

Nipah virus: Age and breathing difficulties increase the risk of disease spread

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Nipah virus, a bat-borne paramyxovirus found throughout South and South East Asia, has been identified by WHO as an emerging infectious disease that may cause severe epidemics in the near future. Infections in humans result in severe respiratory and neurological disease with a high case fatality. With no available treatment or vaccine, the control of Nipah virus outbreaks must rely on a detailed understanding of factors that may facilitate inter-human transmission.

In this context, researchers from the Institut Pasteur, CNRS, and Johns Hopkins Bloomberg School of Public Health, worked with colleagues at the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b), the Institute of Epidemiology Disease Control And Research (IEDCR), and the US Centers for Disease Control and Prevention (US CDC), studied the transmission dynamics of Nipah virus during the last 14 years of outbreak investigations in Bangladesh, the country that has reported the largest number of cases. The study showed in particular that adult cases with respiratory symptoms transmitted the virus to more individuals

than other cases, and might therefore be targeted for interventions when the isolation of all suspected Nipah cases is not possible. This research paves the way to more efficient control measures. These results will be published in the scientific journal *NEJM* on May 9th, 2019.

Nipah virus is a bat-borne paramyxovirus found throughout South and South East Asia. With a case fatality of >70% and no available treatment or vaccines, Nipah virus was identified by the World Health Organization as an emerging infectious disease that may cause major epidemics if the pathogen evolves to become more transmissible, leading the organization to prioritize it for research to prevent future health emergencies.

In the absence of efficient treatments or vaccines, the only way to control Nipah virus outbreaks are through targeted interventions that limit opportunities of spread. However, designing such interventions is challenging in a context where transmission mechanisms remain poorly understood. Further insights on mechanisms of person-to-person transmission of Nipah virus are therefore urgently needed.

To unravel the drivers of person-to-person transmission of Nipah virus, researchers from the Institut Pasteur, CNRS, icddr,b, IEDCR, US CDC and Johns Hopkins Bloomberg School of Public Health studied the characteristics of all Nipah cases and over 2000 of their contacts identified during the last 14 years of outbreak investigations in Bangladesh, the country that has reported the largest number of cases.

The study showed that, in particular, adult cases with respiratory symptoms transmitted the virus to more individuals than other cases, and therefore might be targeted for interventions when the isolation of all suspected Nipah cases is not possible. Moreover, contacts exposed to body fluids, including respiratory secretions, were more

likely to get infected than others- consistent with an important role of respiratory secretions in person-to-person transmission of Nipah virus. The study further showed that spouses of cases and contacts with long exposure duration (often the caregivers) were more likely to get infected and should therefore be the focus of protective measures.

"Epidemic preparedness and the ability to stop transmission efficiently during an outbreak can only be achieved through a detailed understanding of the drivers of Nipah transmission. The detailed outbreak investigations carried out over the last decade by our colleagues from the icddr,b and IEDCR in Bangladesh have made it possible to answer key questions about the transmission of the virus between humans," says Simon Cauchemez, co-senior author of the study and head of the Mathematical Modelling of Infectious Diseases Unit at the Institut Pasteur.

The risk of transmission of Nipah virus depends on the characteristics of the case, like the age or the type of symptoms. Birgit Nikolay, first author of the study, says, "The results of this study help identify patients that should be targeted for interventions such as isolation measures if resources are insufficient to cover all suspected Nipah cases. This may help better control the spread of the virus during large outbreaks. "

Despite these important insights, gaps remain in the understanding of Nipah virus person-to-person transmission. Future research should focus on investigating how the [virus](#) propagates in the human body and refine criteria to identify likely Nipah spreaders. Further research is also planned to better understand when and where [transmission](#) is occurring in bats to help predict spillovers into human populations.

More information: *NEJM* (2019). [DOI: 10.1056/NEJMoa1805376](#)

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