

# Should we be worried about ebola becoming airborne?

October 14 2014, by Dominic Dwyer

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Ebola is not spread through small airborne particles or larger droplets from coughing or sneezing. placbo/Flickr, CC BY-NC-SA

Suggestions the Ebola virus could "mutate" into a form that is transmissible by the respiratory route are speculative, and the likelihood of it happening are low. Nonetheless, the idea appears to have captured public attention to the extent that the World Health Organization

recently made public statements about there being [no threat the virus was airborne](#).

The current Ebola [virus](#) outbreak shows a similar pattern of spread and disease as past such outbreaks, but its emergence in previously unaffected cities and countries has increased mortality and media interest.

Like most emerging human viruses, Ebola is of animal origin: in this case, fruit bats. The method of human-human spread of this virus is clear; it's via contaminated body fluids, be it blood, vomit, faeces or urine. The viral load in these fluids is enormous.

Ebola is *not* spread through respiratory transmission, which happens when people can be infected through inhalation or direct contact with the eyes, nose, or mouth from virus present in large droplets or smaller airborne particles.

Small airborne particles are the most efficient method for community and hospital spread of any infection, as demonstrated by outbreaks of measles, varicella (chickenpox), or even the now-eradicated smallpox.

Larger droplets from coughing or sneezing is the main method for spread of influenza and related viruses. For a virus to spread like this, a patient with respiratory symptoms generally has to be within one or two metres of the uninfected person.

Transmission of respiratory viruses can also occur by direct contact with the nose, mouth or eyes from contaminated hands or surfaces. If respiratory transmission became the dominant mode of community spread of Ebola, presumably following mutations in the Ebola genome, it would "up the ante" in terms of risk the virus poses.

Like many RNA viruses, the Ebola genome changes quickly. But there's no evidence of respiratory transmission in the current or previous Ebola community outbreaks, and the genetic variability of the virus is as expected.

The "slowness" of spread in the current Ebola outbreak is against respiratory transmission being a major factor: the 2009 pandemic influenza virus, spread by respiratory droplets, had become worldwide in a comparable timeframe.

The reasons why this epidemic is continuing are multiple. Ebola outbreaks have not occurred before in this part of Africa, meaning there's limited local medical, public health and laboratory experience in managing the disease.

The early stages of infection are similar to the other common local endemic diseases, such as malaria, diarrhoea and influenza. Inadequate hospital and public health infrastructure increases these clinical difficulties.

This is exacerbated by cases appearing in highly populated urban areas, local cultural practices, such as handling of the dead before burial, and patient care outside the medical system, regional insecurity and suspicion of outsiders.

These factors make it difficult to remove infected cases from situations that allow transmission to others, and to provide the best advice to the community on infection control measures.

And poverty is clearly the main amplifier of the Ebola virus' spread.

Although difficult to prove, aerosols generated by medical procedures may contribute to health-care worker infection in the context of poor use

of personnel protective equipment. But once established in humans, viruses do not generally change their mode of transmission even though they may change in virulence.

This doesn't alter the importance of infection-control measures needed to control the outbreak, especially in the health-care setting. Appropriate mask and personal protective equipment use, with training of health-care personnel, is a crucial part of these procedures.

There are no antiviral agents for the Ebola virus, although virus-specific antibody preparations and new drugs have been proposed and are in trial. Vaccine development has progressed although the interest by the profit-driven industry has been limited.

But there are reasons for delays in vaccine development apart from the likely low financial return. The remoteness of the problem, the rarity of the disease, and technical issues in working with the live virus have also contributed.

In the short term, what's needed most to combat the epidemic is provision of quality infection control practices, and research to fast-track antiviral drugs and vaccines. In the longer term, repair or creation of satisfactory health-care systems (in the context of the alleviation of poverty) in the developing world will minimise the impact of such outbreaks.

Opinions freely given in the general media without supporting evidence risk diversion from the core requirements for controlling this outbreak. These requirements centre on immediate and significant medical, technical and supportive assistance to the affected countries, including clear [infection control](#) advice for their health-care systems and general population.

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