

Nipah virus (NiV) - FAQs

1. What is Nipah virus?

NiV is a newly emerging disease that can be transmitted from its reservoir (natural wildlife host) the flying foxes (fruit bats) to both animals and humans. It takes its name from Sungai Nipah, a village in Malaysia where it was first identified.

2. What do we know about past outbreaks of Nipah virus?

NiV was first recognized in 1999 during an outbreak in Kampung Sungai Nipah, Malaysia. The outbreak among pigs infected approximately 300 people killed over 100 people within a year. An outbreak was also reported in Singapore. No new outbreaks have been reported in Malaysia and Singapore since 1999.

NiV was first recognized in Bangladesh in 2001. Since then, outbreaks have occurred almost every year. The disease was also identified periodically in India – in Siliguri, West Bengal in 2001, in Nadia, West Bengal in 2007 and in Kozhikode and Malappuram, Kerala in 2018.

In 2014, an outbreak of a putative NiV infection resulting in fatal disease in horses and humans was reported in the Philippines.

3. How does Nipah virus circulate in animal populations?

Infected bats shed the virus in their excretions and secretions such as faeces, saliva, urine and birthing fluids. However, as the host reservoir, they are asymptomatic.

NiV is highly contagious among pigs and is spread by infected droplets. Pigs acquire NiV and act as an intermediate and possibly amplifying host after contact with infected bats or their secretions.

4. How is Nipah virus transmitted from animals to humans? How do people get the disease?

NiV is a zoonotic virus (a virus transmitted to humans from animals). People get infected by two mechanisms of zoonotic transmission (i.e. spillover from fruit bats): transmission via an intermediate animal host and bat-to-human transmission. Once NiV is introduced into the human population, human-to-human transmission occurs among family and caregivers of infected patients.

During the initial outbreaks in 1999 in Malaysia and Singapore, most human infections resulted from direct contact with sick pigs or their contaminated tissues. 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.

During the outbreaks in Bangladesh and India, consumption of fruits or fruit products (e.g. raw date palm juice) contaminated with urine or saliva from infected fruit bats was the

most likely source of infection. The outbreak in the Philippines was characterized by horse-to-human, food-borne, and human-to-human transmission.

5. How common is the human-to-human transmission of Nipah virus and what are its risk factors?

Limited human-to-human transmission of NiV has been reported among family and caregivers of infected patients. In Bangladesh outbreaks, the patients' increased age and respiratory symptoms were indicators of infectivity of NiV (i.e. risk-factors for onward human-to-human transmission).

During the outbreaks in Bangladesh, India and the Philippines, NiV spread directly from human-to-human through close contact with people's secretions and excretions. In Siliguri, India, the 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 the human-to-human transmission by providing care to infected patients. The outbreak in Kerala in 2018 saw a similar picture.

6. What are the common signs and symptoms of Nipah virus?

Human infections can range from asymptomatic infection, acute respiratory infection (mild, severe), and fatal encephalitis.

Infected people initially develop influenza-like symptoms of fever, headache, myalgia (muscle pain), vomiting and sore throat. This can be followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis.

Some people can also experience atypical pneumonia and severe respiratory problems, including acute respiratory distress. Encephalitis and seizures occur in severe cases, progressing to coma within 24 to 48 hours.

In the outbreak in Kerala in 2018, we saw patients with encephalitis, myocarditis and acute respiratory infection.

7. How is Nipah virus disease treated?

There are currently no drugs or vaccines specific for NiV infection although this is a priority disease on the WHO R&D Blueprint. Intensive supportive care is recommended to treat severe respiratory and neurologic complications.

The drug ribavirin has been shown to be effective against the NiV in a laboratory (in vitro), but human investigations to date have been inconclusive and the clinical usefulness of ribavirin remains uncertain.

8. Do people who survive Nipah virus recover fully?

Most people who survive acute encephalitis make a full recovery, but long term neurologic conditions have been reported in a few survivors. Approximately 20% of patients are left with residual neurological consequences such as seizure disorder and

personality changes. A small number of people, suffer a relapse or develop delayed-onset encephalitis, after showing signs of recovery.

9. How is the disease diagnosed?

NiV infection can be laboratory diagnosed during the acute and convalescent phase of the disease. Main tests include real-time polymerase chain reaction (RT-PCR) from body fluids (throat and nasal swabs, cerebrospinal fluid, urine, and blood) and antibody detection by ELISA.

10. Why is the diagnosis of Nipah missed in the early stages of the outbreak?

Initial signs and symptoms of NiV infection are non-specific and the diagnosis is often not suspected at the time of presentation. This can create challenges in outbreak detection and institution of effective and timely infection control measures and outbreak response activities.

11. How can the risk of infection in people be reduced?

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.

Public health educational messages should focus on the following:

- **Reducing the risk of bat-to-human transmission:**
Efforts to prevent transmission should first focus on decreasing bat access to date palm sap and to other fresh food products. Keeping bats away from sap collection sites with protective coverings (e.g., bamboo sap skirts) may be helpful. Freshly collected raw juice/date palm sap should be boiled and fruits should be thoroughly washed and peeled before consumption.
- **Reducing the risk of animal-to-human transmission:**
Gloves and other protective clothing should be worn while handling sick animals or their tissues, and during slaughtering and culling procedures. As much as possible, people should avoid being in contact with infected pigs.
- **Reducing the risk of human-to-human transmission:**
Close unprotected physical contact with NiV-infected people should be avoided. Regular hand washing should be carried out after caring for or visiting sick people.

12. How can the Nipah virus be controlled in domestic animals?

Currently, there are no vaccines available against NiV. Routine and thorough cleaning and disinfection of pig farms (with appropriate detergents) may be effective in preventing infection.

If an outbreak is suspected, the animal premises should be quarantined immediately. Culling of infected animals – with close supervision of burial or incineration of carcasses – may be necessary to reduce the risk of transmission to people. Restricting or banning the movement of animals from infected farms to other areas can reduce the spread of the disease.

As NiV outbreaks in domestic animals have preceded human cases, establishing an

animal health surveillance system, using a One Health approach, to detect new cases is essential in providing early warning for veterinary and human public health authorities.

13. How can the Nipah virus be controlled in health care settings?

Health-care workers caring for patients with suspected or confirmed NiV infection, or handling specimens from them, should implement standard infection control precautions for all patients at all times.

As human-to-human transmission in particular nosocomial transmission has been reported, contact and droplet precautions should be used in addition to standard precautions.

Samples taken from people and animals with suspected NiV infection should be handled by trained staff working in suitably equipped laboratories.

14. How long does the Nipah virus survive in the environment?

NiV is a fragile virus. It may survive in the environment for several hours up to a couple of days outside of bats.

15. What is the incubation period of Nipah Virus?

The incubation period (interval from infection to the onset of symptoms) is believed to range between 4-14 days. However, an incubation period as long as 45 days has also been reported.

16. What is the case fatality rate of Nipah virus infection?

The case fatality rate (CFR) has been reported from 40% up to 100%; however, this rate can vary by outbreak depending on local capabilities for epidemiological surveillance and clinical management.

17. What is the Nipah outbreak situation in India?

India confirmed its first Nipah outbreak in Siliguri, West Bengal, in 2001, with 66 cases and 45 deaths. The second outbreak in Nadia district in 2007 reported 5 cases that were all fatal. The third outbreak hit Kozhikode and Malappuram, Kerala in 2018, resulting in 23 cases of whom only 2 survived (CFR 91%). More importantly, human-to-human transmission in various hospital settings (nosocomial infection) has been reported as the principal mode of transmission.

In early June 2019, India reported one laboratory-confirmed case of NiV disease from Ernakulum district, Kerala state. The case had acute febrile encephalitis without the respiratory syndrome, was treated with Ribavirin and subsequently recovered. A dozen suspected cases (symptomatic contacts) were isolated and tested negative; over 330 contacts have been followed up in home quarantine. To date, no other cases have been confirmed.

The health authorities are monitoring the situation closely, while educating the public,

strengthening infection control practices and working with animal health, wildlife, environment to establish the origin and spill-over of the disease from animal to human.

In India, there are 3 laboratories with advanced capacity for NiV diagnoses: Manipal Institute of Virus Research and National Institute of Virology in Alappuzha and Pune, of which the two latter laboratories have been actively contributing towards event verification for the 2019 outbreak.

Deaths among pigs and domestic animals have not been reported so far. National Institute of Virology has collected samples from livestock (pigs and cows) and bat from the residential area of the case. Preliminary results were tested negative.

18. Why the three outbreaks in India (West Bengal and Kerala States) so far apart?

Although the distribution of the virus is restricted so far to Malaysia, Singapore, Bangladesh, the Philippines and West Bengal and Kerala States in India, the distribution of the flying foxes (bats with more than 58 species) which are considered as natural hosts of the virus, extends from the east coast of Africa, across South and Southeast Asia, east to the Philippines, Pacific islands and Australia.

As such all India is part of the flying foxes' territories. It can be conjectured that NiV can emerge as a human pathogen anywhere in these distribution areas. Countries with serological evidence or molecular detection of the virus in these flying foxes include Bangladesh, Cambodia, China, India, Indonesia, Madagascar, PNG Taiwan, and Thailand.

Other Regions may also be at risk for NiV infection, as serologic evidence for NiV has been found in the known natural reservoir (Pteropus bat species) and several other bat species in several countries, including Cambodia, Thailand, Indonesia, Madagascar, Ghana, and the Philippines.

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