Could BFFB mode breath aerosol play a role in H5N1 transmission?

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Recent findings concerning exhaled aerosol size distributions and the regions in the respiratory tract in which they are generated could have significant implications for human to human spread of lower respiratory tract-specific infections. Even in healthy people, measurable quantities of aerosol are routinely generated from the Lower Respiratory Tract (LRT) during breathing(1-3).

We have found that there at least three modes in the exhaled aerosol size distribution of healthy adults(4) (see Figure 1). These modes each have a characteristic size and arise from different parts of the respiratory tract. The respiratory bronchioles produce aerosol during breathing, the larynx during speech and the oral cavity also during speech. The model of the resulting droplet size distribution is therefore called the Bronchial Laryngeal Oral (B.L.O.) tri-modal model of expired aerosol.

The bronchiolar fluid film burst (BFFB) mechanism (or simply B) mode is produced from fluid lining the respiratory bronchioles(1-3). The B mode droplets are produced in very large numbers by some individuals (see Figure 2). The small size of the B mode droplets means that they can remain in the air for prolonged periods, giving them the potential to travel large distances.

For a virus to be spread effectively between humans by aerosolisation, it must acquire the ability to infect cells in the upper respiratory tract and proliferate there so that high viral load can exist in the fluid that is aerosolised by sneezing and coughing(5).

We examine what role the B mode might play in the context of the news of the two research groups, who have independently demonstrated that H5 viruses including the much-hyped H5N1 avian influenza, can easily be modified to transmit between mammals (ferrets) and suggesting the potential in humans via exhaled aerosol.