

# SEPTEMBER 2022 **CLIMATE AND HEALTH** BULLETIN



## MONTHLY DISEASE VIGILANCE FOR NIGERIA.

ISSUED: SEPTEMBER 1<sup>ST</sup>, 2022.

VALID UNTIL: SEPTEMBER 30<sup>TH</sup>, 2022.

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### CLIMATE OF SEPTEMBER

In September, most of the country will continue to experience the influx of moisture-laden southwesterly wind over most parts of the country. While the extreme northern fringes of the country will begin to experience cessation of rains, the southern parts will be witnessing their second peak of the rainy season which is usually characterized by increase in temperature and occurrence of thunderstorms.

**The highlights of the Bulletin for September 2022 are as follows:**

- The cumulative rainfall amounts anticipated over the northern parts of the country will likely be above normal. In the Southwestern states, the cumulative rainfall is predicted to be near-normal, while normal-to-below normal cumulative rainfall amounts are expected over the South- south and Southeast states.
- The predicted Maximum (day-time) and Minimum (night-time) temperature values over the country are to be within the range of 26.3°C-34.8°C and 16.8°C-24.0°C, respectively.
- The anticipated weather conditions favour *high vigilance* for malaria over most parts of the country and *moderate vigilance* for parts of Oyo, Plateau, Bauchi, Kaduna, Gombe, Adamawa, Kano, Niger, Kebbi and the remaining northern states.
- *High vigilance* for medicine instability would be required over most northern states and some states in the north east like Adamawa, Taraba, Gombe and parts of Yobe state as well as the central and southern parts of the country. While moderate vigilance is expected over most part of the southern states, places such as Port Harcourt, Imo, Enugu, Bayelsa, Lagos, Ogun, Osun and Ekiti state among others.
- The predicted rainfall for September favours moderate to high watch for cholera in most parts of the country.
- *High caution* is predicted for Heat Index over the extreme northern parts of Borno and Yobe states and *caution* is predicted over most parts of the country. However, *no caution* is predicted for small portions of some north-central and north-western states, as well as south-western states.

- The increased humidity expected in August will likely promote the growth of fungus in damp and poorly ventilated buildings and surroundings. This could trigger respiratory tract infections and illnesses.
- In areas where above-normal rainfall is predicted, incidents of flooding are likely. Flash floods can also occur in the areas where normal or below-normal rainfall are envisaged. This could, in turn, increase the risks of outbreaks of cholera and other water-borne diseases. Cholera is fatal with severe watery diarrhea, vomiting, and even leg cramps in some people, and could lead to rapid loss of body fluids and by implication dehydration, shock, or even death.
- Flooding could also cause water contamination in communities with poor sanitation. An increase in cases of gastroenteritis in such communities is probable.
- It is expedient to note that during extreme weather events in September, vulnerable segments of populations like women, children, and the elderly may likely have an increased need for medical attention as they face a greater risk of poor health and even death. The development of tailored approaches for supporting this at-risk population during extreme weather events is therefore recommended.

## **1.0 GENERAL OUTLOOK FOR 1<sup>ST</sup>-30<sup>TH</sup> SEPTEMBER 2022.**

In September 2022, the Inter-Tropical Discontinuity (ITD) is expected to remain above the country and fluctuate around latitude 18.5°N (Figure 1). This implies that moisture-laden south-westerly winds will penetrate deeply inland, transporting moisture over the entire country. This feature will enhance rainfall activities over the south, central and northern cities. The predicted rainfall amounts across Nigeria for September 2022 show the prospect of above-normal rainfall over the north and some central states, with a 45% probability. Normal to above normal rainfall is expected over the southwestern states with a 45% probability. There is a 45% chance of the occurrence of normal to below normal rainfall over parts of the south and the eastern parts of the north central region. There is a 50% likelihood of normal rainfall amount over the central part of the country (Figure 2). The Probabilistic Multi-Model (PMM) Ensemble forecast from the World Meteorological Organization (WMO) lead centers align with the prediction for most parts of the country particularly for rainfall as depicted in Figure 3.

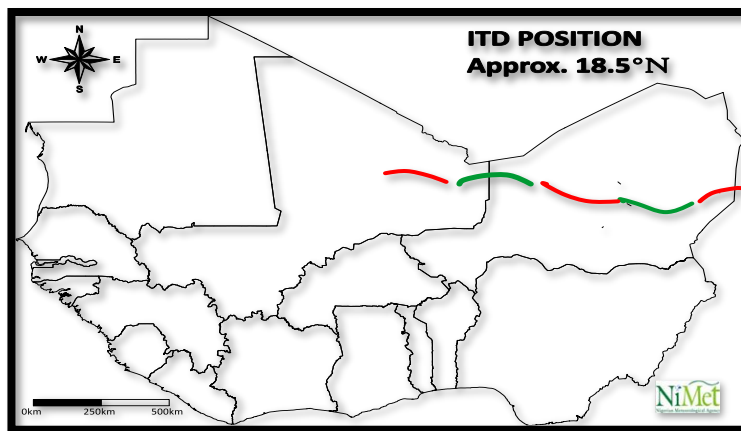


Figure1: Projected ITD position for September 2022

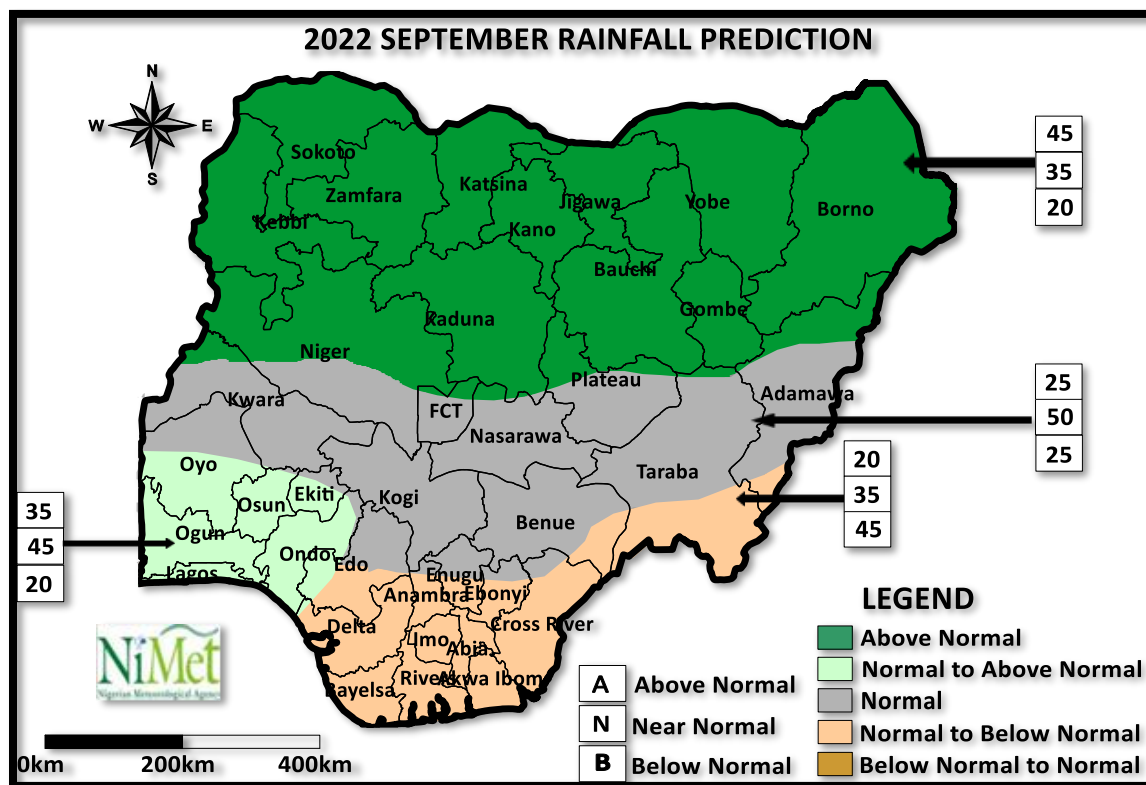


Figure 2: NiMet rainfall forecast for September 2022

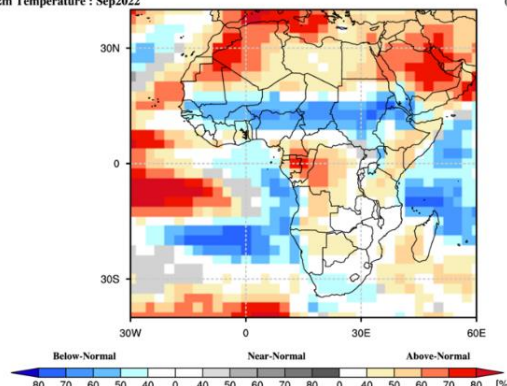


Figure 3: September Temperature Ensemble Forecast  
Source: WMO Lead Centres

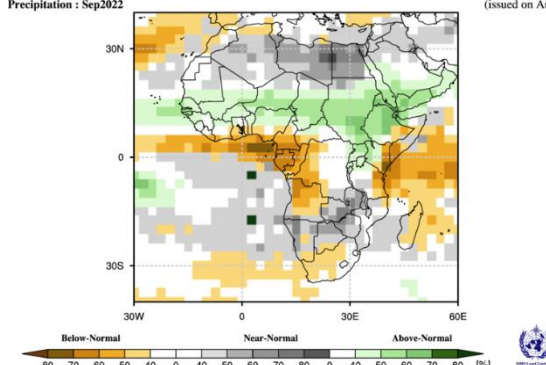


Figure 4: September Rainfall Ensemble Forecast  
Source: WMO Lead Centres

## 2.0 FORECAST OF ATMOSPHERIC CONDITIONS FOR SEPTEMBER 2022

**2.1 Rainfall:** The cumulative rainfall amounts for September 2022 is predicted to vary across Nigeria from 80.0mm to 450.9mm. Rainfall amounts greater than 400mm are expected around some coastal states such as Cross River and Delta. Rainfall amounts between 240mm and 400mm are expected over parts of the inland, central, and northern states, like Ekiti, Abuja, Edo, Enugu, Kwara, Kaduna, Niger, Ondo, Imo, Rivers, and Abia. No part of the country is expected to record a cumulative rainfall amount of less than 80mm in September. (See Figure 5)

**2.2 Relative Humidity (RH):** The relative humidity across the country in September 2022 is expected to be between 71 % and 92%. RH of over 90% is expected in some of the coastal cities of the country (See Figure 6).

**2.3 Mean Temperature:** The distribution of mean temperature across Nigeria for September 2022 is shown in Figure 7. The greater portion of the country is predicted to record mean temperatures between 21.6°C and 29.2°C, while the lowest value of 21.6°C is expected over Plateau.

**2.4 Maximum Temperature:** As shown in Figure 8, the anticipated maximum temperatures across the country for September 2022 vary from 26°C to 34°C. Least temperatures are anticipated over Jos in Plateau state and the highest in Nguru in Yobe state.

**2.5 Minimum Temperature:** The predicted minimum (nighttime) temperature over Nigeria, for September 2022 is shown in Figure 9 and is expected to range from 16°C to 24.0°C with the lowest value of about 16.0°C anticipated over Plateau state.

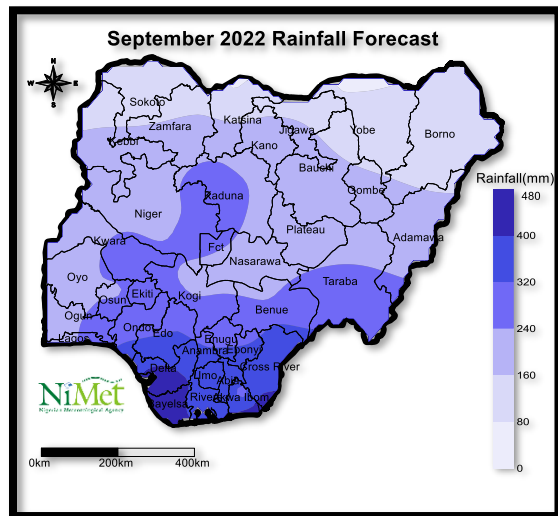


Figure 5: September rainfall amount forecast

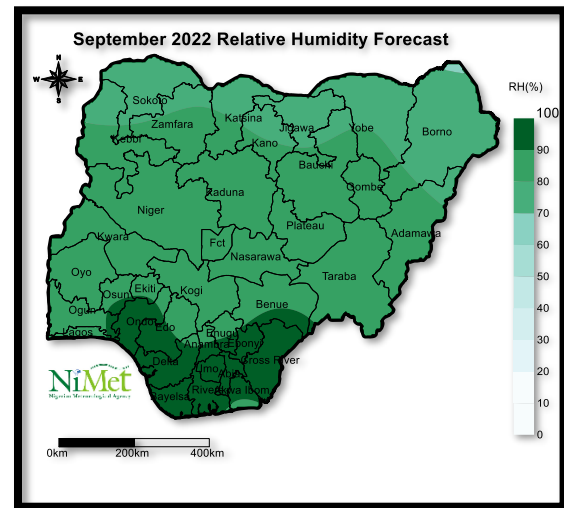


Figure 6: September relative humidity forecast

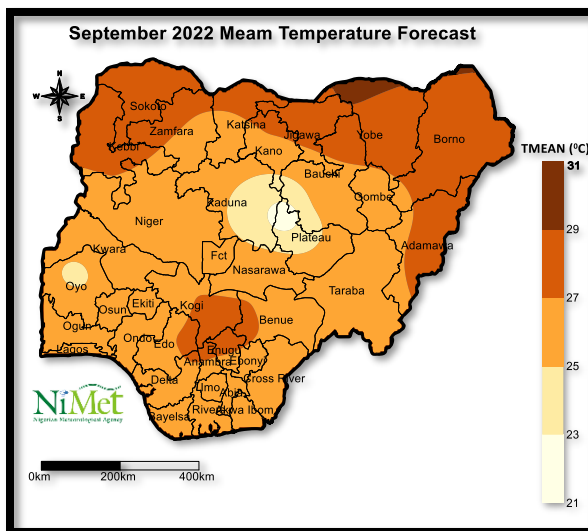


Figure 7: September mean temperature forecast

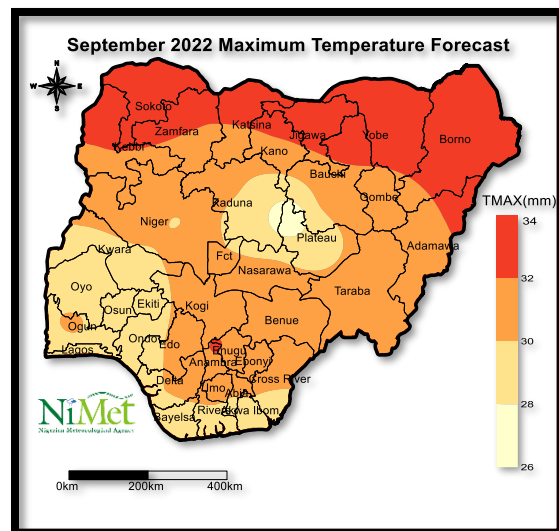


Figure 8: September maximum temperature forecast

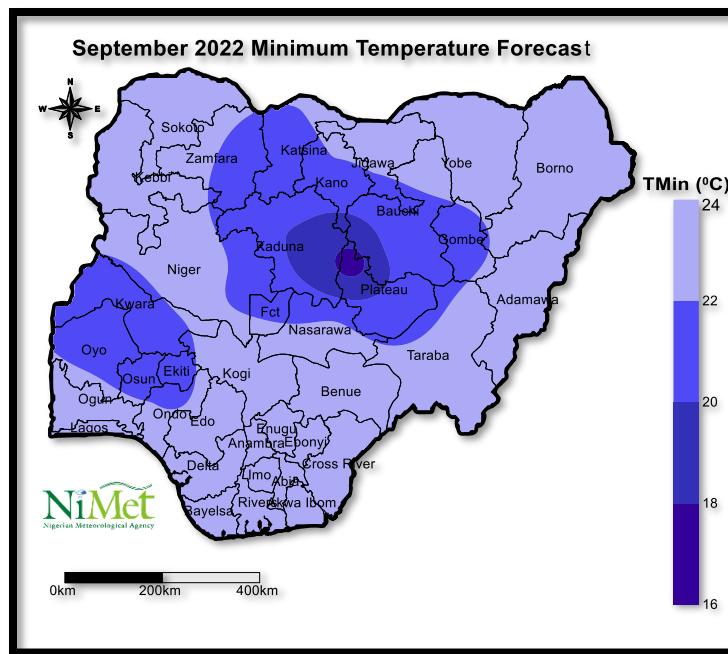


Figure 9: September minimum temperature forecast

### 3.0 CRITERIA FOR DETERMINING THE DEGREE OF VIGILANCE OF DISEASES AND OTHER WEATHER-RELATED PHENOMENA

According to the International Research Institute for Climate and Society, (IRI), *Seasonal Climatic Suitability* for malaria transmission is defined as the chance of precipitation accumulation greater than 80 mm, average temperature between 18°C and 32°C, and relative humidity greater than 60%. The combined value of these climate variables at a given location or region is an indication of the lower limit for potential malaria transmission in the area. This implies that once these conditions are met, malaria cases are probable.

**3.1 Malaria:** The predicted conditions of rainfall, temperature, and relative humidity are used in determining the degree of vigilance for malaria. When rainfall is above 80 mm, the temperature is between 25°C and 32°C, and relative humidity is greater than 80%, the region is at high risk for malaria and is placed under *high vigilance*. When the temperature is between 20°C and 25°C, relative humidity is between 70% and 80%, and rainfall is above 80 mm, then *moderate vigilance* is advised. *Low vigilance* for malaria is issued when the temperature is in the range of 18°C-20°C, relative humidity is between 60% and 70%, and

rainfall is above 80 mm. *No vigilance* is required when the temperature is less than 18°C or higher than 32°C, relative humidity is less than 60%, and rainfall amount below 80 mm.

**3.2 Cholera:** In Nigeria, the outbreak and spread of cholera are usually more rampant during the rainy season. This could be attributed to the strong correlation between increased rainfall and flooding. High-intensity or long-duration of rains often result in flooding; especially in flood-prone areas or areas with poor drainages. In those parts of the country for which normal to above-normal rainfall has been predicted, there is a higher probability of flooding and consequently a greater risk of the cholera outbreak. This is because the bacteria that cause cholera are mostly found in the faeces of infected persons. Consequently, in places where open defecation is practiced, the faeces are easily transported by flowing water and deposited into water bodies that are used by people in the community for cooking and drinking. Even where latrines are available, increased rainfall may result in a surge in groundwater level, sewer swell, and these produce polluted runoff that easily contaminates water basins.

**3.3 Medication Stability:** Medication or drug stability is defined as the ability of pharmaceutical dosage form to maintain the physical, chemical, therapeutic, and microbial properties during the time of storage and usage by the patient.<sup>1</sup> The composition of medicines is affected by weather conditions such as air temperature and relative humidity. When maximum temperature is above 30°C and relative humidity exceeds 75%, the conditions are considered unsafe and unfavorable for the storage of medicines.

**3.4 Heat Index (HI)** is a measure of how hot the weather feels to the human body when relative humidity is factored with the actual air temperature. HI is calculated using Air temperature and Relative Humidity. The levels of caution for heat index are classified as follows:

- (i) ***No Caution*** when the HI is  $\leq 26^{\circ}\text{C}$
- (ii) ***Caution*** HI is ( $27^{\circ}\text{C}$  to  $32^{\circ}\text{C}$ )
- (iii) ***High Caution*** HI is ( $33^{\circ}\text{C}$  to  $39^{\circ}\text{C}$ )
- (iv) ***Danger*** HI is ( $40^{\circ}\text{C}$  -  $51^{\circ}\text{C}$ ) and
- (v) ***Extreme Danger*** HI is ( $\geq 52^{\circ}\text{C}$ )

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<sup>1</sup> Afifi N.A. (2016). Drug stability. Faculty of Vet. Med. Cairo University

Heat Index (HI) is also known as felt air temperature and its unit is degree Celsius (°C) or degrees Fahrenheit (°F). When Heat Index is high, humans and animals strive to lose excess body heat through perspiration. The situation is exacerbated if humidity is high or there is no breeze (i.e., the air is still). This could lead to heat stress. Revealing signs of heat stress include panting, increased respiration rate, persistent thirst, loss of appetite, and fatigue.

## **4.0 DISEASE VIGILANCE**

### **4.1 Malaria**

Based on the predicted values of climatic indices (rainfall, temperature, and relative humidity), malaria parasites are expected to persist across the country (but in varying intensities) in September 2022.

#### **4.1.1 Effects of Malaria**

Malaria is a leading cause of illness and death, particularly in areas with high transmission rates. It has both economic and social implications and can strain the economy. Malaria is particularly detrimental to the health of pregnant women because their unborn babies could also be affected. The effects include maternal anemia which is a condition in which one lacks enough healthy red blood cells to carry adequate oxygen to all parts of the body. In Nigeria, the overall malaria prevalence stood at 79.5%. Some southern states like Lagos and Enugu, malaria prevalence during pregnancy was reported to be 52 and 99 percent respectively, and has devastating effects on pregnant women, the fetus, and the newborn<sup>2</sup>.

#### **4.1.2 Malaria vigilance**

- High vigilance for malaria is expected over the entire southeast and most parts of western and central states, stretching to some parts of northern states like Kebbi, Kaduna, Kano, Bauchi, Gombe, and Adamawa states as shown in Figure 10.
- Moderate vigilance is expected over most parts of the northern region and some states like Plateau, Bauchi, Kaduna, and Oyo states.

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<sup>2</sup> Omang, J., Ndep A.O., Offiong, D., Out, F., Onyejose, K. (2020) Malaria in Pregnancy in Nigeria: A literature review. *Int Health Res J*; 3(11):346-348. Retrieved July 18, 2022, from <https://doi.org/10.26440/IHRJ/0311.02315>

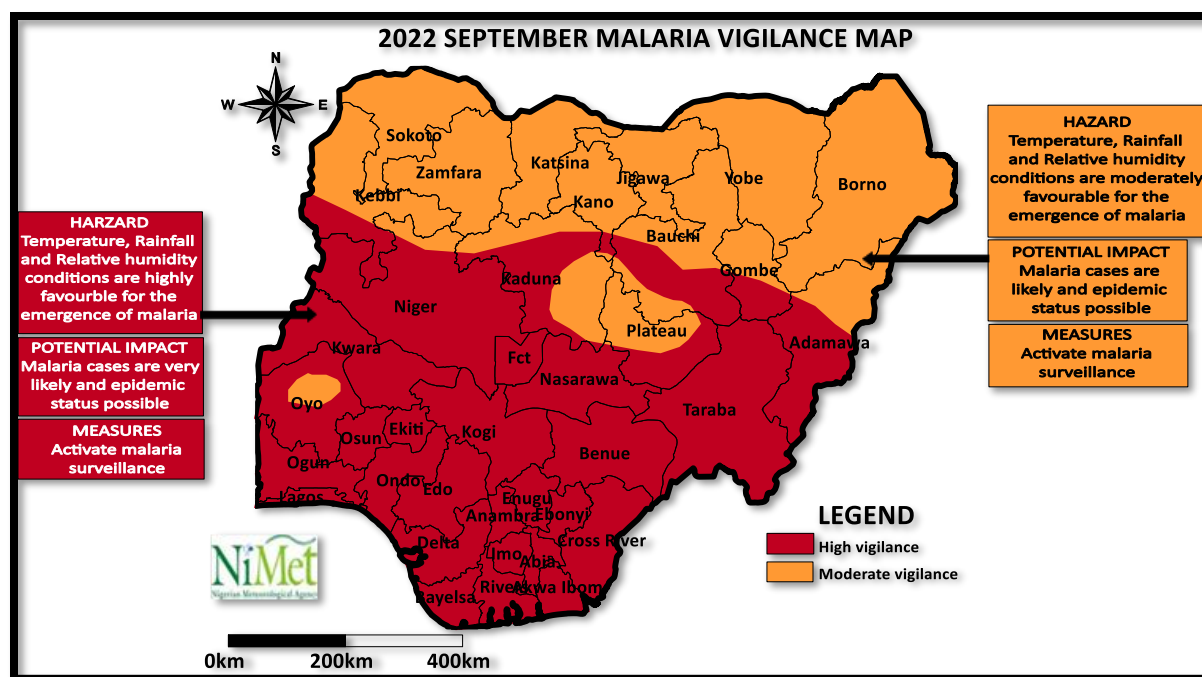


Figure 10 Malaria vigilance map for September 2022.

#### 4.1.3 Advisories

- Avoid exposure to mosquitoes as much as possible.
- See the doctor in the event of any illness and take medication as prescribed.
- Drainages should be cleared frequently, and the environment kept clean.
- Use insecticide-treated mosquito nets.
- Fumigate the environment frequently.
- Focus on early diagnosis and prompt treatment.
- Pregnant women are advised to take necessary measures to prevent being infected with malaria, such as sleeping under insecticide-treated mosquito nets and taking anti-malaria prophylaxis

#### 4.2 Cholera

Cholera is a bacterial infection of the small intestine that causes frequent, loose watery stooling (or diarrhea), vomiting and muscle cramps.

Based on the predicted rainfall for September 2022, there is a likelihood of the occurrence of cholera in some parts of the country. The levels of cholera vigilance across Nigeria are shown in Figure 11.

### 4.2.1 Effects of Cholera

This could lead to rapid loss of body fluids and by implication dehydration, shock, or even death.

### 4.2.2 Cholera vigilance

- High vigilance is required over the entire north, west, and the following states in the central region: Niger, FCT, Kwara, Kogi, Kwara, Adamawa, Taraba, and Nasarawa. (See Figure 11)
- Moderate vigilance is projected for the entire east, south, and most parts of central states and some states in other regions like Edo, Delta, and Oyo.

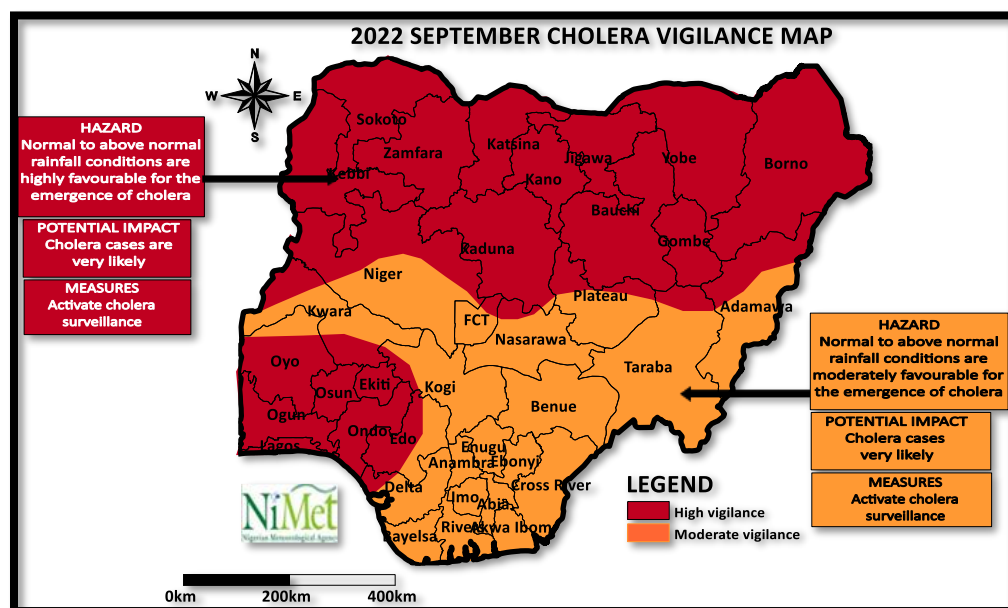


Figure 11 Cholera vigilance map for September 2022.

### 4.2.3 Advisories

The following precautions against cholera are advised:

- Frequent hand washing with soap.
- Ensure proper environmental sanitation.
- Ensure that food and water are not contaminated.
- Infected patients are advised to drink a lot of water and visit the hospital as soon as possible.

## 5.0 MEDICATION INSTABILITY

The predicted temperature and relative humidity values across the country for September 2022 satisfy the conditions for medication instability. Degradation of the composition of medicines is anticipated across the country to different degrees. Moderate to high vigilance for medication instability is therefore required across the country (See Figure 12).

### 5.1 Effects of Medication Instability

The weather conditions for medication instability outlined in Section 3.3 accelerate the degradation of drugs when they are stored under such conditions. Exposing medicines to these weather conditions increases the risk of reduced shelf-life due **degradation in physical and chemical structures, which renders them less potent.**

Compromise in shelf life could predispose drugs to Anti-Microbial Resistance (AMR) which makes bacteria resistant to such antibiotic.

### 5.2 Medication Instability Vigilance

- High vigilance for medicine instability is required over most northern states, and some states in the central, eastern, and southern regions.
- Moderate vigilance is anticipated over the southeast and southwest including Kwara and parts of Niger in the central region. Other states are Bauchi, Jigawa, Yobe, Borno, Kogi, Plateau, Nasarawa, Kwara, Niger, and the FCT.

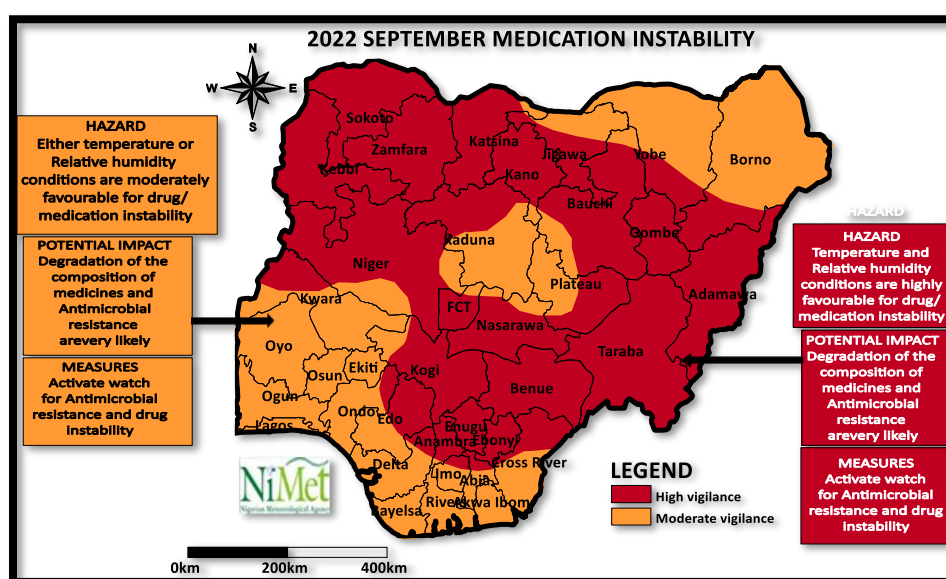


Figure 12 Medication Vigilance Map

### 5.3 Advisories

There is need for more caution while transporting and storing medicines in those parts of the country with high vigilance thresholds. Temperature and humidity control and monitoring systems for transport and storage are therefore necessary. In addition, medical personnel should counsel patients on proper storage measures for their drugs.

## 6.0 HEAT INDEX

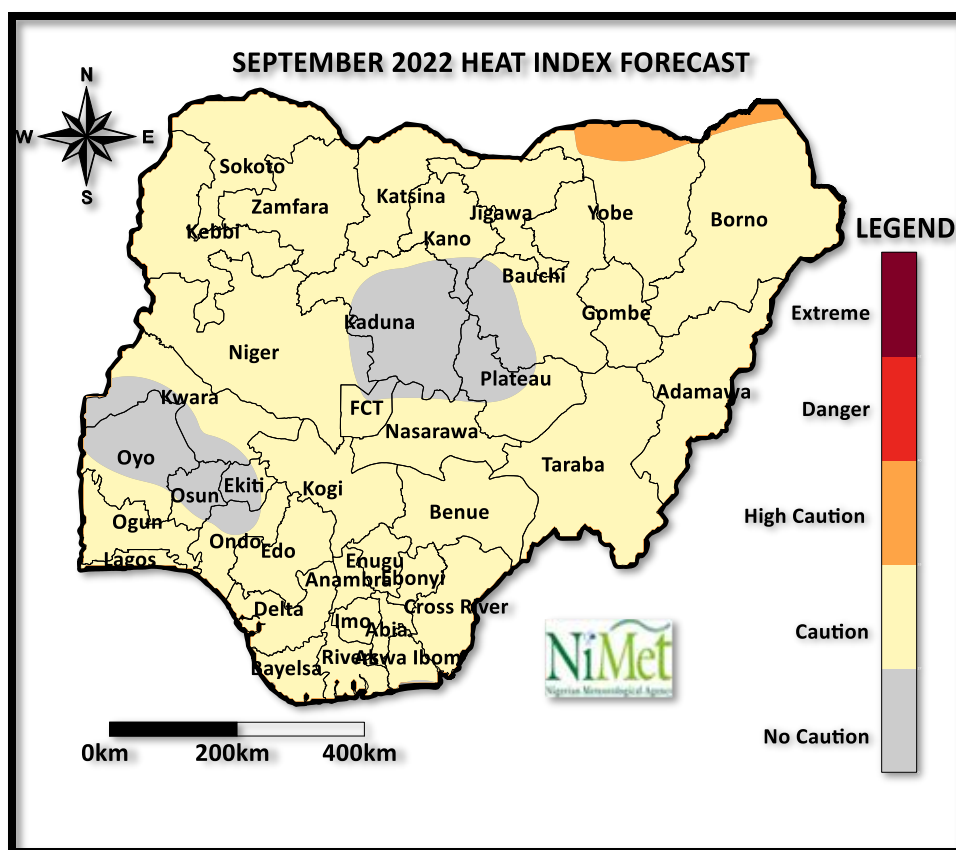
The heat index is also referred to as *what the temperature feels like to the human body when relative humidity is combined with the air temperature*. High heat index affects living things generally, especially humans and animals.

### 6.1 Effects of Heat Index

When the atmospheric moisture content (i.e., relative humidity) is high, the rate of evaporation from the body decreases. The human body, therefore, feels warmer in humid conditions.

### 6.2 Heat Index vigilance

- High caution threshold of Heat Index is predicted over extreme northern parts of Borno and Yobe states.
- Caution threshold is predicted in most of the country.
- No caution is predicted for Heat Index over parts of Oyo, Osun, Ekiti, Kwara, Ondo, Kano, Kaduna, Bauchi, Plateau, Nasarawa, Niger states, and the FCT Abuja as shown in Figure 13.



*Figure 13: Heat Index vigilance map for September 2022.*

### 6.3 Advisories

A high Heat Index is foreseen at the northern fringes of Borno and Yobe states. The following precautions for protection against the hazards are usually recommended.

- Use shade for outdoor work sites and other activities.
- Schedule work earlier or later in the day when the weather is usually lower.
- Limit strenuous work during hot weather.
- Drink enough water or other healthy fluids frequently to keep the body hydrated.
- Wear clothing that is appropriate for hot weather.

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