



Letter to the Editor

Re-emergence of Chandipura virus in India: Urgent need for public health vigilance and proactive management

Dear Editor,

A recent re-emergence of the Chandipura virus (CHPV) has been documented in Gujarat, India, echoing the outbreak that occurred two decades earlier in Andhra Pradesh, Maharashtra, and Gujarat. As of July 31, 2024, 148 cases of Acute Encephalitis Syndrome (AES) have been reported in India, with 140 cases across 24 districts in Gujarat. The virus has also spread to Madhya Pradesh ($n = 4$), Rajasthan ($n = 3$), and Maharashtra ($n = 1$). Among the 148 AES cases, 51 have been confirmed as CHPV infections, resulting in 59 deaths (<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2039935>). By August 15, 2024, the number of AES cases had risen to 245, with the death toll reaching 82. Notably, of these, 64 patients have been confirmed with CHPV infections. Since most of those affected are children under 15 years old (<http://www.who.int/emergencies/disease-outbreak-news/item/2024-DON529>), early diagnosis and proactive management are crucial (Fig. 1).

CHPV is a bullet-shaped RNA virus from the family Rhabdoviridae, genus Vesiculovirus, enveloped by a bilayer lipid membrane. It was first identified in 1965 in the blood of two adults with a febrile illness in Maharashtra [1]. Since then, CHPV has been linked to several AES outbreaks in India, including those in Andhra Pradesh in 2003 and 2007, Gujarat in 2004, Maharashtra in 2007 and 2009, and Odisha in 2015 [2]. During the 2003 outbreak in Andhra Pradesh, 329 children aged between 9 months and 14 years were diagnosed with AES, resulting in 183 fatalities [3]. The situation worsened in 2004 when epidemic of AES was reported in Gujarat with a staggering case fatality rate of approximately 75 %. Clinical examination of affected patients revealed high fever, periodic vomiting, impaired mental status, and convulsions, often progressing to sudden unconsciousness and death [1].

CHPV has also been detected outside India, in countries such as Sri Lanka, Nigeria, and Senegal, raising global concern about potential resurgences. Tourism and urbanization are likely contributing to the virus's spread beyond India's tropical and subtropical regions [1,3]. Given the role of travel in disease spread, there is an urgent need for strengthened surveillance and public health measures, particularly in areas with high traveler influx.

Phlebotomine sandflies, mosquitoes and ticks are vectors of CHPV, which harbor the virus in their salivary glands and transmit it to humans through bites, with cases peaking during the monsoon season. The transmission cycle of the virus by sandflies includes both transovarial and venereal routes. CHPV critically affects children, leading to rapid viral replication and encephalitis, which can cause unconsciousness and death within 2–3 days. Preclinical studies have demonstrated the neurotropic potential of CHPV, marked by phosphoprotein expression, microglial activation, and subsequent apoptosis. Further research is crucial to elucidate the mechanisms of AES and sudden death associated with CHPV infection [3,4].

Significant progress has been made in the diagnostics and prophylaxis of viral infections. While AES can be caused by other viruses, such as West Nile, Japanese encephalitis, Dengue, and herpes simplex virus, current diagnostics can distinguish CHPV from these other arboviruses, facilitating timely and accurate treatment [3]. Advances in vaccine development are promising, with recombinant and inactivated vaccines showing high immune response in preclinical testing. The G-gene recombinant vaccine and beta-propiolactone inactivated tissue culture vaccine have shown efficacy against CHPV, and a multi-epitope vaccine candidate has been developed using *in silico* and immunoinformatic methods. Urgent translation to human clinical testing is necessary to validate the safety and efficacy of these vaccines [3,5].

Despite several resurgences since 2003, the severe impact of CHPV on children has not received the urgent attention it demands. Given the crucial role of children in the nation's future, it is imperative to implement measures to prevent the return of this lethal pathogen. Increased government funding for comprehensive research is vital to lessen the outbreak's effect on public health. To address the widespread cases of AES, it is necessary to conduct coordinated epidemiological analyses, enhance surveillance, and perform thorough environmental and laboratory investigations. Due to the virus's high mutation rate and the absence of specific treatments, except for an siRNA-based antiviral agent, key measures to combat the disease include vector control, personal hygiene, and public awareness. Preventive actions such as avoiding travel with children to infected regions, using insecticidal sprays and mosquito bed nets, and wearing long-sleeve clothing can be effective and help reduce contact with CHPV carriers. Additionally, fumigating slum areas can aid in controlling the spread of vectors (<http://wwwnc.cdc.gov/travel/yellowbook/2016/the-pre-travel-consultation/protect-ion-against-mosquitoes-ticks-other-arthropods>).

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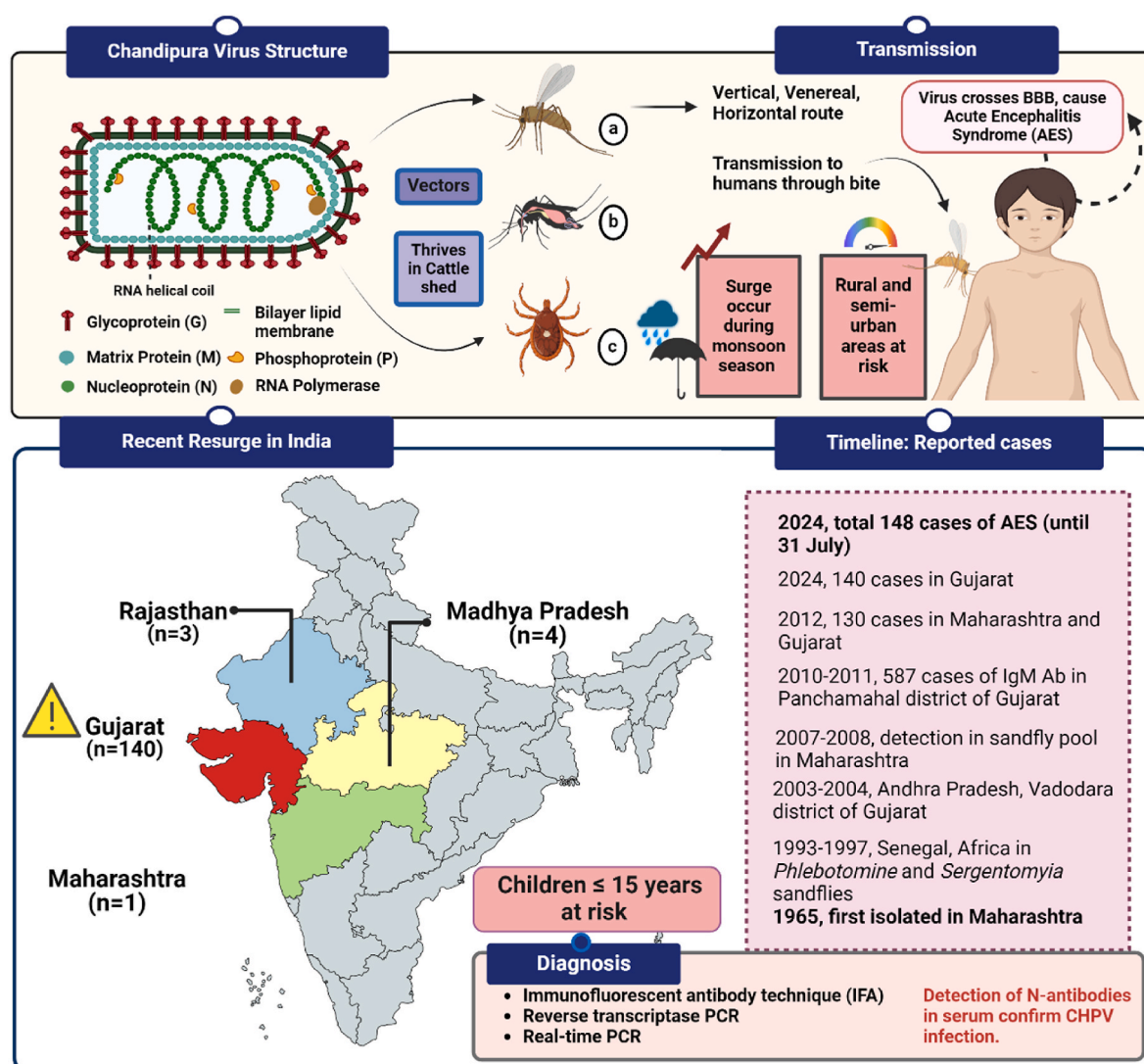


Fig. 1. The lethal Chandipura virus (CHPV) is an RNA virus encapsulated with a bilayer lipid membrane, measuring 150–165 nm in length and 50–65 nm in width. It is transmitted through a) *Phlebotomine* sandflies, b) *Aedes aegypti* mosquito, and c) ticks, which thrive in damp areas like crevices or cattle sheds, with populations rising steeply during monsoon season, especially in backward areas. The transmission cycle of virus in arthropods includes vertical, venereal and horizontal routes. The virus is transferred to humans through carrier bite, resulting in the onset of flu-like symptoms leading to coma or sudden death within 2–3 days due to neuro-invasion, causing Acute Encephalitis Syndrome (AES). A recent re-surge of AES has been reported in 24 districts of Gujarat with highest fatality rate in children under 15 years, spreading to Madhya Pradesh, Maharashtra and Rajasthan, escalating into a public health concern. The timeline of past virus surges in different states is described in the figure. Early diagnosis and proactive management can prevent re-emergence.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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