

time with friends, and those who had negative urine results on heroin, and poly-drugs ( $p < 0.05$ ). Patients with a co-infection status who reported high alcohol use were more likely to have a negative urine result for illicit drugs ( $p < 0.0342$ ) than co-infected patients with low alcohol use. Similarly, co-infected patients with high alcohol use were less likely to use heroin ( $p < 0.030$ ) and poly-drugs ( $p < 0.041$ ) compared to co-infected patients with low alcohol use. Regardless of co-infection status, there was a significant reduction in illicit drug use with the interaction of alcohol and current methadone dose ( $p < 0.0032$ ).

**Conclusion:** Alcohol consumption during methadone treatment affects heroin and poly-drug use of HIV/HCV co-infected patients. Further comprehensive analysis of this inverse relationship will be beneficial by considering socio-economic, behavioural and pharmacological interactions among co-infected patients with further HIV/HCV treatments.

<https://doi.org/10.1016/j.ijid.2023.04.253>

### LOW CONCENTRATION OZONE FOR SURFACE DISINFECTION AGAINST SARS-COV-2 AND FELINE CORONAVIRUS

V. Tiong<sup>1</sup>, P. Hassandarvish<sup>1</sup>, P. Tham<sup>2</sup>, D. Lu<sup>2</sup>, S. AbuBakar<sup>1</sup>

<sup>1</sup>Universiti Malaya, Tropical Infectious Diseases Research & Education Centre (TIDREC), Kuala Lumpur, Malaysia

<sup>2</sup>Medklinn, Medklinn, Shah Alam, Malaysia

**Intro:** Surface and environment disinfection is an important part of infection control strategies, especially in the ongoing COVID-19 pandemic. Ozone, a highly reactive oxidant, is a widely used disinfectant in many industries including food, healthcare and water treatment. It has a broad-spectrum activity and leaves no harmful residues. However, most demonstrated efficacy has been at high ozone levels ( $> 1$ ppm) which can be harmful to humans in case of exposure. Here, we undertook a study to evaluate if exposure to ozone is effective in inactivating SARS-CoV-2 and feline coronavirus (FCoV) even at low concentrations.

**Methods:** Ozone at 0.07, 0.1 and 1.2 ppm were evaluated for its virucidal activity against SARS-CoV-2 and FCoV. An ozone gas generator (Medklinn Air + Surface Sterilizer (Cerafusion™ Technology), Medklinn, Malaysia) supplied controlled levels of ozone to a custom-built chamber of 1.5 ft<sup>3</sup> (1.5ft x 1ft x 1ft) where dry virus films containing  $1 \times 10^4$  PFU of test virus were exposed to ozone gas for 0.5h, 1h, 3h, 5h, and 8h. The experiment was performed at ambient temperature (23–24°C) and relative humidity (RH) of 55% (FCoV only) and 85% (SARS-CoV-2 and FCoV).

**Findings:** At low level of ozone of 0.1ppm,  $> 90\%$  reduction of both viruses was achieved after 3h exposure at 85% and 55% humidity. At 1.2ppm,  $> 90\%$  reduction of both viruses was achieved after 0.5h exposure at 85% humidity. Ozone at 0.07ppm, however, did not show good efficacy as reduction not exceeding 90% was achieved only after 8h exposure at 85% and 55% humidity.

**Conclusion:** The study demonstrated that low concentration of ozone of at least 0.1 ppm reduced SARS-CoV-2 and FCoV by  $> 90\%$  when used at 85% humidity. The use of low level ozone presents a safer alternative for disinfecting enclosed spaces and greatly reduces any potential harmful health effects in case of accidental exposure.

<https://doi.org/10.1016/j.ijid.2023.04.254>

### A HOSPITAL-BASED ENTEROVIRUS 71 SURVEILLANCE IN SOUTHERN VIETNAM, 2012-2020

Y. Chang<sup>1</sup>, T.H. Khanh<sup>2</sup>, W.-C. Chang<sup>1</sup>, N.T. Hung<sup>2</sup>, S.-T. Luo<sup>1</sup>, L.N.T. Nhan<sup>2</sup>, W.-Y. Chung<sup>1</sup>, Y.-S. Chien<sup>1</sup>, M.-S. Lee<sup>1</sup>

<sup>1</sup>National Health Research Institutes, National Institute of Infectious Diseases and Vaccinology, Miaoli, Taiwan

<sup>2</sup>Children's Hospital 1, Infectious Diseases, Ho Chi Minh City, Viet Nam

**Intro:** Enterovirus-A71 (EV-A71), a major cause of hand, foot, and mouth diseases (HFMD), has caused several outbreaks in Vietnam after its first identification in 2003. In 2011, a large-scale EV-A71 outbreak occurred in Southern Vietnam. To characterize epidemiological patterns of EV-A71 in Southern Vietnam, we conducted a hospital-based enterovirus surveillance in Children's Hospital No. 1 (CH1) Ho Chi Minh City over a 9-year period from 2012-2020.

**Methods:** Clinical samples (throat swabs and serum) were collected from CH1 inpatients with suspected enterovirus infection for virus isolation in CH1. VP1-CODEHOP, a molecular assay, was performed for detection and genotyping of enteroviruses in National Health Research Institutes. Full genomes of selected EV-A71 viruses were also sequenced for phylogenetic analysis using Neighbor-joining method in MEGA 11 software.

**Findings:** From 2012 to 2020, a total of 3184 HFMD inpatients were tested and 1693 of them (53%) were positive for enterovirus using VP1-CODEHOP, including 368 (11.56%) EV-A71 cases. Based on virus isolation conducted in 2012-2019, EV-A71 detection rate was 6.79% (177/2607). During the study period, EV-A71 was the top serotype detected in 2013, and 2016~2018. Overall, the other prevalent serotypes were CV-A2, CV-A6, CV-A10 and CV-A16. Partial VP1 genes of 368 EV-A71 isolates were sequenced, 86.4% were genotype B5 and 13.6% C4. The predominant genotype was C4 in 2012 and shifted to B5 afterward. Based on full genome sequencing of five EV-A71 strains (3 B5 and 2 C4), the genotype C4 viruses were phylogenetically related to the C4 viruses isolated in China, genotype B5 were phylogenetically related to the B5 virus circulated in Malaysia, Singapore, and Taiwan.

**Conclusion:** EV-A71 outbreaks occurred every 2-3 years in Southern Vietnam and the predominant genotype circulating in Southern Vietnam was genotype B5. Development of EV-A71 vaccine is the priority and other prevalent serotypes should be included for developing multivalent vaccines in the future.

<https://doi.org/10.1016/j.ijid.2023.04.255>