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Reasons for Increased Social Distancing and Surface Disinfection from a Physics Perspective

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Introduction

There is increasing scientific evidence for the spread of the new coronavirus SARS-CoV-2 by the airborne transmission of virus particles in congested areas.

Experts in air dynamics have used simulations to show that such virus particles, which have typical sizes of 120 nanometres (400 times smaller than the width of a human hair), can be carried by exhaled water droplets over distances that are greater than the current recommended social distance of 2 metres, especially in the presence of rapid airflow, such as that from air conditioning systems. Such evidence, which is based on physics and surface science, indicates the importance of using non-pharmaceutical interventions, including increased social distancing and improved surface disinfection, at points of contact in society.

Research scientists such as Ben Cowling, an epidemiologist at the University of Hong Kong, have reported that liquid gas clouds formed through coughing and sneezing can contain a wide range of droplet sizes, with droplets that have sizes of below 5 micrometers travelling by distances of much more than 2 metres. According to a 2014 research report from the Massachusetts Institute of Technology, which included applied mathematics Professor John Bush [1], such droplets can be swept by gas clouds and re-suspended by eddies, before dropping slowly. A more recent report from March 2020 by one of the authors of the previous study shows that exhalation speeds can reach 30 metres per second, with the resulting clouds spanning up to 8 metres [2].

The ability of the virus to spread through normal breathing has been stated by Dr. Anthony Fauci, the top infectious diseases expert in the US, as well as in a report in The New England Journal of Medicine from the National Institute of Allergy and Infectious

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Diseases in Hamilton [3].

As SARS-COV-2 virus particles can have life times of several days on surfaces in public stores and at other contact points such as buses and trains, the virus can accumulate over time with a coverage that is difficult to estimate.

While politicians discuss coronavirus exit strategies and loosening lock-down, we wish to emphasise the importance of considering evidence based on basic physics in favour of the implementation of even greater social distancing, as well as the use of improved disinfection methods in air conditioning systems and surfaces in public areas, such as stores, public transportation, hospitals, care homes and offices.

Examples of disinfection approaches that could be implemented in the future include the use of ozone in public areas at night and the redesign of air conditioning systems to include higher quality filters and ultra-violet light sanitizers, especially in hospitals.

High concentration of ozone gas for the bio-clean room has been confirmed to have good sterilization effect [4]. With this evidence, we can think about to use high concentration ozone around 400 ppm to sterilization of PPE which is in shortage due to supplier chain issue. With or without sonication, inactivation of viruses and bacteria by ozone is observed as well[5]. For this reason, if using correctly with guidance by experts, various types of situation can be treated with high efficiency including ambulance cars, offices, shops, hospticals and supermarkets. We also found ozone can be used for air plane. Due to gas phase as highly active molecular form, in comparison to UV disinfection measure, ozone molecular can diffuse into the area which is not possible radiated by UV light. This will be useful for reopening after shut-down which is inevitable. Combination with other disinfection measures, will do positive role to reduce spreading rate.

References

1. L. Bourouiba et al., J. Fluid Mech. (2014), vol. 745, pp. 537-563
2. https://jamanetwork.com/journals/jama/fullarticle/2763852
3. N. van Doremalen et al. The New England Journal of Medicine DOI: 10.1056/NEJMc2004973
4. T. Iwamura, K. Nagano, T. Nogami, N. Kosaka, H. Shintani, M. Katoh, Biocontrol Sci. 2013; 18(1):9-20
5. G.R. Burleson, T.M. Murray and Morris Pollard, Appl Microbiol. 1975 Mar;29(3):340-344