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Safety of air travel during the ongoing COVID-19 pandemic

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Dear editor

During the continuing COVID-19 pandemic, countries have partially resumed air travel; however, strict COVID-19 guidelines have been implemented to control the spread. Travelling with a passenger with an unknown infection status or getting infected from a co-passenger seem to be the biggest concerns for air travelers. However, as more information regarding COVID-19 becomes available, public perception regarding air travel safety is also changing. An older International Air Transport Association (IATA) survey showed a significant reduction in the willingness of passengers to travel by air, with 30% of passengers willing to wait at least six months before they consider flying while 10% were unwilling to fly for at least a year [1]. However, as the COVID-19 pandemic progresses with the roll-out of vaccines against COVID-19, more people have resumed air travel for essential activities. A study by Graham et al. among the aged population (>65 years) in the United Kingdom, showed that social distancing, regular disinfection and mandatory use of masks were the preferred measures, while most participants were concerned that they could acquire the virus on-board the airplane [2].

Respiratory infections spread primarily via droplets with size ≥5 μm, released while breathing, speaking, singing, coughing or sneezing; these travel short distances (≤1 m) [3]. Guidelines suggest that the sphere of transmission of COVID-19 is most likely to be within a distance of 2 rows or 2 m from the infected person [3]. Risk of transmission of droplet infections for passengers within the 2-row distance is approximately 6%, while the risk beyond this distance is about 2% [3]. This suggests that seating proximity to the infected passenger is not the sole factor influencing transmission. Other factors such as the movement of other passengers or flight crew and physical proximity before or after the flight could also lead to potential transmission. Transmission could also occur via fomites and contaminated hands. Aerosol (respiratory particles < 5 μm) transmission could occur during the closing and opening of cabin doors. A study by Olsen et al. on the in-flight transmission of Severe Acute Respiratory Syndrome (SARS) during a flight from Hong Kong to Beijing exhibited airborne transmission due to a dysfunctional air filtration system and infection before or after the flight as possible transmission mechanisms [4]. Large numbers of people have travelled by air to different locations during various respiratory infection outbreaks in the past, and the overall reported incidence of airborne respiratory infection among airline passengers and crew is very low.

Overall (Table 1), the risk of transmission of respiratory tract infections such as SARS, COVID-19, influenza, and tuberculosis during a flight varies according to the nature and mode of transmission of that disease.

The air quality within modern commercial aircraft is enhanced by frequent air changes, with a complete air change every 2–4 minutes [5]. The air travels into the cabin through overhead inlets and is removed through outlets near the floor [5]. This maintains a constant, unidirectional flow of air downwards toward the passengers. The airflow occurs at the row level, without significant forward or backward flow, reducing the possibility of transmission between rows [5]. About 60% of the air circulating within the plane is drawn from outside and is fresh, while 40% of the air is filtered via the high-efficiency particulate air (HEPA) filters and re-circulated [5]. HEPA filters have the capacity of filtering 99.7% particles above the 0.3-μm sizes [5]. The use of HEPA filter is less frequent in small aircrafts carrying less than 100 passengers as the cost to retrofit the filters may be high [5]. However, most modern (bigger) aircraft contain HEPA filters, and there are strict guidelines from the International Civil Aviation Organization (ICAO) regarding servicing and operation of HEPA filters in an aircraft. Furthermore, air flow exchange rate and direction seem to be less conducive for droplet spread, and seating arrangement with a passenger facing forward has been linked to a lower risk of in-flight transmission of COVID-19.

Air travel is becoming increasingly necessary as the pandemic continues into the second year. The evidence so far suggests a minimal risk of in-flight transmission of COVID-19 because of the air-flow management mechanisms, especially if the travelers, crew members, and airlines follow adequate COVID-19 safety measures. Recent reports suggest that together with stringent in-flight safety measures for air travelers during COVID-19, proper standards and care should be given to the ground handling of passengers and crew. All stakeholders must ensure information regarding air travel is regularly updated and communicated to the travelers.

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Table 1
Reports of COVID-19 Transmission on board Aircraft [6].

Flight/Case	No. of passengers	No. of positive cases	No. of transmissions	Date	Remarks
Tel-Aviv to Frankfurt	78	7	Two likely transmissions	March 9, 2020	Seven passengers tested positive, and 2 likely transmissions during the flight. The passenger with likely transmission was seated within 2 rows of an index case.
QF577, Sydney to Perth	241	29 (18 primaries and 11 secondaries)	8 out of 11 secondary cases were reported to be flight associated	March 19, 2020	29 tested positive, among which 18 primary cases from 13 passengers from a cruise ship. 8 out of 11 passengers might have got infected during the flight
VN54, London to Hanoi	201	16	15 highly likely transmissions	March 2, 2020	One index case transmitted it to at least 12 persons in flight
CX811, Boston to Hong Kong	NS	2	Two highly likely transmissions	March 10, 2020	Two index cases contracted COVID-19 in the US and transmitted to 2 flight attendants during the flight
Repatriation of Israeli nationals from Diamond Princess	11	2	0	February 20, 2020	Passengers were seated in proximity. They wore masks except during two meals for about 15 minutes.
Singapore to Hangzhou, China	355	16	1	January 24, 2020	The one case was seated close to 4 infected cases for about 1 hour, without an adequately worn mask Contact, airborne and droplet transmission have been documented similarly for influenza and SARS.
Guangzhou to Toronto	350	1	0	January 22, 2020	The case was symptomatic (dry cough) and had 25 close contacts. The passengers were wearing masks

NS – Not stated.

Ethical approval

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Author contributions

BKC and RS authors contributed to the conception of the review, reviewed the literature, and drafted the manuscript. PL, PRS and SS critically reviewed the manuscript. All authors contributed to the revision of the manuscript.

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Declaration of competing interest

All authors report no potential conflicts.

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