

Performance Assessment of COVID-19 Swab Collection Booth (SCB)

Abstract— In the wake of the COVID-19 pandemic, all emergency and routine medical activities have been greatly affected. A safe method of swab collection for PCR testing is deemed necessary for the sake of protection of healthcare workers and patients, and in mitigating the pandemic through timely contact tracing. Given the highly contagious character of the virus, swab collection booths should be aimed at creating a safe environment for the collection of specimens from the patients. This can be accomplished by achieving a desired pressure difference between the chambers containing the patients and the doctors. Quite a few such systems were developed and implemented worldwide, including in Nepal; however, their scientific study is very limited. Thus, with a view to scientifically back the claims of positive pressure mechanisms warranted in swab collection process, in this paper, the airflow into and out of a swab collection booth (SCB) is simulated using computational fluid dynamics (CFD) techniques. The model simulated showed a positive pressure inside the chamber proving that the air carrying droplets cannot enter the chamber stationing the medical staff.

Keywords—*COVID-19, Computational Fluid Dynamics (CFD), Swab Collection Booth (SCB)*