Introduction: The role of the indoor environment in the COVID-19 pandemic

Yuguo Li
Department of Mechanical Engineering and School of Public Health
The University of Hong Kong
Pokfulam Road,
Hong Kong SAR, China

Understanding where and how SARS-CoV-2 is transmitted from an infected to a susceptible is essential for effective intervention. The once-in-a-century pandemic of COVID-19 occurred right in the age of AI and big data. Many clusters or outbreaks were identified through contact tracing by local health authorities in China and elsewhere using both traditional and new technologies. Based on a synthesis of the existing understanding of the transmission of most respiratory infection, and the data we have so far for the COVID-19 pandemic, I shall show how indoor environments play a role in the pandemics, and also infer the possible dominant transmission route(s) and shall also classify one common misleading concept in defining the droplet transmission, i.e. the threshold droplet size. In particular, the short-range airborne route has not been sufficiently recognized, but very likely has played a role in COVID-19 and other respiratory infection.

Biography

Yuguo Li is Chair Professor of Building Environment, Department of Mechanical Engineering, and Honorary Professor, School of Public Health, at The University of Hong Kong. He studied at Shanghai Jiaotong University, Tsinghua and KTH in Stockholm, and was a Principal Research Scientist at CSIRO, Australia. His main research interests are on building environment engineering (indoor air quality, city climate, and environment studies of infection). He led the development of 2009 WHO guidelines on natural ventilation. He currently serves as Editor-in-chief of Indoor Air and was the President of ISIAQ Academy of Fellows.

Highlights:

- The transmission dynamics of the COVID-19 outbreak is still unclear but developing strategies for mitigating the severity of the pandemic is now a top priority for global public health.
- We developed a new compartmental model to predict the evolution of COVID-19 in China and the world.
- We predicted that the epidemic can only be contained if more stringent interventions were implemented as earlier as possible. Otherwise, COVID-19 epidemic will break out again this autumn, with perhaps 2 billion cumulative cases at the end of 2020.
- China has essentially succeeded in controlling COVID-19 and the experience will encourage other countries to act proactively.

Biography

Qihong Deng (PhD., Professor, FISBE)
Email: qhdeng@csu.edu.cn; Homepage: http://faculty.csu.edu.cn/dengqihong

Dr. Deng is a distinguished professor of Central South University, Changsha, China. His work has been mainly focused on the health risk of air pollution and global warming, with the objectives to design comfortable and healthy buildings and/or cities. He is now a fellow of the International Society of the Built Environment (ISBE) and one of the Most Cited Chinese Researchers (Elsevier). He is now a guest editor of Environment International (2019-), regional editor of International Journal of Environmental Health Research, and editorial board members
for several international journals including Indoor Air, Building and Environment, Energy and Buildings. Dr. Deng is the president of Healthy Buildings 2019 Asia, a flagship international conference of ISIAQ. He won the award National Excellent Doctoral Dissertation of China in 2005 and has published more than 80 papers in the international journals.