BRIEF COMMUNICATION

SARS-COV2 Source, Control, Conundrums

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There have been several recent publications on the exposure and control options against COVID-19.[1,2] Effects of physical distancing, eye and respiratory protection and person to person spread of SARS-CoV-2 have been extensively described in literature.[3] We would like to caution readers drawing causal conclusions based on statistical modelling alone for example, the beneficial effect of eye protection alone may not be biologically plausible.

The major differences between surgical masks and respirators are shown in table 1. Respirators have finer filters and seal against the wearer's face but require mandatory ***fit testing,*** allowing for variations in face shape and size in different gender and ethnic groups.[4] Once *fit tested*, a wearer should adhere to the same make and model and *fit check* before entering high-risk areas.[5]

As surgical masks and respirators are in short supply worldwide, universal public masking for preventing spread should be with multi-layered cloth masks, preferably certified.[6] Those with medical contraindications to mask wear may be placed at risk especially when conducting heavy work activities or exercise. Three students in China died during intense physical exercise whilst observing mandatory mask wear.[7] Droplets and aerosol are an artificial divide – particle sizes exist as a continuum.[8] A droplet can become aerosol with evaporation. The minimum infective dose of SARS-CoV2 is still unknown. The relative contributions from droplets, aerosol and indirectly via fomites is also uncertain. Further, particle settling time and maximum travel distance in air will depend on prevailing wind, room size, amount of ventilation, air exchange, humidity and whether the particles were propelled by cough, sneeze and singing/ shouting. Particle density also depends on the number of virus shedding occupants in the room.[8]

Should we observe physical distancing? Physical distancing is sufficient for non-propelled droplets, but insufficient for aerosol and propelled droplets. Nevertheless, it is highly protective when combined with universal mask wear to keep air and surfaces clean. It would be prudent to avoid repeated and lengthy exposure, and we should reduce aerosol-generating activities such as talking, singing, and shouting during the pandemic. Self-isolation of those with COVID-19 symptoms, universal mask wear, hand hygiene, strict no touching of face and one another, and ventilation of closed spaces should allow society to reopen.[9]

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Table: *Differences between Surgical Masks and Respirators.*

	Surgical Mask	N95/FFP2/FFP3 Respirators
Purpose	Primary use to prevent bio-aerosol spread from the wearer.	Primary use to protect wearer from exposure to inhaling bio-aerosol from ambient air.
Intended Use	Protection against expel of large droplets from wearer, and external splashes/sprays of bodily or other hazardous fluids.	Protection against inhaling particles including small particle aerosols up to MUC* and external splashes/sprays of bodily or other hazardous fluids (only non-oil aerosols). Protect against expel of large droplets from wearer with exception of respirator with exhaled valve.
Face Seal Fit	Loose- fitting	Tight-fitting

Fit-Testing Requirement	No	Yes (N95) No (FFP2) Yes (FFP3)
Ability for User Fit-Checking	No	Yes
Filtration	Unreliable protection against airborne particle filtration and is not considered respiratory protection	(N95)≥ 95% (FFP2) ≥ 94% (FFP3) ≥ 99%
Leakage	Leakage occurs around the edge of the mask when user inhales	When properly fitted and donned, minimal leakage occurs around edges of the respirator when user inhales
Clean-Shaven Requirement	No	Yes

*MUC – Maximum Use Concentration calculated as safe exposure concentration multiply by respirator assigned protection factor (APF). As there is no safe infection dose for SARS-CoV-2, the use of respirator only offers a relative exposure concentration reduction up to the APF of the selected properly fitted respirator.

Conflict of Interest

Authors declared no conflict of interest.

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