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## Nipah virus 1998 to 2018

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### Abstract

Outbreaks of Nipah in South-East Asia have a strong seasonal pattern and a limited geographical range. Nipah virus (NiV) infection in humans can be asymptomatic infection to acute respiratory distress syndrome and fatal encephalitis. NiV infection can be diagnosed together with clinical history during the acute and convalescent phase of the disease. Real time polymerase chain reaction (RT-PCR) from bodily fluids as well as antibody detection. Reducing the risk of human-to-human transmission by unprotected physical contact with infected people must be avoided. Regular hand washing should be carried out after caring for or visiting sick people, in health care setups nosocomial transmission have been reported, contact and droplet precautions should be used in addition to standard precautions.

**Keywords:** Nipah Virus, distress syndrome, fatal encephalitis

### Introduction

Nipah virus (NiV) infection is a newly emerging zoonosis that causes severe disease in both animals and humans. Nipah virus is an RNA virus that is part of the Paramyxoviridae family that was first identified as a zoonotic pathogen after an outbreak involving severe respiratory illness in pigs and encephalitic disease in humans. Nipah virus is closely related to Hendra virus. Both are members of the genus *Henipavirus*, a new class of virus in the *Paramyxoviridae* family.

It is assumed that the geographic distribution of *Henipaviruses* overlaps with that of Pteropus category Fruit bats (Pteropodidae Family, Pteropus genus.) are natural symptomless host for the virus and due to migratory habit of the locally abundant fruit bats in South Asia, Nipah outbreaks occur more in this region. Infected Bat/pig/human's direct contact cause spread infection. NiV can also cause severe disease in animals such as pigs, resulting in significant economic losses for farmers. The name, Nipah, is derived from the village in Malaysia where the person from whom the virus was first isolated succumbed to the disease.

### History

Many of the original human cases of the Nipah Virus disease were provisionally diagnosed as Japanese encephalitis (JE) before the isolation and identification of the newly discovered Nipah Virus.

Previous outbreaks have been reported in India, Bangladesh, Thailand, Cambodia, Philippines, Laos and Malaysia. NiV was first identified during an outbreak of disease in Kampung Sungai Nipah, Malaysia, in 1998, where, pigs were the intermediate hosts. In Bangladesh in 2004, humans were infected with Nipah virus after consuming date palm contaminated by infected fruit bats.

The NCDC India has issued high alert across the country after Nipah virus (NiV) infection outbreak in Kerala. Kerala, a state in South India, has been hit by a spate of Nipah virus infections since 19 May 2018. Since then, 17 people have died from the disease. This is India's third encounter with the virus, with the last outbreak reported in 2007. Scientists in India are still trying to trace the origin of the current Nipah virus outbreak. Laboratory testing of fruit-eating bats (*Megaderma spasma*) found in the compound of the initial victims tested negative for the virus. This may be because the virus stays only for a limited time in its winged host, making its detection difficult, said researchers familiar with the nature of Nipah virus reservoirs.

Earlier in India two outbreaks were reported in the eastern state of West Bengal, bordering Bangladesh, in 2001 and 2007. Seventy one cases with 50 deaths (70% of the cases) were reported in two outbreaks. During January and February 2001, an outbreak of febrile illness

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with neurological symptoms was observed in Siliguri, West Bengal. Clinical material obtained during the Siliguri outbreak was retrospectively analyzed for evidence of NiV infection. Nipah virus-specific immunoglobulin M (IgM) and IgG antibodies were detected in 9 out of 18 patients. Reverse transcription-polymerase chain reaction (RT-PCR) assays detected RNA from NiV in urine samples from 5 patients. A second outbreak was reported in 2007 in Nadia district of West Bengal. Thirty cases of fever with acute respiratory distress and/or neurological symptoms were reported and five cases were fatal. All five fatal cases were found to be positive for NiV by RT-PCR. When an outbreak of encephalitis occurred in Siliguri town of West Bengal in India in February 2001, investigators took nearly six months to conclude that it was a Nipah virus outbreak.

Nipah virus is on the WHO list of Blueprint priority diseases. Earlier this year, the WHO had added Nipah virus to a priority list warranting urgent research along with the Zika and Ebola viruses. However, the WHO has not recommended any trade or travel restrictions to the affected regions.

Transmission is thought to have occurred via respiratory droplets, contact with throat or nasal secretions from the pigs, or contact with the tissue of a sick animal. Incubation period (interval from infection to the onset of symptoms) is believed to range between from 4-14 days. However an incubation period as long as 45 days has been reported.

In the Bangladesh and India outbreaks, consumption of contaminated fruits or fruit products (e.g. raw date palm juice) was the most likely source of infection, later on spread directly from human-to-human by close contact with infected people's secretions and excretions. In Siliguri, India, transmission of the virus was also reported within a health-care setting (nosocomial), where 75% of cases occurred among hospital staff or visitors. From 2001 to 2008, around half of reported cases in Bangladesh were due to human-to-human transmission through providing care to infected patients.

Outbreaks of Nipah in South-East Asia have a strong seasonal pattern and a limited geographical range. All the outbreaks occurred during winter and spring (December-May). This could be associated with several factors like the breeding season of the bats, increased shedding of virus by the bats and the date palm sap harvesting season.

Symptoms of NiV infection in humans can be asymptomatic infection to acute respiratory distress syndrome and fatal encephalitis. Infected people may initially develop influenza-like symptoms of fever, headaches, uneasiness, muscle pain, trembling, twitching and muscle spasms, nausea, vomiting and sore throat, followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis progresses to coma within 24 to 48 hours. Some people can also experience atypical pneumonia and severe respiratory problems, including ARDS.

Most people who survive acute encephalitis make a full recovery, but long term neurologic conditions have been reported in survivors such as seizure disorder and personality changes. The case fatality rate is estimated at 40% to 75%; however, vary by outbreak depending on local capabilities for epidemiological surveillance and clinical management.

Starting signs and symptoms of NiV infection are non-specific and the diagnosis is often not suspected at the time of presentation. This can hinder accurate diagnosis.

NiV infection can be diagnosed together with clinical history during the acute and convalescent phase of the disease. Real

time polymerase chain reaction (RT-PCR) from bodily fluids as well as antibody detection via ELISA are two diagnostic tests, yet virus isolation by cell culture can also be done.

With, limited treatment options, preventive part is must in NiV infection that includes preventing farm animals from eating fruit contaminated by bats and avoiding consumption of contaminated date palm sap. Healthcare workers caring for patients should put in place standard precautions including washing hands. Wearing a gown, mask, cap and gloves is also recommended. There is no vaccine for either humans or animals In the absence of a licensed vaccine, the only way to reduce infection in people is by raising awareness of the risk factors and educating people about the measures they can take to reduce exposure to and decrease infection from NiV. Such as

Reducing the risk of bat-to-human transmission by preventing bat access to date palm sap and to other fresh food products through protective coverings (e.g., bamboo sap skirts). Freshly collected date palm juice if taken must be boiled and fruits should be thoroughly washed and peeled before consumption. Reducing the risk of animal-to-human transmission by gloves and other protective clothing should be worn while handling sick animals or their tissues, direct contact must be avoided. Reducing the risk of human-to-human transmission by unprotected physical contact with infected people must be avoided. Regular hand washing should be carried out after caring for or visiting sick people, in health care setups nosocomial transmission have been reported, contact and droplet precautions should be used in addition to standard precautions.

Across the globe, efforts are underway to develop and manufacture a vaccine against the Nipah virus. For example, on 24 May 2018, a non-profit organization based in Norway—the Coalition for Epidemic Preparedness Innovations (CEPI)—pledged US\$25 million to two pharmaceutical partners (Profectus Bio Sciences, Inc. and Emergent Bio Solutions Inc.) to support research on Nipah vaccines.

The primary treatment is intensive supportive care. Treatment is focused on managing fever and the neurological symptoms. Ribavirin may alleviate the symptoms of nausea, vomiting, and convulsions. In Kerala outbreak Anti-viral drug Ribavirin and a monoclonal antibody were imported and tried on some patients. Alternative medicine systems also issued guideline for treated any suspected case. Central council for research in ayurveda and siddha (CCRAS) also come up with treatment advisory for treating suspected case.

Health experts of kerala hit a blind spot during the initial stages of the outbreak in north Kerala last month. But they fought back and contained its secondary infection and nursed back to health two Nipah-positive patients - Ajanya, a nursing student and Ubeesh, a male nurse. Health experts said that the way the potentially explosive epidemic was contained was laudable.

In two affected districts, Kozhikode and Malappuram, when educational institutions reopened after the extended summer vacation on mid June; all schools devoted the first period of the academic session to Nipah. All medical colleges in the state plan to include epidemiology of this virus in the new curriculum.

Kerala health minister KK Shailaja announced on 10 June, 2018, that the state's Nipah virus infection (NiV), had been contained, with the recovery of the last two patients who tested positive.

On 12 June State government of Kerala lifted the travel advisory stating that now it is safe to travel Kerala as no new case has been reported since last 21 days, this is more than the longest known incubation period of Nipah virus. Hence the outbreak is considered over.

The Center for Infectious Disease Research and Policy (CIDRAP) at the University of Minnesota, with support from the Wellcome Trust and in collaboration with the WHO, has been tasked with facilitating the collaborative development of a draft “Nipah R&D Roadmap”. The roadmap prioritizes the development of countermeasures (diagnostics, therapeutics and vaccines) that are most needed by Nipah-affected countries and is the result of extensive consultations with the Nipah R&D roadmap taskforce, leading national and international experts and other key stakeholders. Comments have been asked from research world before by 08 June 2018.

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