

Joint Event

Public Health, Women's Health, Nursing and Hospital Management

December 03-04, 2018 | Lisbon, Portugal

Rhinovirus infection is influenced by atmospheric conditions and outdoor-air virus

Rhinovirus are picornavirus with over 150 serotypes and 3 species. Although usually causing common colds, in Asthma, COPD and elders it may cause life-threatening disease. Transmission routes may involve human-to-human and indirect transmission. To the best of our knowledge, no outdoor-air based transmission has been reported.

In the present study we evaluated the role of outdoor and indoor air-borne virus in the transmission of rhinovirus.

Monthly nasal swabs were collected from 89 volunteers. Weekly outdoor and indoor air samples were collected. Daily atmospheric parameters were collected from the FP-ENAS meteorological station and the public air quality monitoring infrastructure. RNA was purified with Qiagen column-based kits. Viral RNA was quantified by RTqPCR on Lightcycler 1.1 (Roche).

No indoor-air samples showed rhinovirus. Outdoor air samples showed rhinovirus presence with a peak in November, closely resembling the frequency of positive nasal samples. Sun Radiation ($p < 0.0001$), and atmospheric SO₂ ($R = -0.843$; $p < 0.009$) and benzene levels ($R = 0.809$; $p < 0.001$) were found to significantly relate to the presence of nasal rhinovirus.

Conclusions: Air-borne rhinovirus correlates with human infection. This may be influenced by viral stability due to atmospheric conditions. Additionally, immune-system interfering pollutants such as atmospheric benzene may also influence airborne rhinovirus infectivity.

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