American Journal of Infection Control 43 (2015) 1372-81

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Letters to the Editor

Do high-touch surfaces in public spaces pose a risk for influenza transmission? A virologic study during the peak of the 2009 influenza A(H1N1) pandemic in Geneva, Switzerland

To the Editor:

In 2009, the influenza A(H1N1) virus caused the first influenza pandemic of the 21st century, lasting from April 2009 through August 2010.[1] An estimated 151,700-575,400 people worldwide died of the virus.[2] To characterize the epidemiology of the virus and advise public health policy makers, research focused on notorious hot spots for transmission, such as health care facilities, schools, and households with laboratory-confirmed cases. The possibility of infection through contact with virus on surfaces shortly before touching the nose or mouth was assessed by studying the survival of the virus on everyday objects, including bank notes.[3] We aimed to complement these investigations in a real live setting of a highly frequented public transport system and other public areas at the peak of the pandemic by screening surfaces for influenza A(H1N1) pdm09 in Geneva, Switzerland. The idea was sparked by vivid social marketing campaigns warning the public of influenza virus lurking in the public transport system and elevators.

A senior infection control physician and 3 medical students performed the specimen collection for virology testing. The times and locations for collection were chosen conveniently on December 3 and 4, 2009, with the objective of covering a broad range of public spaces in the town of Geneva as well as in the University Hospital and Medical School. Swabs were also taken from the immediate surroundings of a patient infected with the pandemic influenza strain. The samples were collected at all times of day, purposefully targeting rush hours.

Reverse-transcription polymerase chain reaction (RT-PCR) and cell culture of influenza viruses were performed at the virology laboratory of the University of Geneva Hospitals, as described previously.[4] In brief, nylon flocked swabs were moistened in 3 mL of Universal Transport Medium (Copan Italia, Brescia, Italy), rubbed on the investigational surface, and then transported to the laboratory in the transport medium tube. A total of 0.4 mL was used for nucleic extraction and RT-PCR analysis (http://www.who.int/csr/resources/publications/swineflu/WHO_Diagnostic_RecommendationsH1N1_20090521.pdf). If results were positive, then 0.4 mL of the sample was used to inoculate Madin-Darby canine kidney cells (CCL34; American Type Culture Collection, Manassas, VA). The cells were collected and submitted to immunofluorescence analysis after 7 days at 37°C under 5% CO_2. According to Swiss law on research on humans, ethics approval was not warranted for this type of study.

A total of 49 swabs were collected, including 22 (45%) in the morning, 20 (41%) in the afternoon, and 7 (14%) in the evening. The swabs were collected from high-touch surfaces in public transport vehicles, from ticket and coffee vending machines, and from elevator buttons and door handles at the hospital and medical school (Table 1; online). Only 1 specimen tested positive for A(H1N1) pdm09: the swab from the right bedrail of a female A(H1N1) patient. The corresponding culture remained negative, however.

Although busy public transportation systems in large cities are known to pose a significant risk for airborne transmission of viral infections, surprisingly, during the peak of the pandemic, we did not detect influenza A(H1N1)pdm09 on high-touch surfaces of the public transport system or within the hospital and medical school, except in the vicinity of an infected patient. The incidence of influenza A(H1N1) was 40/100,000 in Geneva during the study week, as reported by the Swiss Federal Office of Public Health, and was higher in the 3 preceding weeks, with a maximum rate of 80/100,000. Thus, sampling during different time points could have increased the chance of obtaining positive swabs.

Our samples were taken from nonporous metal, glass, and plastic objects, which showed a virus survival time of 24-48 hours in previous studies.[5] Survival of virus particles were also found to vary, from 8 hours on cloth,[6] 30-60 minutes on human fingers,[4,7] and several days on bank notes,[3] depending on virus quantity, material, and beneficial microenvironment, including temperature, pH, and humidity. We speculate that our negative results could have been linked to low virus quantity, given that people acutely infected with influenza A(H1N1)pdm09, shedding large amounts of virus, were presumably less likely to use public transport systems. Furthermore, the samples were taken from highly frequented surfaces, which could result in a decrease in virus concentration with each consecutive touch. Furthermore, increased vigilance during the pandemic might have fostered overall hand hygiene among the public.

In contrast to the message portrayed by public advertisements during the pandemic, we did not detect influenza A(H1N1)pdm09 on surfaces in buses and trams. Larger studies are needed to assess the true risk of acquiring influenza infections through contact with potentially contaminated surfaces in high-touch areas.

The authors thank Ruoxi Ren, Yassaman Alipour Tehrany, and Babtiste Waeber for their help with swab collection, and Francisca Morán Cadenas, Federal Office of Public Health Switzerland, for providing the epidemiologic data.

SUPPLEMENTARY DATA

Supplementary data related to this article are available at http://dx.doi.org/10.1016/j.ajic.2015.07.012.

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Conflicts of interest: None to report.

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http://dx.doi.org/10.1016/j.ajic.2015.07.012

Electronic control device prongs: a growing cause of bloodborne pathogen exposure?

To the Editor:

Electronic control devices (ECDs) are now being used by many law enforcement agencies as nonlethal means to subdue individuals. The devices fire 2 small dart-like probes into a target individual that attach through the skin with a fishhook-like prong and remain attached to the weapon to deliver an electronic shock to disrupt voluntary muscle control. For the first time in our reported sharps exposure history, 2 separate BBP exposures involving ECD probes were reported at our medical center in the months of April and May of 2015. The first involved a staff member in our medical center's emergency department (ED) and the second concerned a law enforcement officer.

CASE 1

An ED clinical staff member was taking the vital signs of a patient who was subdued using an ECD. The ECD probe was still embedded in the patient's soft tissue of their chest wall. The patient moved, causing the probe to dislodge and the prong tip punctured the staff member's palmer surface of their right hand. The staff member received treatment, including BBP exposure treatment, per our protocol.

CASE 2

A law enforcement officer suffered an abrasion and puncture wound because of an ECD probe prong after it was removed from a man who was later brought to our ED. The Massachusetts Department of Public Health mandates the health care facility that receives individuals who are the source patient for an unprotected exposure provide testing for HIV (with consent) and hepatitis B and C. In addition, the exposed provider is offered medical care, follow-up, and counseling.

Discussion with local law enforcement agencies determined that there has been increased use of ECDs and that at least 1 additional local law enforcement agency was anticipating to further increase their use of these devices.

In follow-up to these 2 events, an alert memo was sent to all staff working in the medical center's 2 EDs and to affiliate EDs outlining the following reminders and guidelines:

- ECD probe prongs represent a sharp exposure risk.
- Ensure the cooperation of the patient so not to put yourself, staff, or the patient at risk of injury.
- An instrument, such as a hemostat, should be used to remove ECD probes attached to a patient (and do not directly remove them by hand).
- Dispose of ECD probes in an approved, hard-sided sharps container.
- If there is an exposure, it should be treated the same as any bloodborne fluid exposure.

Because the electric shock delivered by an ECD can potentially cause the subdued individual to fall or induce cardiac arrhythmias, it is likely that EDs will see an increasing number of patients presenting after they have been subdued by these devices.[1-3] Institutions should consider educating staff as to the sharp injuries risk associated with them and implementing procedures to reduce the risk.

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Conflicts of interest: None to report.

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