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Editorial

Nipah Virus Outbreak in India: Another Bat-Related Infectious Disease and Public Health Emergency

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The Ministry of Health and Family Welfare in India reported two confirmed cases of Niaph virus infections since December 2025. These two patients were linked to a private hospital in Barasat, near Kolkata, the capital city of West Bengal, with subsequent laboratory confirmation by the National Institute for Virology in Pune at the state of Maharashtra from Western India in January 2026 [1].

Nipah virus is a highly pathogenic zoonotic virus that has caused deadly outbreaks in South and Southeast Asia since its discovery in the late 1990s. Nipah virus belongs to the *Henipavirus* genus of the *Paramyxoviridae* family and has a single-stranded, negative-sense RNA genome. It was first identified during an outbreak in Malaysia in 1998/1999 [2], four years before the more familiar Severe Acute Respiratory Syndrome (SARS) epidemic in 2003 [3]. The Malaysian Nipah outbreak began with a cluster of cases of severe encephalitis involving farmers who had close contact with pigs, which were experiencing a sudden and unusual illness, with a rapid onset of respiratory and neurological symptoms [2]. A high percentage of the affected individuals fell into coma, with a mortality rate of around 40% [2]. Unlike the SARS coronavirus, of which the ultimate source was found to be Chinese horseshoe bats (*Rhinolophus sinicus*) [4], classified as microbats (previously suborder *Microchiroptera* within the order *Chiroptera*), epidemiological investigations revealed that the natural reservoir of Nipah virus was fruit bats of the genus *Pteropus*, classified as megabats (previously suborder *Megachiroptera*). Based on molecular genetic data, bats were reclassified into suborder *Yinpterochiroptera* (or *Pteropodiformes*), which includes the large fruit-eating megabats (family *Pteropodidae*) with five specialized microbat families and *Yangochiroptera* (or *Vespertilioniformes*), which includes the other microbat families [5]. These fruit bats were found to be able to carry the virus without displaying symptoms. The primary route of transmission to pigs was through bat droppings or urine, which contaminated fruit or feed consumed by pigs. The virus then spread rapidly within pig populations. The infected pigs became a key source of transmission to humans, either through direct contact with pig tissues, respiratory secretions, or indirectly through consumption of infected pork products. Once the cause of the outbreak was identified as the Nipah virus, the Malaysian government and health authorities implemented a number of control measures, including culling approximately one million pigs, in an effort to contain the spread of the virus in the livestock population. The culling significantly reduced the number of cases in humans but also caused considerable economic losses in the agriculture and pig farming sectors. The outbreak was officially declared contained by April 1999, with a total of more than 250 confirmed human cases and more than 100 fatalities in Malaysia, as well as 11 additional cases and one death in Singapore.

Since 1999, there have been no reported Nipah outbreaks in Malaysia or Singapore, but the virus was found to continue circulating in fruit bat populations, not only in Malaysia but also in other countries, most notably Bangladesh and India, with periodic spillovers continuing into the present. Beginning in 2001, Bangladesh has experienced nearly annual Nipah outbreaks, mostly in the winter months [6]. These events were strongly associated with the consumption of raw date palm sap contaminated by bat saliva or urine [7]. These Bangladesh outbreaks have typically had high fatality rates of 60–70% and frequent human-to-human transmission among caregivers and family members. As for India, the first reported Nipah outbreak was in January/February 2001 in Siliguri of

West Bengal [8]. In this outbreak, about 75% of cases involved hospital staff or visitors, indicating nosocomial and human-to-human transmission. Another outbreak occurred in 2007 in the Nadia district of West Bengal, involving a number of fatal cases [9]. After around a decade without reported cases, Nipah resurfaced since 2018 in Kozhikode and Malappuram of Kerala in South India [10,11]. These isolated cases and outbreaks were largely traced back to fruit bats, reflecting sustained spillover from bats in these regions.

Instead of Kerala, the current small cluster of cases was identified in West Bengal again. So far, there are no licensed effective antiviral treatments or vaccines for the Nipah virus, although rigorous *in silico* analysis with the help of machine learning has identified a number of potential inhibitors of various targets in the virus and new vaccine platforms are also emerging [12–15]. For example, using an attention-based deep learning model, it was found that Cangrelor, an antiplatelet drug, was capable of binding the RNA-dependent RNA polymerase of Nipah virus, and hence may potentially interfere with its replication [13]; and in another study, machine learning assisted *in silico* methods were used to identify small-molecule inhibitors that target the Nipah virus glycoprotein, a critical component for viral entry [12]. As for the current measures, public health strategies focus on surveillance and early detection, rapid isolation and supportive care of cases, contact tracing and quarantine, and public education to reduce high-risk exposures such as avoiding bat contact and raw palm sap. The recent Indian cases have prompted heightened alert and precautionary actions across the regions. For example, ministries of health in various nations are advising enhanced vigilance among clinicians, particularly for patients with febrile or neurological symptoms who have recently travelled from affected regions; temperature screening has been reintroduced at airports as well as seaports and other borders in a number of South and Southeast Asian countries, echoing COVID-19-era practices with dedicated lanes and health declarations required before immigration clearance; Thailand's Department of Medical Sciences has streamlined the real-time RT-PCR laboratory testing with high sensitivity and specificity to detect Nipah virus, and results would be available within eight hours; and Taiwan Centers for Disease Control has moved to classify Nipah virus infections as a Category 5 notifiable disease, reflecting increased vigilance. All these actions focus on early detection of symptoms like fever and prompt isolation and assessment for catching possible Nipah cases before community transmission can occur, as well as avoiding contact with potential reservoirs, such as fruit bats. Since bats are hosts of a diverse number of viruses that can infect humans, contact with bats in general should be extremely cautious in order to prevent these zoonotic diseases [16,17].

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Conflicts of Interest

The authors declare no conflict of interest.

Use of AI and AI-Assisted Technologies

No AI tools were utilized for this paper.

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