Sequelae following an epidemic of meningococcal meningitis in Niger

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Conflict of Interest:
The author has declared no conflict of interest.

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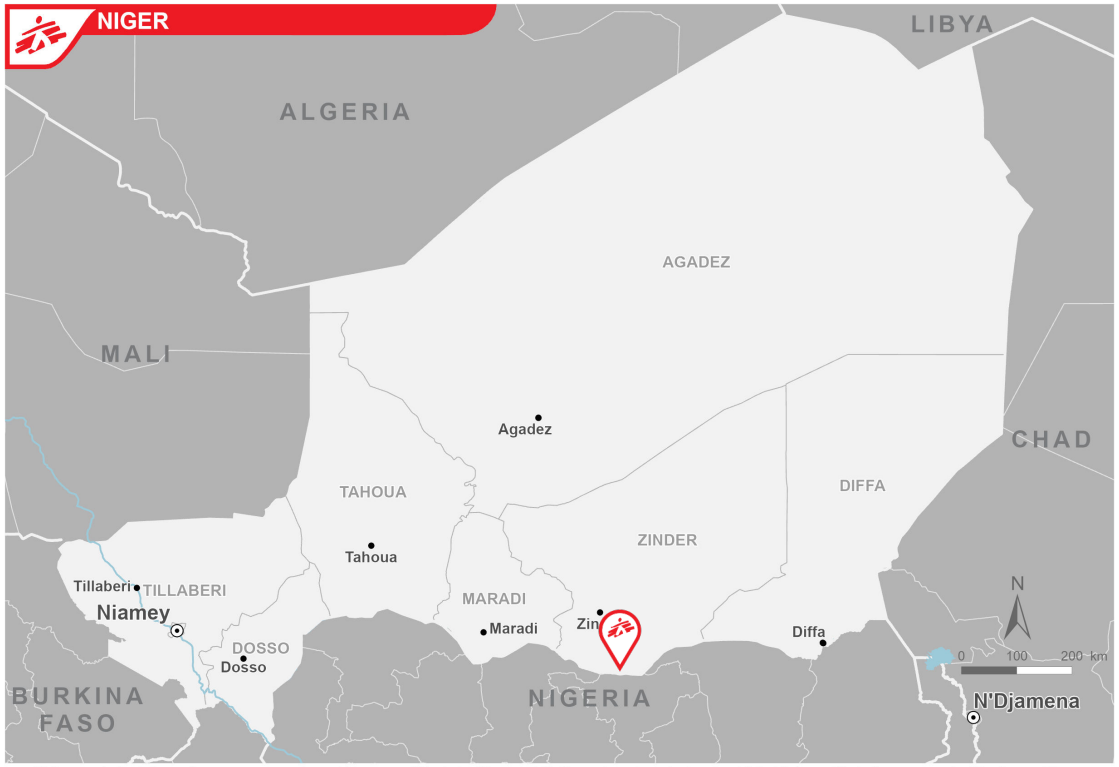
Introduction – 2022 meningitis epidemic in Magaria and Dungass

Epidemics of Serogroup C *Neisseria meningitidis* (NmC) in area in 2020 and 2021

2022 epidemic ran between November 2021 and April 2022

MSF supported Ministry of Public Health

- Case management
- Reactive vaccination campaign (March 2022)



Introduction – Burden of meningitis sequelae

1 in 5 bacterial meningitis survivors have enduring after-effects[1]

- Deafness, epilepsy, paralysis, cognitive impairment, limb amputation
- Pneumococcal and Hib meningitis > meningococcal meningitis

Costs to patients and their families

- Acute illness
- Long-term aftercare costs and opportunity costs related to caregiving[2]

Meningitis increases health disparities

- Poorest are most vulnerable to meningitis
- Women and girls disproportionally serve as caregivers

[1]Edmond K et al, Lancet Infect Dis 2010;10:317-28
[2]Edmond K et al, Pediatr Infect Dis J 2010;29:1023-29

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Introduction – Defeating Meningitis 2030 Roadmap

World Health Organization

DEFEATING MENINGITIS BY 2030
A GLOBAL ROAD MAP

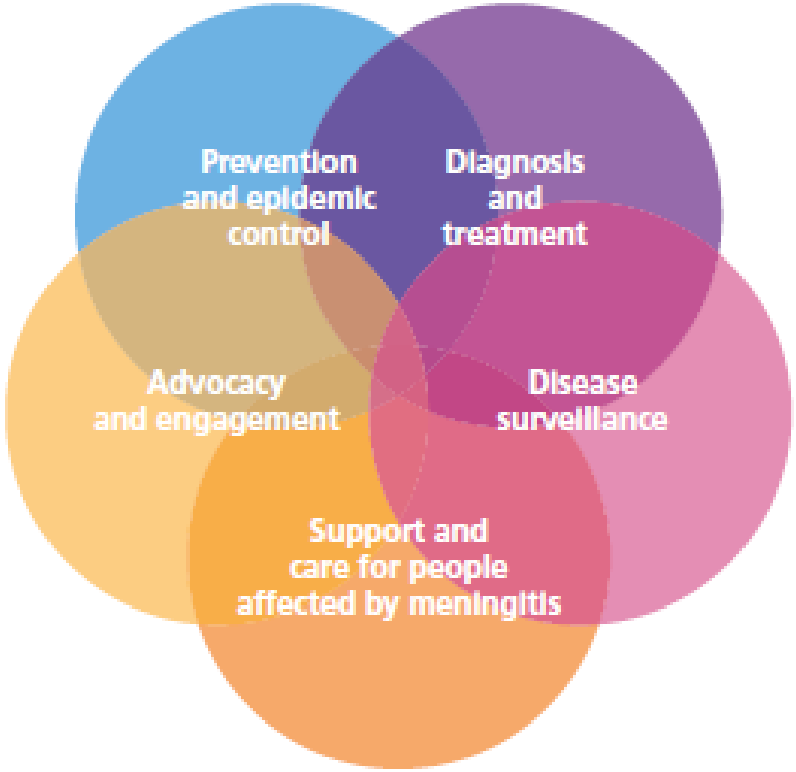
Strategic goals related to sequelae:

- "Strengthen early recognition and management of sequelae from meningitis in health care and community settings"
- "Increase the availability of and access to appropriate care and support for: (i) people affected by meningitis; (ii) their families and carers"

Today's reality:

- Evaluation of sequelae not a part of epidemic response
- Resources for aftercare are scarce and often not integrated into curative healthcare system
- Paucity of data from sub-Saharan Africa perpetuates the problem → MSF wants to contribute to change

5 overlapping pillars of the roadmap



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Survey methods

WHO case definitions used during epidemic

District Health authorities provided linelists

- PCR results from national reference lab
- Patients sorted by village of origin

Survey nurses attempted to locate patients using local guides in October 2022

- Patients (or surviving relatives) provided written consent

Ethics review by MSF-ERB and CNERS of Niger

Questionnaire topics

- Household composition
- Vaccination status / use of antibiotic prophylaxis in household
- Health seeking behavior
- Additional meningitis cases in household
- Vital status / timing of death
- Self-reported sequelae (hearing and vision loss, seizures, cognitive problems)
- Physical exam (anosmia, paralysis, weakness)

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Results – Epidemic description

Overall epidemic

1001 cases reported in 230 distinct villages

470 cerebrospinal fluid (CSF) samples received at national reference laboratory

220 (47%) positive for bacterial cause by PCR

- 192 NmC
- 22 *S. pneumoniae*
- 3 *H. influenzae* serotype b
- 3 NmX

50 deaths (CFR 5.0%)

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Surveyed patients

Attempted to locate 919 – excluded distant villages reporting only 1 case

570 cases found (62% of target), of whom 356 had had CSF samples sent to lab during epidemic

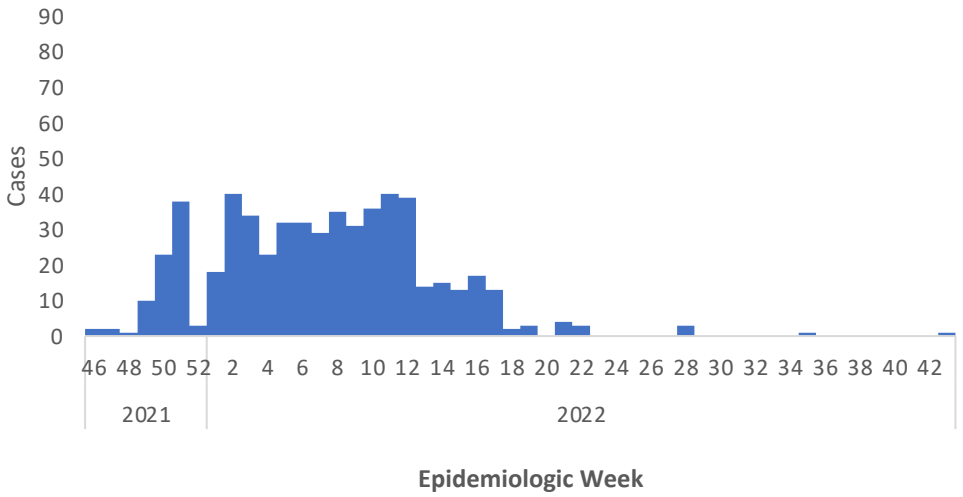
165 (45%) positive for bacterial cause

- 149 NmC
- 10 S. pneumoniae
- 3 H. influenzae serotype b
- 3 NmX

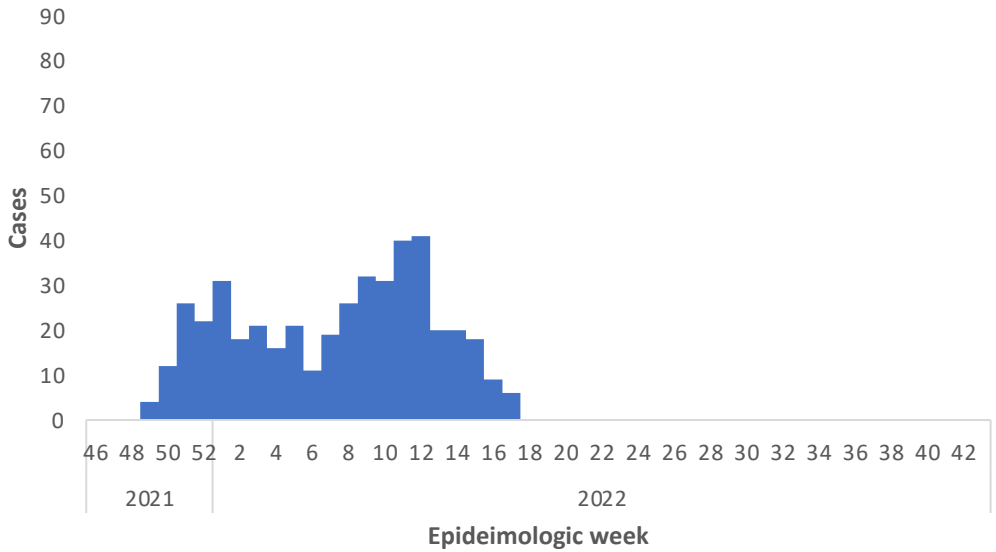
49 deaths (CFR 8.6%)

All notified cases during the epidemic

Magaria



Dungass



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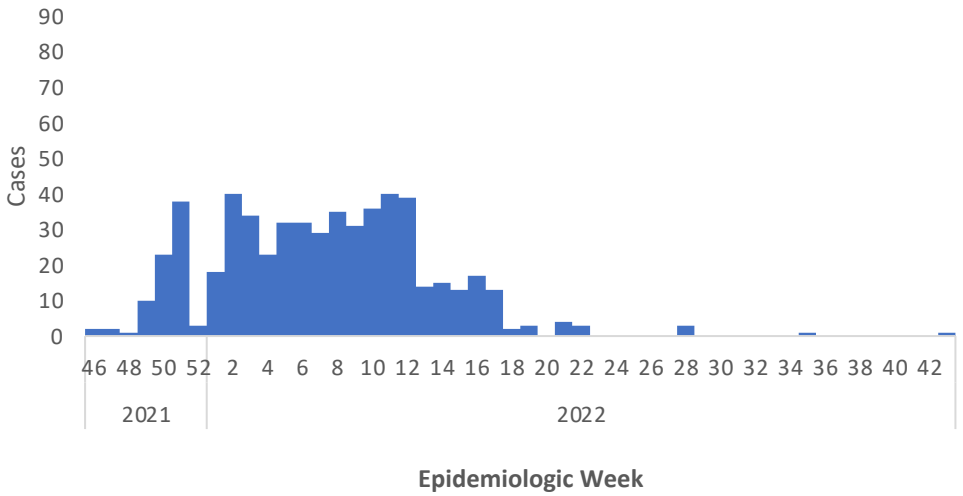

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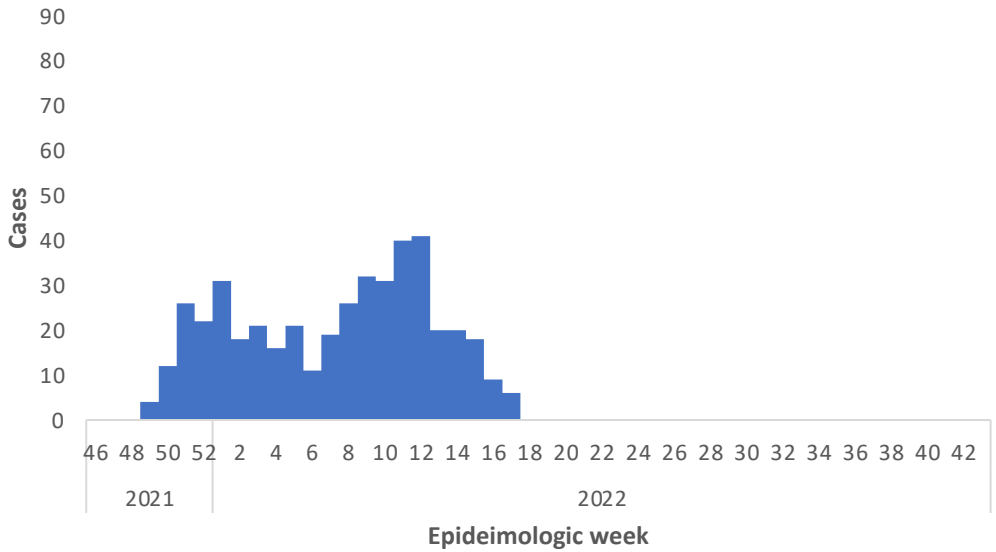
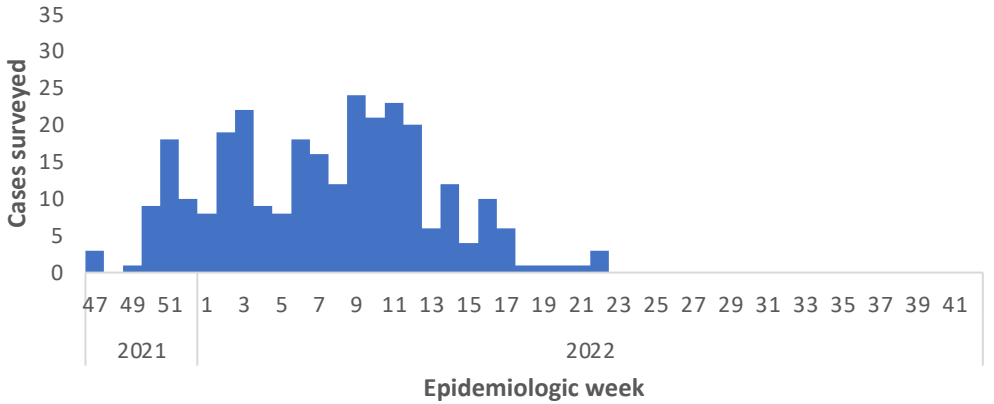


Cases enrolled in the survey

Magaria



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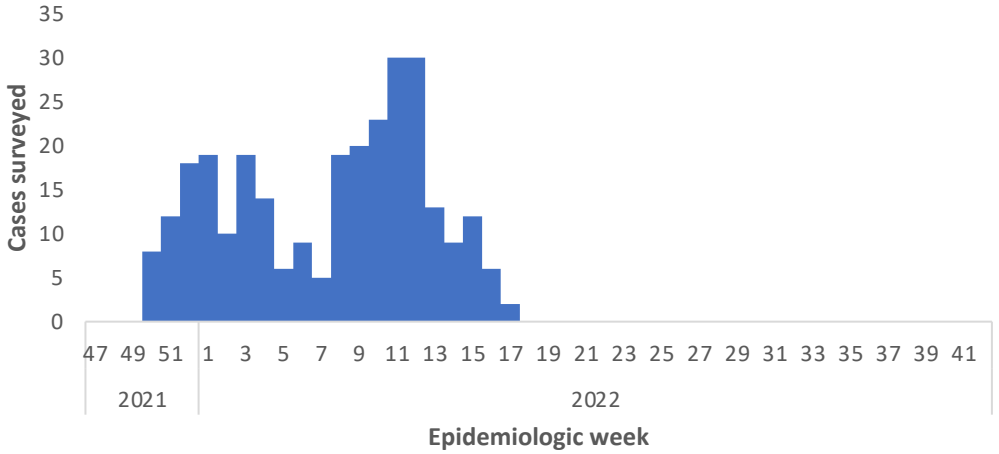

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Results – Prevalence of sequelae

61 of 521 (12%) surviving cases had ≥1 sequela

25 of 138 (18%) surviving confirmed cases of NmC had ≥1 sequela

Age in years	Number of cases surveyed	Number of cases (%) with sequelae
0-1	59	7 (12)
2-4	117	16 (14)
5-14	257	27 (11)
15-29	64	9 (14)
30-44	17	2 (12)
≥45	7	0

Results – Selected details about the sequelae

Sequela	Number of cases	Prevalence among survivors (%)
Hearing loss / deafness	29	5.6
Paralysis	15	2.9
Epilepsy	9	1.7
Cognitive troubles	6	1.2
Severe headache	4	0.8
Skin lesions	4	0.8

Hearing loss/deafness

- Median age 10 years old [IQR 4-15]

Paralysis

- Mix of paraplegia, hemiplegia and isolated limb paralysis

Epilepsy

- 7/9 cases were in children <10 years

Limitations

Not necessarily representative sample of all meningitis patients during epidemic

Predominantly meningococcal meninigitis epidemic – conclusions not necessarily the same for other meningitis pathogens, or for sporadic cases

No pre- and post- measurements of hearing loss or cognitive function

Self-reporting of hearing loss may have missed more subtle cases, particularly in younger children

Conclusions

Severe sequelae were common among meningitis survivors

- Results concordant with previous survey after an NmC epidemic in Niger in 2015[3]

No long-term care was offered to survivors with sequelae during/after this epidemic

- MSF now searching for disability care partners in Niger

Inclusion of aftercare for meningitis survivors requires re-thinking models of care

- Justice, equity, and patient-centeredness
- Solutions will not be easy – but we need to keep meningitis aftercare on agenda

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[3]Coldiron ME et al, Emerg Infect Dis 2016;22:1827-9

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Acknowledgements

Patients and their families

Village leaders and community health agents in the Magaria and Dungass Districts

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