



Meningitis outbreak forecasts over the African meningitis belt

Cheikh DIONE (ACMAD), Joshua TALIB (CEH), Elisabeth THOMPSON (NCAS), Ado M. BWAKA (WHO AFRO), André A. BITA FOU DA (WHO AFRO), WHO team ...*

Contact: Cheikh.dione@acmad.org

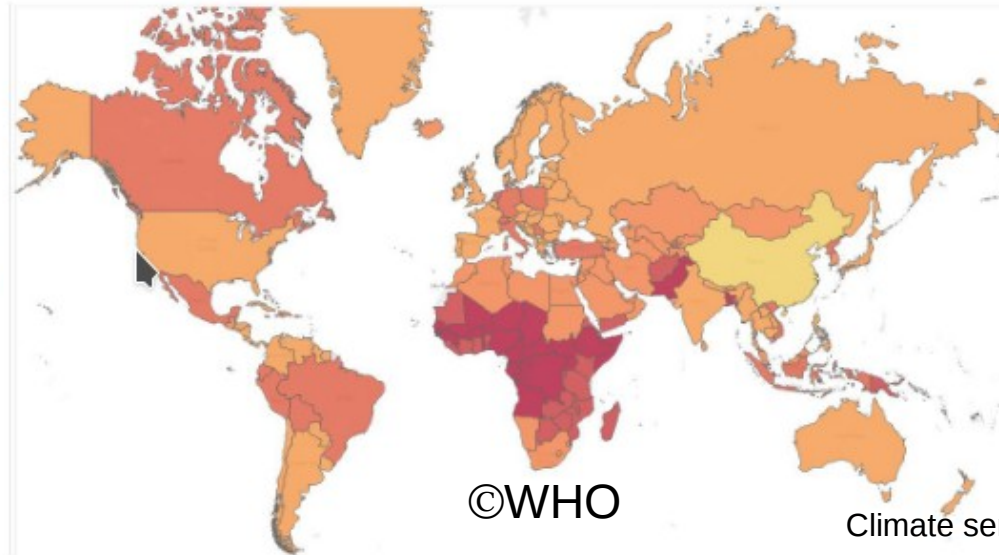
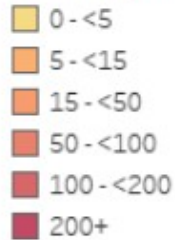




Why forecasting Meningitis outbreaks?

Meningitis incidence

Incidence (cases per 100,000)



Very large outbreaks in Africa

Meningitis epidemics develop during the dry season and end at the monsoon onset over West Africa (*Sultan et al., 2005, Yaka et al., 2008, and Martiny and Chiapello (2013)*)

Climate sensitive disease associate with several serogroups

MERIT project funded by WHO

Thompson et al., 2013

SWIFT sub-seasonal to seasonal Testbed to develop useful climate information services to support decision-making over Africa – meningitis eradication by 2030 project from WHO



Co-production approach

- **ACMAD**, Pan-African institution, **SWIFT partner**, producer supported by **NCAS and CEH in UK**
&
- **WHO AFRO**, user, coordinating meningitis actions over the African meningitis belt countries
 - S2S forecast data from ECMWF provided by SWIFT S2S testbed through WMO's Sub-seasonal to seasonal prediction project
 - Temperature, Relative Humidity, and latest available dust forecasts from ECMWF
 - Bias correction using the Hindcast and ERA5 data
 - Meningitis cases reported by WHO AFRO to evaluate forecasts



Co-developed solution

Vigilance levels

Red: very dry ($RH \leq 20$); warm and very dusty

Orange: $20 < RH \leq 40$; moderate dust and moderate to warm temperature

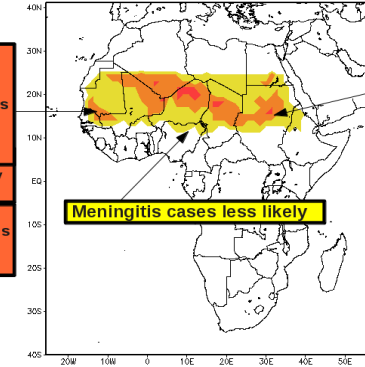
Yellow: $40 < RH \leq 60$ %, low dust and moderate to warm temperature

Week 1



VIGILANCE MAP FOR EMERGENCE OF MENINGITIS IN AFRICA
ISSUED ON MAY 24, 2021 for 24 – 30 MAY 2021

HAZARD
Dust, wind, relative humidity and temperature conditions are favorable for emergence of meningitis cases
Meningitis cases very likely
MEASURES
Activation of meningitis surveillance and systems



HAZARD
Dust, wind and relative humidity and temperature conditions are very much favorable for emergence of meningitis
POTENTIAL IMPACTS
Meningitis cases very likely and epidemics status possible
MEASURES
Strengthen meningitis surveillance and systems

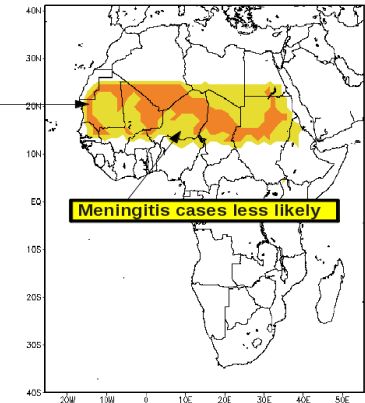


Week 2



VIGILANCE MAP FOR EMERGENCE OF MENINGITIS IN AFRICA
ISSUED ON MAY 24, 2021 for 31 MAY – 6 JUNE 2021

HAZARD
Dust, wind, relative humidity and temperature conditions are favorable for emergence of meningitis cases
Meningitis cases very likely
MEASURES
Activation of meningitis surveillance and systems



HAZARD
Dust, wind and relative humidity and temperature conditions are very much favorable for emergence of meningitis
POTENTIAL IMPACTS
Meningitis cases very likely and epidemics status possible
MEASURES
Strengthen meningitis surveillance and systems





Co-delivered solution

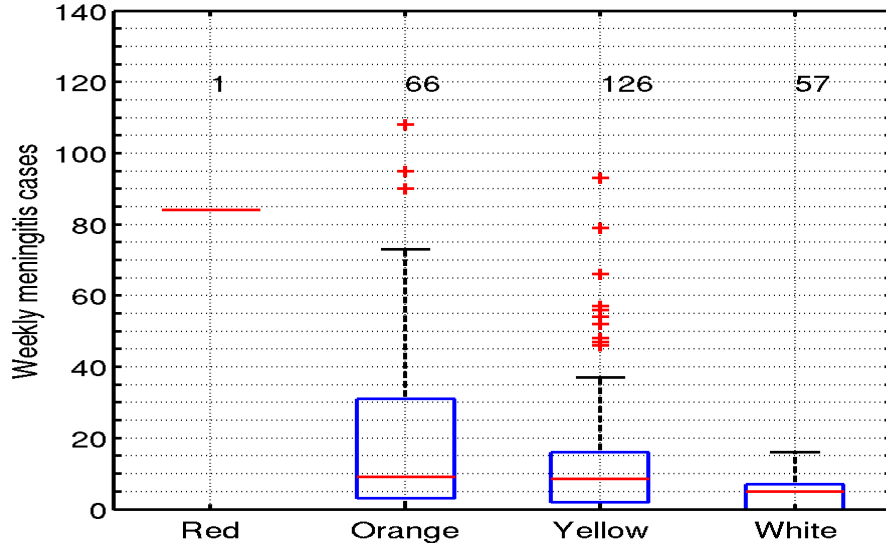
Weekly Meningitis Early Warning (MEW) issued on Monday (from week 1 to 26)

- MEW send by email to **WHO AFRO** which shares the bulletin to health services in each country and technical supports (**CDC, UNICEF, MSF etc.**)
- Alerting countries for preparedness and awareness for meningitis epidemics
- Fortnight meeting to discuss: epidemiological situation; meningitis early warning, control measures implemented; constraints and expectations
 - reinforcement of surveillance system for the 2 or 3 coming weeks
 - coordination of immunization – request for vaccine doses to ICG,
- WHO AFRO is giving quarterly feedback on MEW



Co-evaluating forecasts

Weekly Meningitis cases & vigilance levels
2021



Good performance of the forecasts

Vigilance levels captured the intensity of meningitis cases

Challenges

Red vigilance over uninhabited or inaccessible area in the meningitis belt

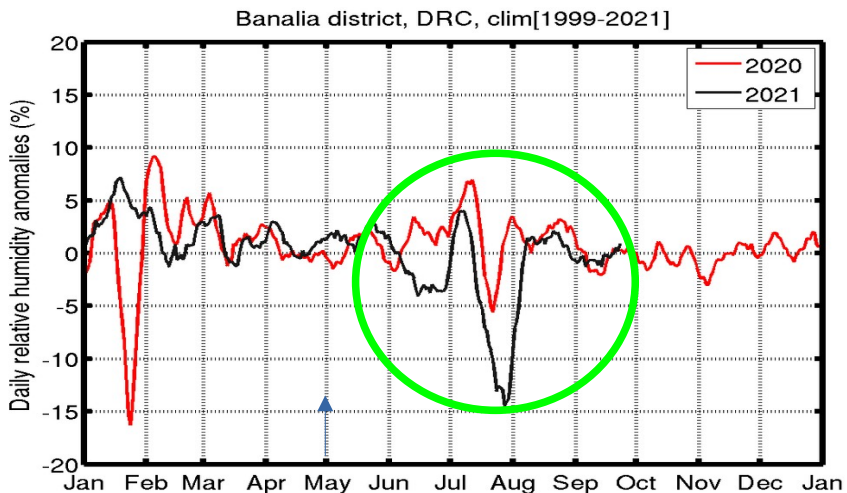
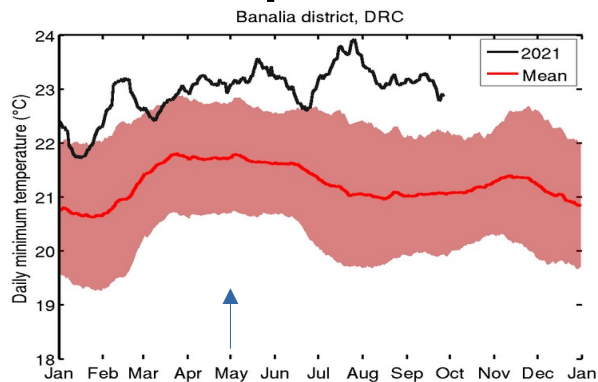
Meningitis cases are reported at country level with discontinuity

Specificity of meningitis transmission (close contact)

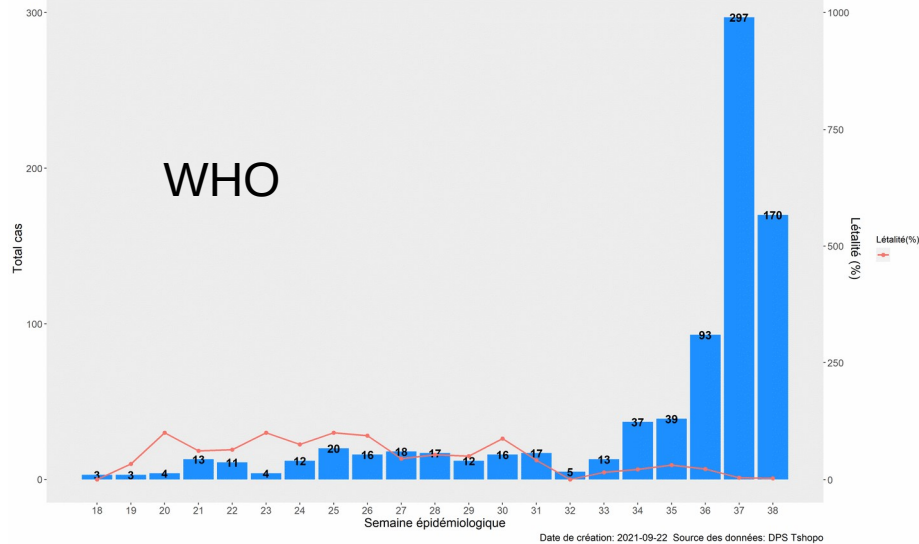


Co-developing research questions

Current meningitis epidemic in Banalia, DRC



Evolution des cas de meningite et létalité S18- S38 ZS Banalia



What are the climate metrics linked to meningitis outbreaks over Central Africa (wet area)?
What are the serogroups associated with epidemics?



Summary

- Built capacity for climate scientists on co-production and skills on generating useful climate information services.
- Health services free access to useful and accurate climate information services
- Good co-production to save lives and dommmages associated to meningitis disease
- Climate scientists to evaluate their forecasts and develop research questions (meningitis outbreaks over Central and East Africa)
- Ongoing work on road map of Country prioritization for implementation of the Regional Framework to Defeat Meningitis in Africa by 2030 – climate information



Thank you for your attention !

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