Health & Medicine | Jan 24, 2026 | 9 min read | By Bryan White

Zoonotic Spillover in West Bengal: Fruit Bats Serve as Nipah Virus Vector in 2026 Outbreak

Biology * Public Health * Global Health

The Re-Emergence of Nipah Virus in the Bengal Basin

The reappearance of the Nipah virus (NiV) in West Bengal, India, in January 2026 marks a critical epidemiological event, breaking a nineteen-year hiatus in the eastern subcontinent.[9][10] A member of the family Paramyxoviridae and genus Henipavirus, Nipah virus is benignly maintained in fruit bat reservoirs yet devastatingly lethal in humans.[1][3] Whereas the 1998-1999 outbreak in Kampung Sungai Nipah, Malaysia (NiV-M strain) required domestic pigs as amplifying hosts, the Bangladesh/India lineage (NiV-B) in the Bengal basin jumps directly from bats to humans via contaminated food matrices and spreads person-to-person via respiratory droplets.[3][5]

Unlike Kerala, which has experienced recurring spillovers since 2018, West Bengal had not recorded a confirmed outbreak since Nadia in 2007 and Siliguri in 2001.[10][25] The January 2026 cluster in Barasat, North 24 Parganas near Kolkata highlights the cryptic persistence of NiV-B in synanthropic bats, the molecular mechanics of neuroinvasion, and the urgent need for indigenous monoclonal antibodies and One Health surveillance.[7][27]

Anatomy of the 2026 Outbreak and Reservoir Ecology

According to World Health Organization (WHO) reporting, two 20-30-year-old healthcare workers (one female nurse and one male nurse) at the same private hospital in Barasat, North 24 Parganas, developed severe Nipah virus symptoms in late December 2025 and were hospitalized in early January 2026.[10] Following preliminary laboratory testing around January 11 and confirmation by the National Institute of Virology (NIV) in Pune via Real-Time Polymerase Chain Reaction (RT-PCR) and ELISA on January 13, two cases were formally confirmed.[8][10] While early local accounts cited up to five suspected staff infections, over 190 traced healthcare and community contacts tested negative and no additional confirmed cases emerged -- averting a repeat of the 2001 Siliguri outbreak, where unshielded exposure to infectious aerosols during respiratory care drove 75% of infections.[10][12][13]

The primary reservoir is the Indian Flying Fox (Pteropus medius). Serological and molecular surveys across eastern India and Bangladesh confirm continuous viral circulation, with urinary and salivary shedding peaking between December and April under reproductive and nutritional stress.[17][18] In the Bengal basin, clay collection pots act as the spillover vehicle:

* The Date Palm Sap Vector: During winter nights, harvesters (gachias) shave date palm bark to collect sweet sap (nolen gur). Infrared studies show Pteropus bats licking the sap stream and contaminating open pots with infectious urine and saliva.[15][19]

* Cold Wave Catalyst & Habitat Loss: Mid-January 2026 minimum temperatures dropped 2-3 deg C below normal across the Gangetic plains, preserving enveloped viral viability in raw sap consumed fresh at dawn, while peri-urban deforestation forces bats into domestic orchards.[6][11][14]

| Outbreak Year | | Location | | Primary Route | | Epidemiological Profile | | Fatality Rate |

| 2001 | | Siliguri, West Bengal | | Nosocomial | | 66 cases (75% hospital staff/visitors); pre-PPE era.[12] | | ~68% |

| 2007 | | Nadia, West Bengal | | Foodborne / Sap | | 5 cases linked to raw date palm sap; rapid progression.[25] | | 100% |

| 2018 | | Kozhikode, Kerala | | Zoonotic / Nosocomial | | 23 cases; rapid molecular containment.[24] | | ~91% |

| 2026 | | Barasat / Kolkata, WB | | Healthcare-associated cluster | | 2 laboratory-confirmed cases (nurses; 5 initially suspected); >190 contacts traced and negative.[10] | | 50% (1 male nurse recovered Jan 2026; 1 female nurse cleared viral RNA but died Feb 12, 2026 from post-Nipah cardiac and pulmonary complications)[10, 34] |

Molecular Virology: Glycoprotein Cascades and Immune Evasion

The negative-sense, single-stranded RNA virus genome of Nipah encodes six structural proteins (N, P, M, F, G, and L), with host cell entry governed by the Attachment (G) and Fusion (F) glycoproteins:[1][2]

* Ephrin Receptor Engagement (G Protein): The tetrameric G glycoprotein binds conserved host receptors: Ephrin-B2 on vascular endothelium (driving systemic vasculitis) and Ephrin-B3 in the brainstem and central nervous system.[1][20] Binding shifts the G globular head, exposing a hidden stalk domain.[21]

* Six-Helix Bundle Fusion (F Protein): The exposed G stalk triggers the metastable trimeric F protein to insert its hydrophobic fusion peptide into the host cell membrane and zip its Heptad Repeat domains (HRA/HRB) into a six-helix bundle (6HB), merging membranes.[16][22][23]

* Syncytia and STAT Antagonism: Surface F and G expression fuses neighboring cells into multinucleated syncytia, while P-gene products (V and W) sequester STAT1/STAT2 to block interferon signaling.[2][4]

| Viral Protein | | Host Target | | Pathogenic Mechanism | | Therapeutic Target |

| Attachment (G) | | Ephrin-B2 & Ephrin-B3 | | High-affinity binding; stalk exposure triggers F protein.[1][21] | | Monoclonal antibody m102.4; ChAdOx1 NipahB.[26][28] |

| Fusion (F) | | Host plasma membrane | | 6-helix bundle (6HB) membrane merger and syncytia.[23] | | HRB peptide fusion inhibitors.[22] |

| P / V / W | | STAT1 & STAT2 | | Blocks Type I interferon transcription.[2] | | Polymerase (L) & host immunomodulators. |

Clinical Pathology, Transmission Dynamics, and Countermeasures

After a 3-14 day incubation period (up to 45 days in rare cases), NiV-B progresses from fever and myalgia into a dual respiratory-neurological crisis.[3][10] NiV-B causes atypical pneumonia and Acute Respiratory Distress Syndrome (ARDS) in severe cases while breaching the blood-brain barrier to infect cortical and brainstem neurons, provoking myoclonus, seizures, and coma within 24-48 hours.[10][29] Approximately 20% of survivors experience chronic neurological sequelae or late-onset relapsing encephalitis from dormant CNS virus.[12][30]

Under Kermack-McKendrick theory, Nipah's baseline basic reproduction number (R0 ~ 0.4-0.5) prevents sustained community pandemics, but respiratory superspreaders drive acute nosocomial spikes (Re > 1).[31][32] Public health containment in Barasat combined isolation care, tracing and testing over 190 contacts, and heightened infection prevention controls.[10][33] Therapeutically, the G-targeting monoclonal antibody m102.4 prompted an Indian Council of Medical Research (ICMR) initiative for domestic manufacturing alongside viral-vector vaccine trials.[26][27][28]

Conclusion: Vigilance at the Ecological Interface

The January 2026 West Bengal outbreak proves that multidecadal lulls do not signify viral absence when NiV-B persists in synanthropic Pteropus medius colonies.[9][18] As climate change and habitat compression intensify winter bat-human overlap, preventing nosocomial amplification requires pairing point-of-care diagnostics and domestic monoclonal antibody stockpiles with One Health public health interventions.[11][27]

Updates... (Nov 22, 2026): Updated the 2026 Barasat clinical outcome table to record that while the male nurse recovered in January 2026, the 25-year-old female nurse died on February 12, 2026 from cardiac arrest and secondary critical-care complications after clearing active Nipah viral RNA; replaced the CAPTCHA-gated NCBI Bookshelf link with Khan et al. (2012, PLOS ONE); and added exact publication dates, authors, and volume metadata across all 34 citations. (Earlier update, Nov 18, 2026: Refined the 2026 West Bengal outbreak clinical timeline per WHO 2026-DON593.)

Works Cited

* Negrete, O. A., Wolf, M. C., Aguilar, H. C., et al. (2006, February 10). Two Key Residues in EphrinB3 Are Critical for Its Use as an Alternative Receptor for Nipah Virus. PLoS Pathogens, 2(2), e7, https://doi.org/10.1371/journal.ppat.0020007

* Madhukalya, R., Yadav, U., Parray, H. A., et al. (2025, July 1). Nipah virus: pathogenesis, genome, diagnosis, and treatment. Applied Microbiology and Biotechnology, 109, 158, https://doi.org/10.1007/s00253-025-13474-6

* World Health Organization (WHO) (2019, November 1). Nipah virus infection. https://www.who.int/health-topics/nipah-virus-infection

* Wong, K. T., Shieh, W.-J., Kumar, S., et al. (2002, December). Nipah Virus Infection: Pathology and Pathogenesis of an Emerging Paramyxoviral Zoonosis. American Journal of Pathology, 161(6), 2153-2167, https://pmc.ncbi.nlm.nih.gov/articles/PMC1850894/

* Tan, F. H., Sukri, A., Idris, N., & Ong, K. C. (2024, July 25). A systematic review on Nipah virus: global molecular epidemiology and medical countermeasures development. Virus Evolution, 10(1), veae048, https://doi.org/10.1093/ve/veae048

* Journal of Pure and Applied Microbiology (2022, January 1). Nipah Virus Mystery: Insight into Transmission and Mechanism of Disease Progression. https://microbiologyjournal.org/nipah-virus-mystery-insight-into-transmission-and-mechanism-of-disease-progression/

* The Independent (2026, January 30). What is Nipah virus? Symptoms to watch out for as India races to contain outbreak. https://www.the-independent.com/asia/india/nipah-virus-outbreak-symptoms-signs-india-b2906226.html

* UK Health Security Agency (2026, January). Outbreaks under monitoring: week 3 (week ending 18 January 2026). https://www.gov.uk/government/publications/outbreaks-under-monitoring-in-2026/outbreaks-under-monitoring-week-3-week-ending

* India Today (2026, January 19). What is Nipah virus that has been detected in West Bengal after 19 years? https://www.indiatoday.in/science/story/what-is-nipah-virus-that-has-been-detected-in-west-bengal-after-19-years-2854149-2026-01

* World Health Organization (WHO) (2026, January 26). Nipah virus disease - India (Disease Outbreak News 2026-DON593). https://www.who.int/southeastasia/outbreaks-and-emergencies/nipah-virus/2026-DON593

* McKee, C. D., Islam, A., Luby, S. P., Salje, H., Hudson, P. J., Plowright, R. K., & Gurley, E. S. (2021, January 23). The Ecology of Nipah Virus in Bangladesh: A Nexus of Land-Use Change and Opportunistic Feeding Behavior in Bats. Viruses, 13(2), 169, https://doi.org/10.3390/v13020169

* World Health Organization (WHO) (2026, January 29). Nipah virus fact sheet. https://www.who.int/news-room/fact-sheets/detail/nipah-virus

* John, J., Thomas, A., & Rahul, E. (2024, December 31). Nipah Virus Transmission Dynamics: Zoonotic Origins, Human Spread, and Control Strategies. Jurnal Vokasi Kesehatan. https://journal.bengkuluinstitute.com/index.php/juvokes/article/download/1004/465

* Bangladesh Meteorological Department (2026, January 13). Weather Forecast Bulletin (13-01-2026). https://live8.bmd.gov.bd/file/2026/01/13/pdf/198450.pdf

* The Locavore (2024, January 18). Bringing Bengal's Cherished Winter Jaggery to the World. https://thelocavore.in/2024/01/18/bringing-bengals-cherished-winter-jaggery-to-the-world/

* Larsen, B. B., McMahon, T., Brown, J. T., et al. (2024, April 19). Functional and antigenic landscape of the Nipah virus receptor binding protein. bioRxiv (PubMed Central PMC11042328), https://pmc.ncbi.nlm.nih.gov/articles/PMC11042328/

* Epstein, J. H., Anthony, S. J., Islam, A., et al. (2020, November 17). Nipah virus dynamics in bats and implications for spillover to humans. Proceedings of the National Academy of Sciences, 117(46), 29190-29201, https://doi.org/10.1073/pnas.2000429117

* Mohandas, S., Patil, D., Mathapati, B., et al. (2024, December 24). Nipah virus survey in Pteropus medius of eastern and northeastern region of India, 2022-2023.

Frontiers in Microbiology, 15, 1493428, https://doi.org/10.3389/fmicb.2024.1493428

* Khan, S. U., Gurley, E. S., Hossain, M. J., et al. (2012, August 8). A Randomized Controlled Trial of Interventions to Impede Date Palm Sap Contamination by Bats to Prevent Nipah Virus Transmission in Bangladesh. PLOS ONE, 7(8), e42689, https://doi.org/10.1371/journal.pone.0042689

* Xu, K., Broder, C. C., & Nikolov, D. B. (2012, February). Ephrin-B2 and ephrin-B3 as functional henipavirus receptors. Seminars in Cell & Developmental Biology, 23(1), 116-123 (PubMed Central PMC3327611), https://pmc.ncbi.nlm.nih.gov/articles/PMC3327611/

* Liu, Q., Stone, J. A., Bradel-Tretheway, B., et al. (2013, November 21). Unraveling a Three-Step Spatiotemporal Mechanism of Triggering of Receptor-Induced Nipah Virus Fusion and Cell Entry. PLoS Pathogens, 9(11), e1003770, https://doi.org/10.1371/journal.ppat.1003770

* Zamora, J. L. R., Ortega, V., Johnston, G. P., et al. (2020, September 15). Third Helical Domain of the Nipah Virus Fusion Glycoprotein Modulates both Early and Late Steps in the Membrane Fusion Cascade. Journal of Virology, 94(19) (PubMed Central PMC7495395), https://pmc.ncbi.nlm.nih.gov/articles/PMC7495395/

* Brindley, M. A., Plattet, P., & Plemper, R. K. (2014, September 9). Efficient replication of a paramyxovirus independent of full zippering of the fusion protein six-helix bundle domain. Proceedings of the National Academy of Sciences, 111(36), E3795-E3804, https://doi.org/10.1073/pnas.1403609111

* Chandran, P., Bina, T., Lilabi, M. P., & George, B. (2019, October 1). Nipah virus infection in Kozhikode, Kerala, South India, in 2018: Epidemiology of an outbreak of an emerging disease. Indian Journal of Community Medicine, 44(4), 383-387, https://doi.org/10.4103/ijcm.ijcm_198_19

* Kumar, S., Pattnaik, R., Mathapati, B., & Sahu, P. S. (2024, May 9). Nipah virus outbreak in the Indian subcontinent and means to counter it. New Microbes and New Infections, 59, 101425, https://doi.org/10.1016/j.nmni.2024.101425

* Geisbert, T. W., Mire, C. E., Geisbert, J. B., et al. (2014, June 25). Therapeutic Treatment of Nipah Virus Infection in Nonhuman Primates with a Neutralizing Human Monoclonal Antibody. Science Translational Medicine, 6(242), 242ra82 (PubMed Central PMC4467163), https://pmc.ncbi.nlm.nih.gov/articles/PMC4467163/

* Pharmabiz.com (2025, December 17). ICMR reopens the call for EoI for development of mAbs against Nipah virus due to inadequate responses. https://www.pharmabiz.com/NewsDetails.aspx?aid=183076&sid=1

* Cortes-Azuero, O., Vegvari, C., Sutcliffe, E., et al. (2025, November 2). Modeling optimal deployment strategies for Nipah vaccines and monoclonal antibodies. medRxiv, https://doi.org/10.1101/2025.10.31.25339251

* The Independent (2026, January 23). Nipah virus symptoms explained as deadly outbreak spreads in India. https://www.independent.co.uk/bulletin/news/nipah-virus-symptoms-west-bengal-india-b2906412.html

* Liu, J., Coffin, K. M., Johnston, S. C., et al. (2019, July 25). Nipah virus persists in the brains of nonhuman primate survivors. JCI Insight, 4(14), e129629,

https://doi.org/10.1172/jci.insight.129629

* World Health Organization (WHO) (2023, September). Nipah virus infection - India (Disease Outbreak News 2023-DON490). https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON490

* Anish, T. S., Aravind, R., Radhakrishnan, C., & Gupta, N. (2024, December 19). Pandemic potential of the Nipah virus and public health strategies adopted during outbreaks: Lessons from Kerala, India. PLOS Global Public Health, 4(12), e0003926 (PubMed Central PMC11658523), https://pmc.ncbi.nlm.nih.gov/articles/PMC11658523/

* Khan, A. K. M. D., Islam, A., Munro, S., et al. (2025, November 20). Risk of Nipah virus transmission through date palm sap trade in Bangladesh: a qualitative ethnographic study. One Health Outlook, 7(1), 59 (PubMed Central PMC12636189), https://pmc.ncbi.nlm.nih.gov/articles/PMC12636189/

* India Today (2026, February 12). West Bengal reports 1st Nipah death, 25-year-old nurse succumbs to virus. https://www.indiatoday.in/india/story/25-year-old-nurse-dies-nipah-virus-infection-west-bengal-first-fatality-recent-years-2867334-2