

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**PREDICTING THE SECONDARY INFECTION
FOR AIRBORNE TRANSMISSION OF COVID-19
INFECTION IN BOEING B737-800 PLANE: BASED
WELLS-RILEY APPROACH**

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**NUR AMIRA NADIA BINTI MOHD ALI (2021119855)
AINI SAHIRA BINTI MOHAMAD RAZALI (2021132165)
SITI ADIBA BINTI MAHASAN (2021103367)**

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ABSTRACT

This study are mainly about estimating the potential risk of Covid-19 infection among passengers on Boeing B737-800 aircraft. The aim of this study is to calculate secondary infection for Covid-19 virus in the Boeing B737-800 aircraft due to airborne transmission. Aircraft are preferred over other enclosed spaces like trains and buses because they require passengers to spend longer time in the enclosed spaces during flight without any interruption between the journey. A major risk to passengers in a cabin could be posed by massive droplet and airborne transmissions given the high density and close proximity of passengers. An aircraft with passengers in a cabin would increase the risk for infected people becoming more frequent since it has a high occupant density but limited fresh air supply. The Wells-Riley model is used in this study because it is appropriate for populations in confined spaces and it has been frequently used for quantifying the infection risk assessment of infectious illnesses in indoor settings. In this study the secondary risk of infection is calculated for every susceptible passenger flying for one, two, three and four hours journey. Based on the finding, it is found that the relationship between exposure time and number of infected people are positive linear relationships. This means that the longer time a passenger is exposed to the infected people in the cabin, the higher chance of the passenger getting infected by the virus. The reproduction number is estimated to be 2 passengers when the exposure duration is less than 2 hours for 80 passengers or less than 1 hour for 166 passengers. This estimation indicates that the risk of secondary infection is not under control and the reproduction rate of secondary infection is high. Based on Olsen, 2003, if the value of secondary infection are greater than 1, a disease may grow in the environment, whereas if the secondary infection are less than 1, it will indicate that the infection is under control. Therefore, it can be concluded that there is a high chance passengers may get infected in the aircraft and the risk will increase when the exposure time is increasing. The best alternatives for protection against large droplets and direct contact transmission for the passengers are wearing mask and face shield, social distancing and sanitising hands frequently. An improvement in ventilation seems to be effective and feasible to prevent Covid-19 infection.