West Nile Virus

For Prelims: West Nile Virus, Flavivirus, Transmission cycle of West Nile Virus, WHO

For Mains: Prevention and Control of virus-associated diseases

Why in News?

Recently, a 47-year-old man in Thrissur, Kerala died due to **West Nile Virus (WNV)**. This has caused the Kerala health department to be on alert.

- Malappuram's 6-year-old boy also died of the same infection, earlier in 2019.
- WNV was **first reported in the state of Alappuzha in 2006**. Later in 2011, it was also reported in Ernakulam, Kerala.

What is WNV?

- **About:**
  - The West Nile Virus is a **flavivirus related to the viruses** that are also **responsible for causing St. Louis encephalitis,** Japanese encephalitis**, and** yellow fever**.**
  - It is a **mosquito-borne, single-stranded** RNA virus.
- **Global Prevalence:**
  - **Along all major bird migratory routes,** WNV outbreak sites are found.
  - **Africa, Europe, the Middle East, North America, and West Asia** are the regions where the virus is commonly found.
  - Usually, WNV **infections peak during the period when mosquito vectors are most active and the ambient temperature is high** enough for virus multiplication for most of the countries.
- **Prevalence in India:**
  - In Mumbai in the year 1952, the **antibodies against WNV were first detected in humans.**
  - Since then, the virus activity has been reported in **southern, central, and western India.**
  - In **Andhra Pradesh and Tamil Nadu**, WNV was isolated from **Culex vishnui mosquitoes.**
  - **In Maharashtra,** it was isolated from **Culex quinquefasciatus mosquitoes.**
  - **In Karnataka,** it has been isolated from **humans**.
  - Further, WNV neutralizing antibodies were found to be present in human serum collected from **Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Odisha, Rajasthan and Assam.**
  - In **1977, 1978 and 1981, serologically confirmed cases of WNV infections were reported in Vellore and Kolar districts, and in West Bengal in 2017.**
  - During an **acute encephalitis outbreak in Kerala, the complete** genome sequence **of WNV was isolated in 2013.**
  - The **association of WNV with** eye infection **in Tamil Nadu** had been clearly established

during an **epidemic of mysterious fever in the first half of 2010.**

- **Origin:**
  - WNV was first isolated in a woman in the **West Nile district of Uganda in 1937.**
  - It was **identified in birds** in the Nile delta region **in 1953**. Before 1997, WNV was not considered pathogenic for birds.
  - **Human infections** attributable to WNV have been **reported in many countries for over 50 years.**

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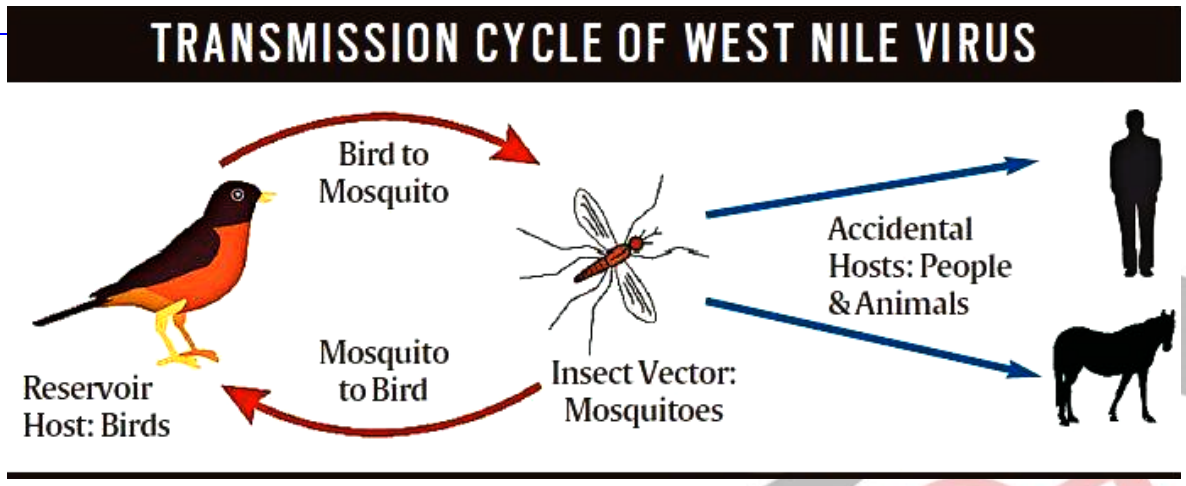

- **Transmission Cycle:**
  - **Principal vector** for transmission is the **culex species of mosquitoes.**
  - **Birds** act as the **reservoir host** of the virus.
  - Infected mosquitoes **transmit WNV between and among humans and animals, including birds.**
  - When a **mosquito feeds on infected birds**, they become **infected.**
  - The **virus circulates in the blood** of those infected mosquitoes for a **few days, eventually getting into the mosquito's salivary glands.**
  - The virus **may get injected into humans and animals during later blood meals (when mosquito bites)**. Therein, WNV can **multiply and possibly cause illness.**
  - WNV can also get transmitted from an **infected mother to her child through blood transfusion** or via exposure to the virus in laboratories.
  - **No instance of transmission by contact with infected humans or animals** has been reported.
  - It **does not spread "through eating infected animals, including birds.**
  - Generally, **the incubation period for WNV disease is 2-6 days.** However, this **may range from 2-14 days**, and can also be **several weeks in people whose immunity is compromised.**
  - According to the **World Health Organization (WHO)**, **no human-to-human transmission of WNV through casual contact has been reported till date.**
- **Symptoms:**
  - **In 80%** of the infected people, the disease is **asymptomatic.**
  - In the rest of the **20% cases, West Nile fever or severe WNV is observed with symptoms such as fever, headache, fatigue, body aches, nausea, rash, and swollen glands.**
  - Severe infection may even cause **neurological diseases like West Nile encephalitis or meningitis or West Nile poliomyelitis or acute flaccid paralysis.**
  - Also, there are reports of **WNV-associated** Guillain-Barré syndrome **and radiculopathy.**
  - Around **1 in 150 individuals** with WNS is likely to develop a more **severe form of disease.**
  - It may take **several weeks or months to recover from severe illness.**
  - **Nervous system damage can last forever.**
  - In persons with **co-morbidities and immuno-compromised persons** (such as transplant patients), the disease may turn out to be **fatal.**
- **Measures of Prevention:**

- The establishment of **an active animal health surveillance system** to detect new cases in birds and horses should be essentially established.
- As WNV outbreaks in animals precede human cases, it is necessary to **provide early warning for veterinary and human public health authorities.**
- The **European Centre for Disease Control and Prevention (ECDC)** has suggested that **28-day blood donor deferral or nucleic acid testing of prospective donors** who have visited or lived in an affected area should be implemented by the **European Union (EU).**
- Besides, **testing for WNV infection must be done for the donors of organs, tissues and cells, who are living in or returning from an affected area.**

- **Treatment:**
  - As of now, **no treatment/vaccine for WNV is available.**
  - Only supportive treatments can be provided to neuroinvasive WNV patients.

UPSC Civil Services Examination, Previous Year Question

Q. Consider the following statements: (2017)

1. In tropical regions, Zika virus disease is transmitted by the same mosquito that transmits dengue.
2. Sexual transmission of Zika virus disease is possible.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Ans: (c)

Exp:

- **Zika virus is a flavivirus** which was first discovered in 1947 in monkeys and then in humans in Uganda in 1952.
- Both Zika and Dengue have similarities in terms of symptoms of fever, skin rashes, conjunctivitis, muscle and joint pain, malaise, and headache. In addition to this, **the mode of transmission is also same for both the diseases, i.e., both are spread by Aedes aegypti and Aedes albopictus species of mosquitoes. Hence, statement 1 is correct.**
- **Modes of Zika Transmission:**
  - **Mosquito bites**
  - **From mother to child during pregnancy,** which can cause microcephaly and other severe fetal brain defects. Zika virus has also been found in breast milk.
  - **Sexual transmission** from infected partner. Hence, statement 2 is correct.
  - **Through blood transfusion.**
- **Therefore, option (c) is the correct answer.**

Source: IE