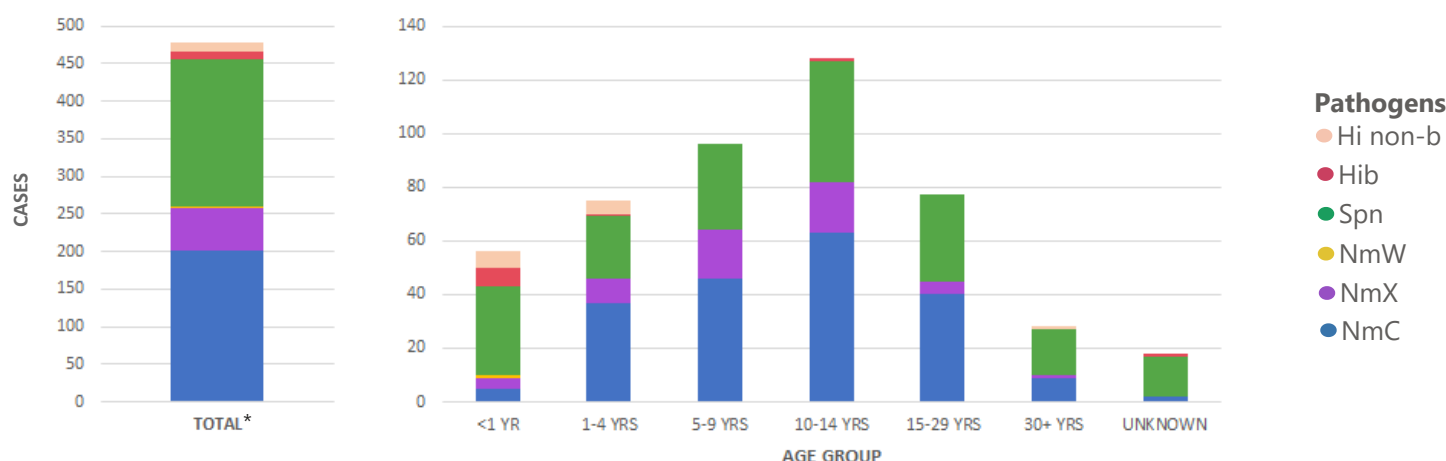
[§] Denominator for laboratory characteristics = number of MenAfriNet suspected cases

[¥] CSF analyzed by PCR or culture at any lab (district, region, or national levels)

** Tested negative for all pathogens and serogroups. Further details of probable meningitis cases can be found here (page 4): <https://apps.who.int/iris/bitstream/handle/10665/312141/9789290234241-eng.pdf>

Meningitis pathogens

The leading causes of confirmed bacterial meningitis cases were *Neisseria meningitidis* C and *Streptococcus pneumoniae*, together accounting for 81% of total confirmed cases. Both *Neisseria meningitidis* C and *Streptococcus pneumoniae* were most common in children between 10-14 years old (see Figure 1).

Figure 1. Age distribution of confirmed bacterial meningitis pathogens

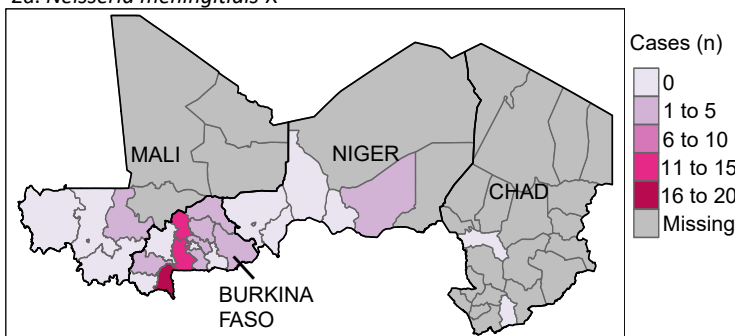
*This figure excludes 12 cases from Burkina Faso and 2 cases from Chad that were reported to be confirmed cases, but did not have the causative pathogen reported.

Spatial Distribution of Bacterial meningitis Pathogens

Neisseria meningitidis continues to be detected throughout MenAfriNet countries, with NmC and NmX as the dominant serogroups in 2021. In total, 202 confirmed cases were reported to be caused by NmC, 56 by NmX, and 1 by NmW. Zero *Neisseria meningitidis* A cases were reported. During epi week 10, the epidemic threshold (≥ 10 suspect cases per week/100,000 inhabitants) was crossed in the district of Say (Tillabéri region, Niger), where three NmC cases were reported. Additionally, the districts of Magaria and Mirriah (Zinder region, Niger) crossed the alert threshold (≥ 3 suspect cases per week/100,000 inhabitants) 12 and 3 times, respectively, during the 2021 epidemic season. This is associated with the dramatic rise of NmC incidence observed in 2021 compared to the previous year.

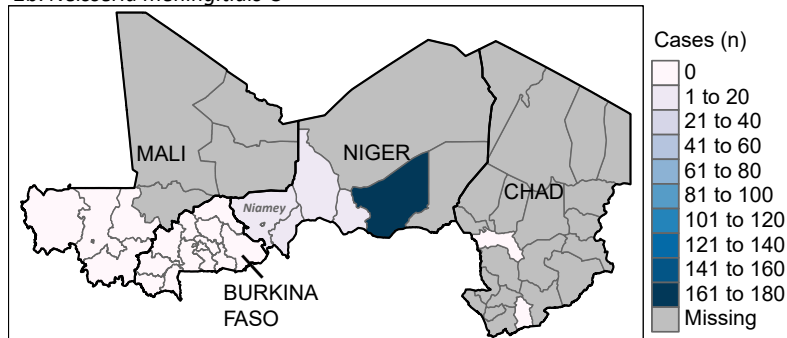
Figures 2a-2d. Regional Distribution of *Neisseria meningitidis* X, *Neisseria meningitidis* C, *Streptococcus pneumoniae*, and *Haemophilus influenzae* across Burkina Faso, Niger, Mali, and Chad

2a. *Neisseria meningitidis* X



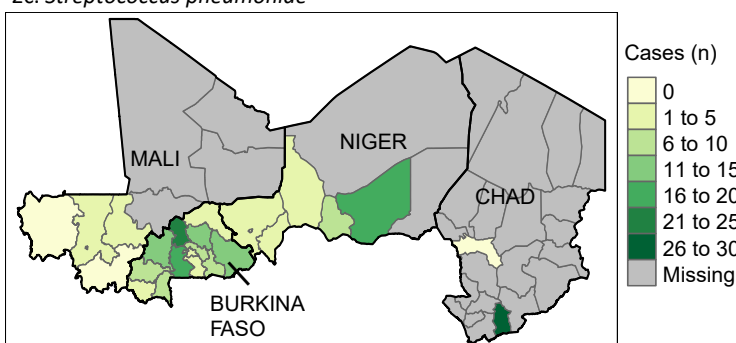
Sud-Ouest, Burkina Faso reported the highest number of confirmed cases due to NmX (n=19), followed by Nord, Burkina Faso (n=13).

2b. *Neisseria meningitidis* C



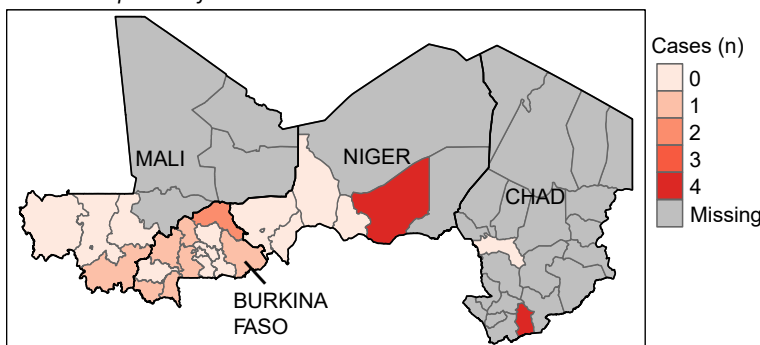
Zinder, Niger reported the highest number of confirmed cases due to NmC (n=177), followed by Niamey, Niger (n=8).

2c. *Streptococcus pneumoniae*



Mandoul, Chad (n=24) and Nord, Burkina Faso (n=24) reported the highest number of confirmed cases due to Hi.

2d. *Haemophilus influenzae*

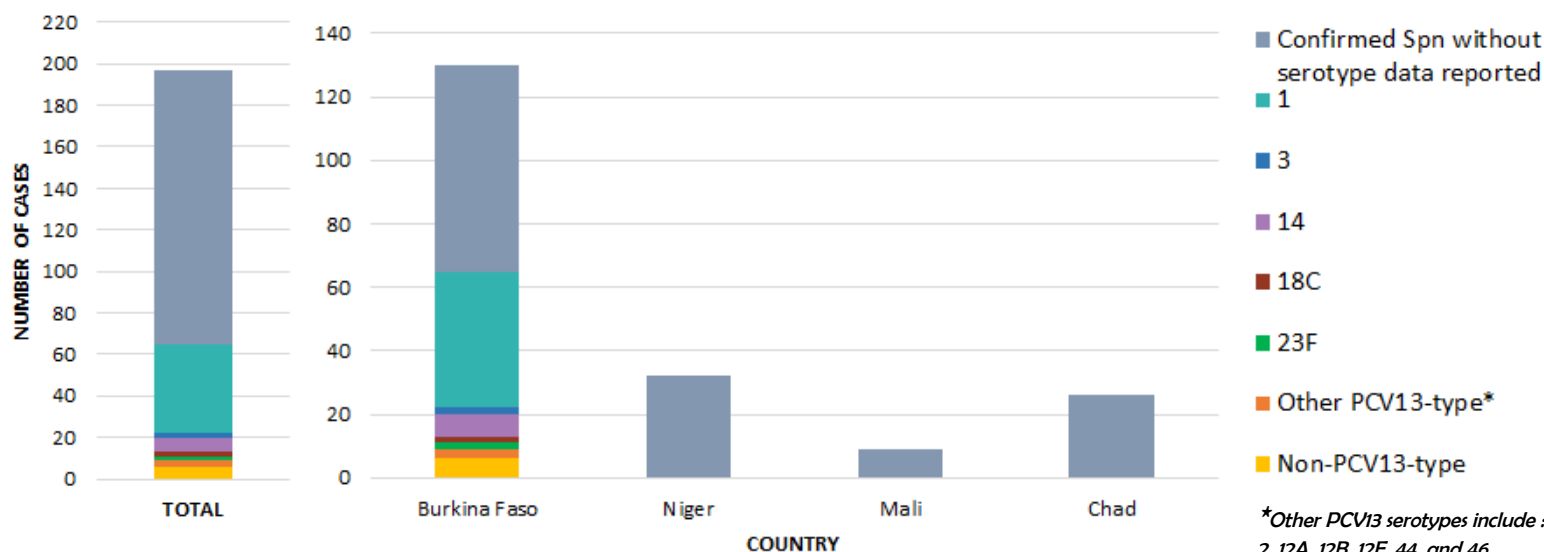


Zinder, Niger (n=4) and Mandoul, Chad (n=4) reported the highest number of confirmed cases due to Hi.

Streptococcus pneumoniae serotype distribution

Burkina Faso was the only country that reported *S. pneumoniae* serotype results in 2021 for inclusion in this bulletin. Among 130 total confirmed *S. pneumoniae* cases reported in Burkina Faso, 65 (50%) had serotype results reported. Of these, serotype 1 (n=43) was the most commonly detected (Figure 3).

Figure 3. *S. pneumoniae* serotypes reported by country

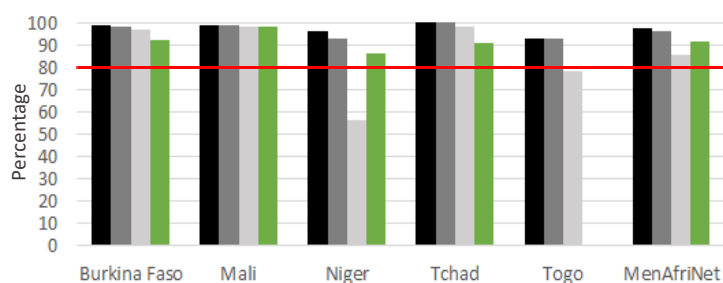


MenAfriNet case-based surveillance performance indicators

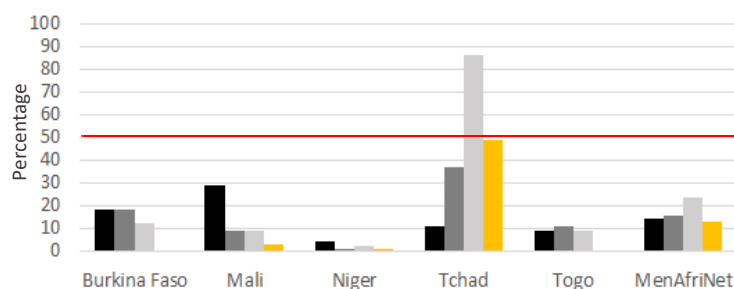
Burkina Faso, Mali, Niger, and Chad all achieved a high percentage of specimen collection rates and low percentage of contamination among samples received at the NRL for culture test (Figures 4a and 4h). Compared to 2020, an improvement is seen in the percent of specimens analyzed by PCR or culture upon arrival to a national reference laboratory (Figure 4d). While timely specimen transport to an NRL (within 7 days) continues to be a key challenge in many countries, Mali has consistently met this performance indicator throughout the last four years (Figure 4e). Please see appendix A for how indicators were calculated.

Figures 4a-4h. Annual Trends of Surveillance and Laboratory Performance Indicators

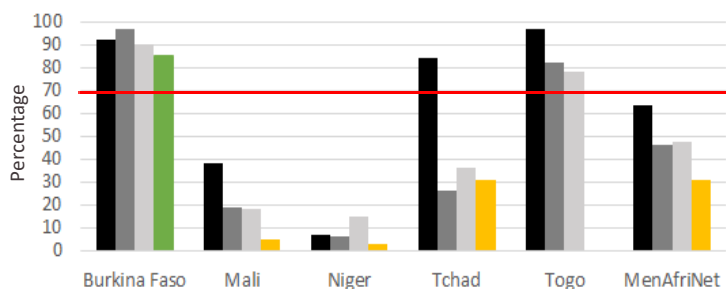
4a. Percent cases with specimen collected



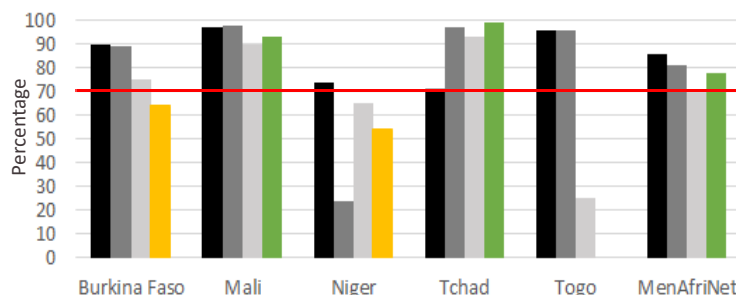
4b. Percent of specimens received at any lab in trans-isolate (T-I) media



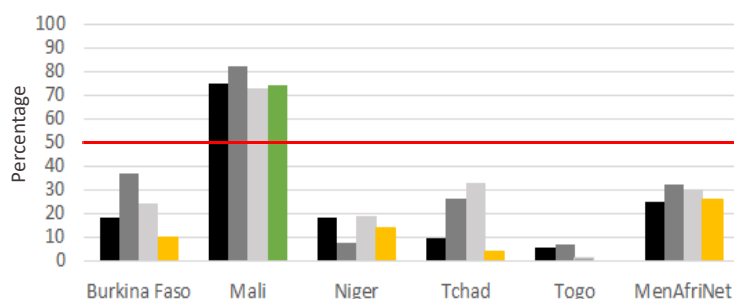
4c. Percent specimens tested by Gram stain at non-NRL lab



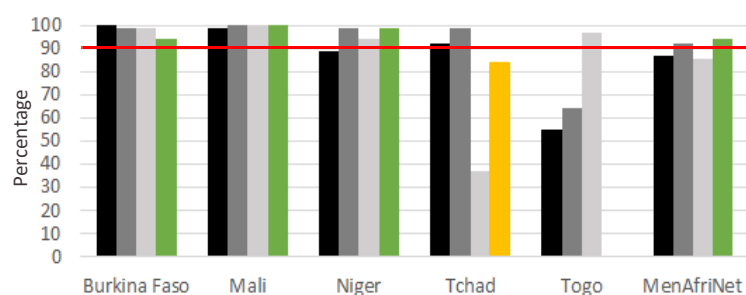
4d. Percent specimens received at NRL



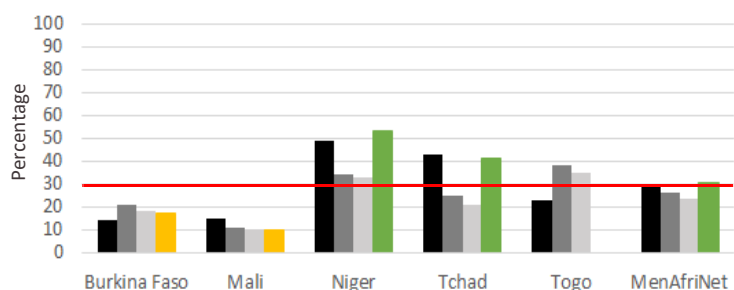
4e. Percent cases with <7 days delay between CSF collection and date of receipt at NRL



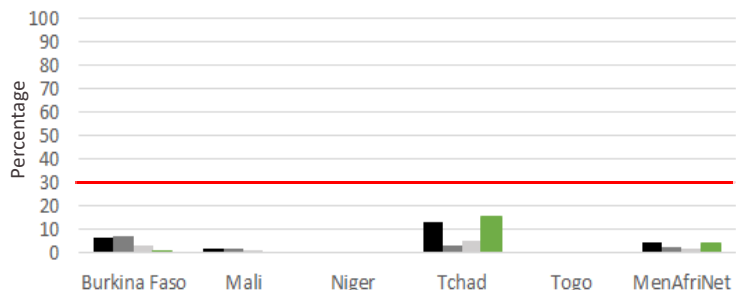
4f. Percent specimens analyzed by culture or PCR upon arrival at NRL



4g. Percent specimens confirmed at NRL for Hi, Spn, Nm, or other bacterial meningitis pathogen



4h. Percent contaminated among samples tested by culture at NRL

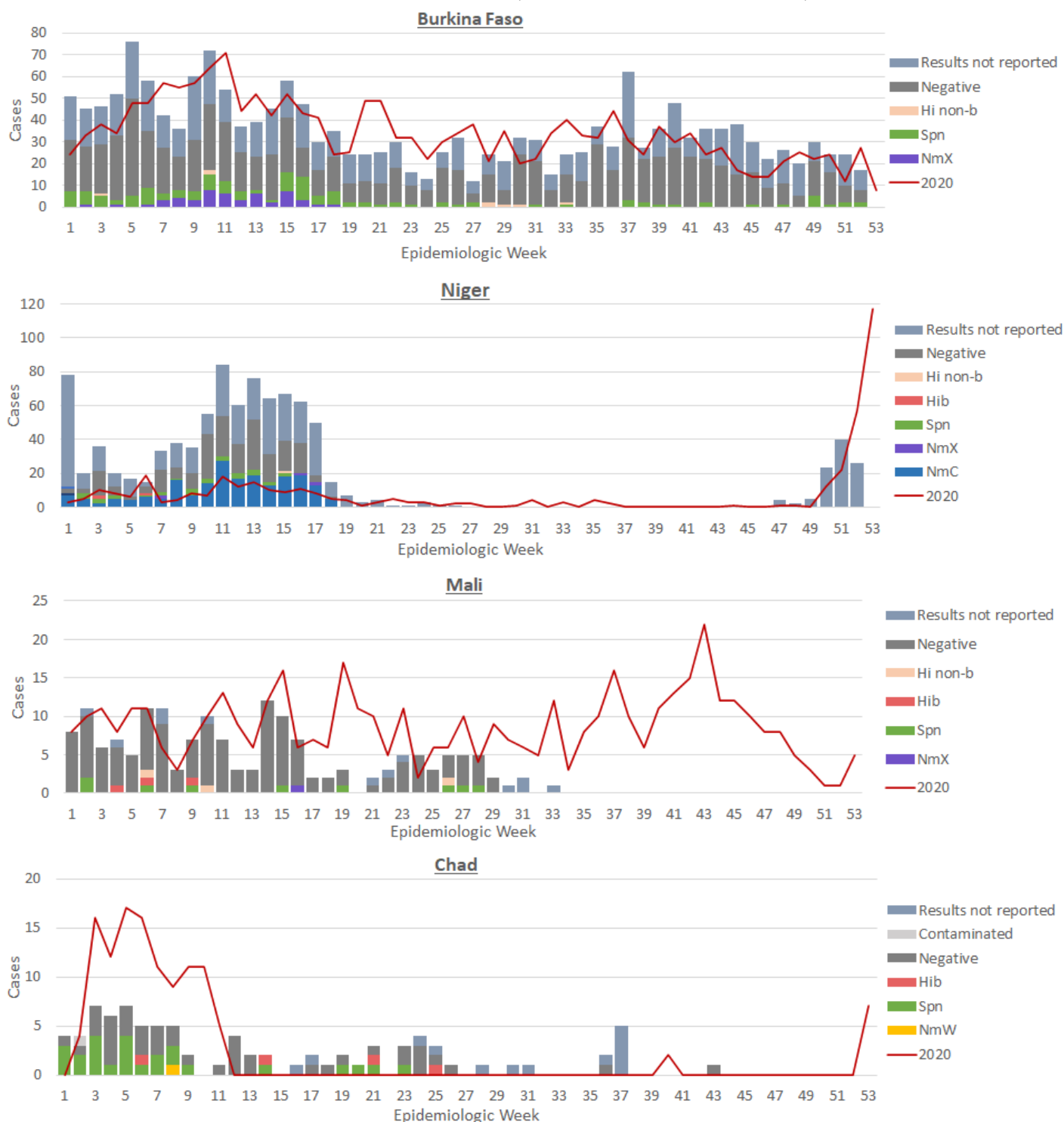


Key: 2018 2019 2020 2021 (meets target) 2021 (does not meet target) — Indicator target

Epidemiological trends over time

The overall number of suspected meningitis cases reported in 2021 remained low. However, compared to the previous year, a noticeable rise in the number cases reported from Niger during the epidemic season (epi weeks 1-26) was observed, with peak number of reported cases and NmC incidence occurring during epi week 11. The districts of Dungass and Magaria crossed the alert threshold during epi weeks 51 and 52.

Figure 5. Epidemic curves by country, weeks 1-53, 2021 (Note y-axes vary by country)



The COVID-19 pandemic negatively impacted bacterial meningitis surveillance, laboratory, and data management capacities throughout the meningitis belt. The urgent in-country demands and needs of the COVID-19 response resulted in reduced availability of health staff dedicated to meningitis surveillance, control, and outbreak response activities in countries within the MenAfriNet consortium. Due to delays of data validation exercises in Niger, Togo, Mali, and Chad, there may be incomplete transmission of case-based data. This is reflected in the epidemiologic and laboratory data published in this bulletin.

Appendix A: MenAfriNet Threshold Calculation

Indicator / Threshold	Numerator	Denominator
Percentage of cases with specimens collected Threshold: > 80%	Number of suspected cases with specimens collected	Number of suspected cases
Percentage of specimens specimen received at any lab in trans-isolate (T-I) Threshold: > 50%	Number of specimens received at any lab in trans-isolate (T-I) tube	Number of suspected cases with specimens collected
Percentage of specimens specimen tested at labs other than the NRL by a Gram stain test Threshold: > 70%	Number of specimens specimen tested at district or regional lab by a Gram stain test	Number of suspected cases with specimens collect
Percentage of specimens specimens received at the NRL Threshold: > 70%	Number of specimens received at NRL	Number of suspected cases with specimens collect
Percentage of cases with a delay of <7 days between specimen collection date and date specimens received at NRL Threshold: > 50%	Delay between specimen collection date and date specimens received at NRL is less than 7 days	Number of specimens received at NRL
Percentage of specimens specimen received at the NRL and analyzed by a confirmatory test (culture, PCR) Threshold: > 90%	Number of specimens analyzed by a confirmatory test at NRL level (culture, PCR)	Number of specimens received at the NRL
Percentage of specimens confirmed at the NRL for Hi, Sp and Nm, and other pathogens. Threshold: > 30 %	Number of specimens confirmed at the NRL for Hi, Spn and Nm and other pathogens	Number of specimens analyzed by a confirmatory test at NRL (culture, PCR)
Percentage of specimens contaminated for culture procedure at the NRL Threshold: < 10 %	Number specimens contaminated for culture procedure at the NRL	Number of specimens received at the NRL