1. HIGHLIGHTS

- Since the last update of (1 March 2017), 73 new suspect meningitis cases including 13 deaths have been reported from Torit county. All the new cases are from Imurok payam, the most recent locus of transmission.
- Hence as of 5 March 2018, a total of 107 suspect meningitis cases including 28 deaths (26%) have been reported from Iyire and Imurok payams, Torit county.
- These findings are consistent with a suspect meningitis outbreak in Torit county.
- The suspect cases have been rising since week 6 and the alert threshold for suspect meningitis was surpassed in week 7.
- There was an exponential rise in cases in week 9, due to transmission in Imurok payam where the attack rate for week 9 was 51.4 cases per 100,000, thus surpassing the meningococcal meningitis outbreak threshold of 10 cases per 100,000.
- Most suspect cases have been reported in individuals aged 30 years who account for 56 (52%) of all suspect cases. and above and most deaths have been reported in cases aged 5-14 years and adults 30 years and above.
- Most deaths 12 (43%) of the deaths have been reported suspect cases aged 30 years and above but the case fatality rate (CFR) is highest 11/21 (52%) in the 5-14-year age group.
- With the epidemic threshold surpassed in week 9, the decision to vaccinate currently rests on the results from the laboratory testing that is currently underway.
- Rapid response teams and diagnostic and case management kits have been deployed to support ongoing investigation and response activities.
- Insecurity on the roads between Torit and Iyire Payam and malfunctionality of the health facilities have constrained access and slowed optimization of response activities.

2. BACKGROUND

- The County Health department (CHD) in Magwi was notified by community leaders of a cluster of deaths in Iyire Payam (Nyara East and West Villages) on 15th February 2018. Nyara is a village under Iyire payam, Torit county, former Eastern Equatoria, with estimated population of 2120 people.
- From 15th to 21st Feb 2018, at least three verification missions were undertaken by the county rapid response team with support from WHO and Magwi County Implementing partner (American Rescue Committee (ARC)). The team initially documented nine (9) community deaths (evidenced by fresh graves) after short illness manifesting with fever, headache neck pain/stiffness and general body weakness. The team also identified fifteen sick persons in the community, among whom one was severe and was referred to Obbo Primary Health care Unit.
Follow up mission by ARC/CHD team on 21st Feb 2018 treated six cases in Polotoka PHCC (with one of the cases being admitted). No samples were collected as the county team did not have a lumbar puncture kit and transport media.

- On the 24th Feb 2018, the state ministry of health in collaboration with WHO dispatched the State Surveillance Officer, the Vaccine Preventable Disease (VPD) surveillance officer and one other technical officer along with the required sample collection materials. On arriving in Iyire the team conducted review of facility records as well as active case search in the community. The team line listed 42 suspect meningitis cases including 9 deaths, and collected one sample from a suspect case.

- On 27th February reports of a second cluster of cases was reported from Imurok Payam, Torit county. The state team promptly investigated the cluster and by 1 March 2018, they had line listed 11 suspect cases (6 deaths).

- As of 5th Mar 2018, a total of 107 cases and 28 deaths (Iyire 23(9) and Imurok 84(19)) have been reported from these two locations. Eight cerebral spiral fluid (CSF) samples (one from Iyire and seven from Imurok) have been received at the National Public Health Laboratory and microbiological testing is already underway.

- Given the scale and evolving nature of the outbreak the National Rapid Response team comprising MOH and WHO was dispatched to Torit on the 1st of Mar 2018 to support the state strengthen coordination, Surveillance and Laboratory, Case management and Risk communication.

- The threat of meningitis outbreaks in South Sudan is premised on its location in the African Meningitis belt in addition to the historical, climatic, and the complex public health situation in the entire country. The dry spell in South Sudan lasts for 5-6 months (from September to March), with outside temperatures reaching as high as 40°C. To pre-empt the risk, a countrywide preventive MenAfrivac campaign was undertaken in April 2016 with Torit county registering sub-optimal administrative coverage of 83% in persons aged 1-29 years.

### 3. EPIDEMIOLOGY & SURVEILLANCE

*The suspect, probable and confirmed case definitions for meningitis are in Annex 1:*

**Descriptive Epidemiology.**

A total of 107 suspected meningitis cases have been listed in the two locations (Iyire and Imurok), with 28 deaths giving a case fatality rate of 26% (WHO standard for optimal control is CFR <10%). This is a very high case fatality rate, mostly driven by the fact that most of the cases did not visit health facilities either because of cultural beliefs or because the facilities were not functional.
Retrospective investigations reveal that in Iyire Payam the index case was in the third epidemiological, no cases were reported in week 4 and 5. From week 6 to 9, there was exponential increase in the number of case that is more accentuated in week 9 (Figure 1).

In Imurok Payam investigations revealed that the index case developed symptoms on the 25 Feb 2018. Other cases identified in the community were managed at the Kur Mosh PHCC. Most suspect cases in week 9 originated from Imurok payam (Figure 2).

The people affected in the two Payams are not leaving in any IDP camp or any congested facility such as prison or school. Majority of those affected so far, 84% report that they never received the
Meningococcal Conjugate A vaccine when during the campaign in 2015. It’s either because they were not in the targeted age group 1-30 years or they were missed during the exercise.

As seen from Figure 3, the proportion of suspect cases increases with age from 2.8% in children 1-4 years; 19.6% in children 5-14 years; 25.2% in persons 15-29 years; to 52.3% in persons aged 30 years and above. Individuals aged 30 years and above were not targeted during the MenAfriVac preventive campaigns of April 2016. Additionally, while most deaths 12 (43%) of the deaths have been reported suspect cases aged 30 years and above, the CFR is highest 11/21 (52%) in the 5-14-year age group (Figure 3).

Figure 4 shows the weekly attack rates (cases per 100,000) and CFR% for suspect meningitis cases in Torit county. Torit county had population of 161,584, projected from the 2008 census. Based on this population, Torit county surpassed the suspect meningitis alert threshold of 3 cases per 100,000 in week 7, when the attack rate for suspect meningitis was 6.2 cases per 100,000 (Figure 4).
In week 9, there was an exponential rise in cases in Torit county, due to transmission in Imurok payam. Consequently, the attack rate for Torit county in week 9 was 51.4 cases per 100,000, thus surpassing the meningococcal meningitis outbreak threshold of 10 cases per 100,000. This therefore calls for:

1. Laboratory confirmation of the outbreak to inform vaccination decisions.
2. Continued data collection and transmission analysis to inform response decisions.
3. Collect CSF from suspect cases to facilitate laboratory confirmation and monitor serogroups
4. Treat all new cases with appropriate antibiotics as recommended by the national protocols

All the rumours and alerts so far have been confined to the Torit County. Both Iyire and Imurok Payam are in Torit County and the communities in the two Payams are related and have the same language and cultural heritage. While Imurok is accessible direct from Torit Town, Iyire Payam is only accessible through Magwi which is the neighbouring county. The location of the two Payams is shown in the spot map.

5. LABORATORY INVESTIGATIONS
   - Thirteen samples have been collected from suspect cases registered as part of the current event and were tested at the National Public Health Laboratory in Juba.
• Rapid pastorex testing showed contamination with *Streptococcus agalactiae* in six of the samples while the rest were negative. Culture testing showed contamination in three of the samples while the rest showed on growth.

6. ENVIRONMENTAL ASSESSMENT

• Torit county is currently experiencing a dry and hot spell that is projected to go on for another 4-8 weeks. These conditions thus favour the transmission of epidemic meningitis especially in areas located in the African meningitis belt where Torit county lies. The former Eastern Equatoria state, where Torit county is located has experienced meningitis outbreaks before (confirmed outbreak in 2007 and suspected in 2016).

• A preventive MenAfriVac Conjugate A vaccine was conducted in Eastern Equatoria state in April 2016. Torit county scored a suboptimal administrative coverage of 83%, which was below the desired coverage of 95%. The other counties with low administrative coverage included Ikotos (55%), Kapoeta East (79%), Kapoeta North (77%) and Magwi (73%). The implication is that there is sufficient pool of susceptible individuals in Torit and neighbouring counties (especially Magwi and Ikotos) and this can lead to further transmission of the disease.

7. PUBLIC HEALTH ACTION / RESPONSE INTERVENTIONS

1. COORDINATION

• The state EPR committee has been activated and is meeting daily to coordinate investigation and response activities in Torit county with the most recent conducted on 6 March 2018. Corresponding meetings are ongoing at Juba level to ensure that the situation is reviewed regularly to ensure that the response is optimised.

• The meningitis response plan is being updated to guide investigation and response activities and to facilitate mobilisation of resources.

2. SURVEILLANCE

• The State Surveillance teams and the County RRT have been deployed to conduct active case search in the health facilities and affected communities.

• The surveillance teams have also conducted extensive review of medical records in Palatoka PHCU and Kur Mosh PHCU.

• The suspect meningitis case line list is being updated daily and shared with the state and national MOH to facilitate regular situation updates.

• Alerts being systemically logged and responded to by the State and County teams.

3. LABORATORY
• At least 13 CSF samples have been collected from Torit and submitted to the National Public Health Laboratory for testing.
• Trans-isolate media have been prepositioned in Magwi and Torit Town.
• Three samples have been collected and transported to the National Public Health Laboratory in Juba for testing.
• Pastorex test kits donated by MSF-CH have been prepositioned at the NPHL to facilitate sample testing

4. CASE MANAGEMENT

• WHO, ARC, Save the children and UNICEF are supporting clinical management of suspect meningitis cases.
• WHO supported deployment of 5-member case management team (one Doctor, one clinical officer, one nurse; and WASH expert) have been deployed by SCI to support patient care in Kormush PHCC. An additional three nurses have been hired to support patient care in Kormush PHCC.
• Save the children has hired four vehicles to support patient referral and other outbreak response activities including social mobilisation and surveillance.
• ARC deployed team to support case management in Iyire Payam and Polatoka PHCU. These health facilities are being reactivated and restocked with routine medicines to facilitate routine patient care and meningitis case detection and response.
• IOM AND UNICEF donated 5500 vials of Ceftriaxone that is currently being used to treat all newly identified suspect cases.
• Currently cases are admitted in Kormush PHCC.

5. RISK COMMUNICATION, COMMUNITY ENGAGEMENT & SOCIAL MOBILISATION

• SSRC has deployed a team of at least 33 volunteers in Imurok payam that are supporting with house-to-house sensitizations on meningitis case presentation, and early care seeking. The volunteers are also conducting active community case search and case referral to designated treatment centers.
• UNICEF and WHO are supporting the risk communication in the state
• UNICEF has provided prevention messages that are being disseminated on radio
• The state Minister of Health and the WHO state Coordinator held a radio talk show on meningitis transmission, signs and symptoms, prevent and control.
• TO strengthen the risk communication and social mobilization WHO supported the deployment of a Risk communication expert from the MOH

6. LOGISTICS

• WHO chartered a flight and delivered antibiotics, Investigation kits and other case management supplies to Torit.
• UNICEF donated 4 tents to be used for case management
• Save the children provided 4 cars, to support movement response teams between Magwi and Torit.

8. CHALLENGES/GAPS

• Rapid pastorex test kits and sero-grouping antisera are required to expedite suspect case testing at field and central levels respectively.
• There is need to engage communities to understand the determinants of the poor health seeking behaviour in affected communities so that these are addressed through messaging.
• Insecurity between Torit and Magwi, UN personnel are not cleared to use that road. High number of robberies in Greater eastern Equatoria is a big challenge.
• Health workers have not been paid salaries for months, health facilities are not always open and the moral to work is low.

9. RECOMMENDATIONS & PRIORITY FOLLOW UP ACTIONS

• COORDINATION AND LEADERSHIP
  a) Enhance the functionality of the state outbreak coordination committee to support all the three pillars of meningitis response
  b) Update the meningitis response plan to inform investigation and response activities as well as resource mobilisation.

• SURVEILLANCE
  c) Work with the SSRC volunteers and local leaders to strengthen community case surveillance including case detection, referral, investigation, and prompt initiation of treatment.
  d) Continued data collection and transmission analysis to inform response decisions.
  e) Strengthen state wide case based and laboratory backed surveillance for meningitis.
  f) Establish Active case search In Iyire and Imurok Payam.
  g) Orient Health workers on Meningitis case definition and reporting.
  h) Institute daily reporting of suspect cases including zero reporting from all the health facilities in Torit county.

• LABORATORY
  i) Laboratory confirmation of the outbreak to inform vaccination decisions.
  j) Collect CSF from suspect cases to facilitate laboratory confirmation and monitor sero-groups.
  k) Secure sero-grouping antisera and additional rapid pastorex kits to facilitate rapid sample testing at field and national levels respectively.
i) Strengthen sample management by enforcing adherence to SoPs for sample collection, processing, and transportation.

m) Review and strengthen diagnostic capacity at NPHL

**CASE MANAGEMENT**

n) Treat all new cases with appropriate antibiotics as recommended by the national protocols

o) Support facilities in the catchment area of the two Payams to manage cases.

p) Train Health care workers on case management as per the treatment protocol.

**RISK COMMUNICATION, COMMUNITY ENGAGEMENT & SOCIAL MOBILISATION**

q) Engage local leaders to ensure they support the implementation of meningitis prevention activities.

r) Engage communities to understand the determinants of the poor health seeking behaviour

s) Risk communication and community Engagement to address community perception and Health seeking behaviour

t) Secure additional megaphones from Unicef to support social mobilisation activities in affected and at-risk locations.

u) There is need for psychosocial support to affected and traumatised households that have lost their loved ones.

**LOGISTICS**

v) Negotiate humanitarian convoy between Torit and Magwi

w) Secure two additional cars for responding in the two payams

**10. CONCLUSIONS**

The current findings are consistent with a suspect meningitis outbreak in Torit county. The suspect cases have been rising since week 6 and the alert threshold for suspect meningitis was surpassed in week 7. The recent exponential rise in cases in Torit county resulted in a weekly attack rate that surpassed the meningitis epidemic threshold in week 9. Most cases (52%) and deaths (43%) have been reported in individuals aged 30 years and above. The CFR is highest (52%) in the 5-14-year age group.

South Sudan is at the tail end of the meningitis season and Torit as one of the high-risk states remains vulnerable to an outbreak. The temperature and environmental conditions remain favourable. In 2013 South Sudan had a meningitis outbreak in May in Malakal town. Thus, its critical
to ensure that the present suspect cases are investigated thoroughly, tested and control/risk mitigation measures instituted.
Annex 1: Case definition

**Suspected meningitis case:**
- Any person with sudden onset of fever (>38.5 °C rectal or 38.0 °C axillary) and neck stiffness or another meningeal sign including bulging fontanels in toddlers.

**Probable meningitis case:**
- Any suspected case with macroscopic aspect of CSF turbid, cloudy or purulent; or with a CSF leukocyte count >10 cells/mm³; or with bacteria identified by Gram stain in CSF.
- In infants: CSF leucocyte count >100 cells/mm³; or CSF leucocyte count 10–100 cells/mm³ AND either an elevated protein (>100 mg/dl) or decreased glucose (<40 mg/dl) level.

**Confirmed meningitis case:**
- Any suspected or probable case that is laboratory confirmed by culturing or identifying (i.e. by polymerase chain reaction, immunochromatographic dipstick or latex agglutination) of Neisseria meningitidis, Streptococcus pneumoniae or Haemophilus influenzae type b in the CSF or blood.