



Title	Virus Shedding and Environmental Deposition of Novel A (H1N1) Pandemic Influenza Virus
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Aim

To collect data on patients infected with pandemic H1N1 2009 (swine flu).

Conclusions and results

Primary objective: to correlate the amount of virus detected in a patient's nose with that recovered from his/her immediate environment (surface swabs and air samples) and with symptom duration and severity. Secondary objectives: to describe virus shedding and duration according to major patient characteristics: adults versus children, and those with mild illness (community patients) versus those with more severe disease (hospitalized patients).

Of the 43 subjects followed up, 19 were proven to be infected with pandemic H1N1 virus. The median duration of virus shedding from the 19 infected cases was 6 days when detection was performed by polymerase chain reaction (PCR), and 3 days when detection was performed by a culture technique. Over 30% of cases remained potentially infectious for at least 5 days. Only 2/397 (0.5%) community and none of the hospital swabs taken revealed virus on surfaces. Five subjects had samples of the air around them collected, and virus was detected by PCR from 4; some of the air particles in which virus was detected were small enough to be inhaled and deposited deep in the lungs. Despite some limitations caused by the small number of subjects recruited, important observations have been made. The finding that over 30% of infected individuals have infectious virus in their noses for 5 days or more has infection control implications. The evidence for the significance of both contact and bioaerosol routes of transmission, depends upon demonstrating that viable virus is deposited from an infected patient. This has been shown for touched fomites. Virus has been demonstrated by PCR in air samples, but the results of live virus testing are inconclusive.

Recommendations

The data generated suggest that contact transmission of

pandemic influenza via fomites may be less important than hitherto emphasized, whereas transmission via bioaerosols at short range may be possible, ie, high-level personal protective equipment (PPE) might be needed by healthcare workers when attending patients with pandemic influenza. Further work is being undertaken to consolidate these findings as they have important potential implications for the protection of healthcare workers and the formulation of advice to households, nationally and internationally.

Methods

Adults and children, both in hospital and from the community, who had symptoms of pandemic H1N1 infection, were enrolled and visited every day during follow-up for a maximum of 12 days. Information about symptoms was collected and samples were taken, including nose swabs and swabs from surfaces and objects (fomites) around patients (eg, door handles, remote controls). Samples of air were obtained using validated sampling equipment. These samples were tested for the presence of pandemic H1N1 virus, using PCR to detect virus genome and an immunofluorescence technique to detect viable (live) virus.

Further research/reviews required

See Executive Summary link www.hta.ac.uk/2225.