

Analysis of COVID-19 transmission in hospital isolation room with different ventilation configurations

DAO THI HUYEN, 김교선[†]

강원대학교

(kkyoseon@kangwon.ac.kr[†])

The world is now facing the COVID-19 pandemic and the control of COVID-19 spread in health care facilities is a serious concern. The ventilation system of isolation rooms for infectious patients plays a significant role in minimizing the spread of viruses and the risk of infection in hospital. In this study, computational fluid dynamics (CFD) simulation is used to investigate the important factors on evaporation and dispersion of multi-component cough droplets in the isolation room with different ventilation configurations. We analyzed the influence of air outlet positions on the removal efficiency of infectious particles. We found that the evaporation rate of droplets is strongly dependent on the relative humidity (RH) and the time for the droplets to shrink to critical size (to reach the equilibrium state between droplet and vapor phase) at RH=90% is 3.1 times longer than at RH=30%. By comparing the particle removal efficiencies with various designs of ventilation system, we tried to propose the optimum location of exhaust vent in hospital isolation room.