

Is the cabin environment safe?

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Multiple Layers of Safety Throughout the Journey



1
Health screening including self-declaration and temperature screening



2
More **contactless and self-service** processes



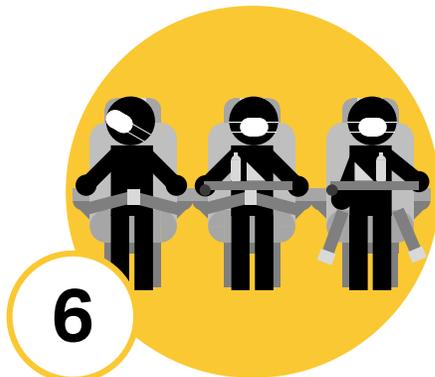
3
More frequent and deeper **cleaning and sanitization** in airport and aircraft



4
Physical distancing at the airport where possible



5
Mask wearing for passengers and crew



6
Simplified cabin service to decrease crew movement and interactions with passengers



7
Limited movement during flight to avoid passengers congregating



8
Contactless procedures for customs and border protection

What are passengers saying?

- **86% say that they felt safe when traveling**
 - Survey sample was of people who had traveled since June
- **But mixed messages on cabin air quality**
 - 60% say that cabin air is as clean as a hospital
 - 60% say that cabin air is dangerous
 - And their biggest concern is catching COVID-19 from the person next to them

Is this concern evidenced by the number of cases of onboard transmission?

Flight-associated spread: up to 44 people in 2020 (1.2 billion pax)

Sector	Author	Month	Primaries	Secondaries	Comment
Guangzhou-Toronto	Schwartz	Jan	1	0	
Singapore-Hangzhou	Chen	Jan	15	1	Possible
Bangui-Yaounde	Eldin	Jan	1	1	Possible (by exclusion, questionable assumptions)
Tel Aviv-Frankfurt	Hoehl	Mar	7	2	Possible
Various-Greece	Pavli	Feb-Mar	21	5	Includes 1 cabin crew, 891 traced
Milan-Seoul	Bae	Mar	7	2	Probable, masks worn, asymptomatic primaries, 1 on the original flight + 1 on a subsequent flight
London-Hanoi	Khanh	Mar	1	15	Probable
New York-Taipei	Freedman	Mar	11	0	Masks worn
Boston-Hong Kong	Choi	Mar	2	2	Whole genome sequencing, both cabin crew
Sydney-Perth	Speake	Mar	3	11	8 definite/3 probable, whole genome sequencing,
Dubai-Hong Kong	Freedman	Jun-Jul	85	2	Possible, masks worn, 6 flights/1 with secondary
IATA Medical	MAG	Feb-Mar	1100	3	Possible, informal data, includes 2 cabin crew*
CDC	In media	2020	1600	TBD	
Total			2853	44	Includes 6 cabin crew

Excluded for lack of evidence/duplication: Yang et al (Singapore-Hangzhou), Qian et al (Hezhiang) *Excluded pilot-pilot transmission events, unknown when they occurred

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See also:

<https://www.nejm.org/doi/full/10.1056/nejmc2001899> Wuhan to Germany

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7055038/pdf/eurosurv-25-8-2.pdf> Wuhan-Thailand

<https://www.nownews.com/news/20200422/4046494/> CI 011

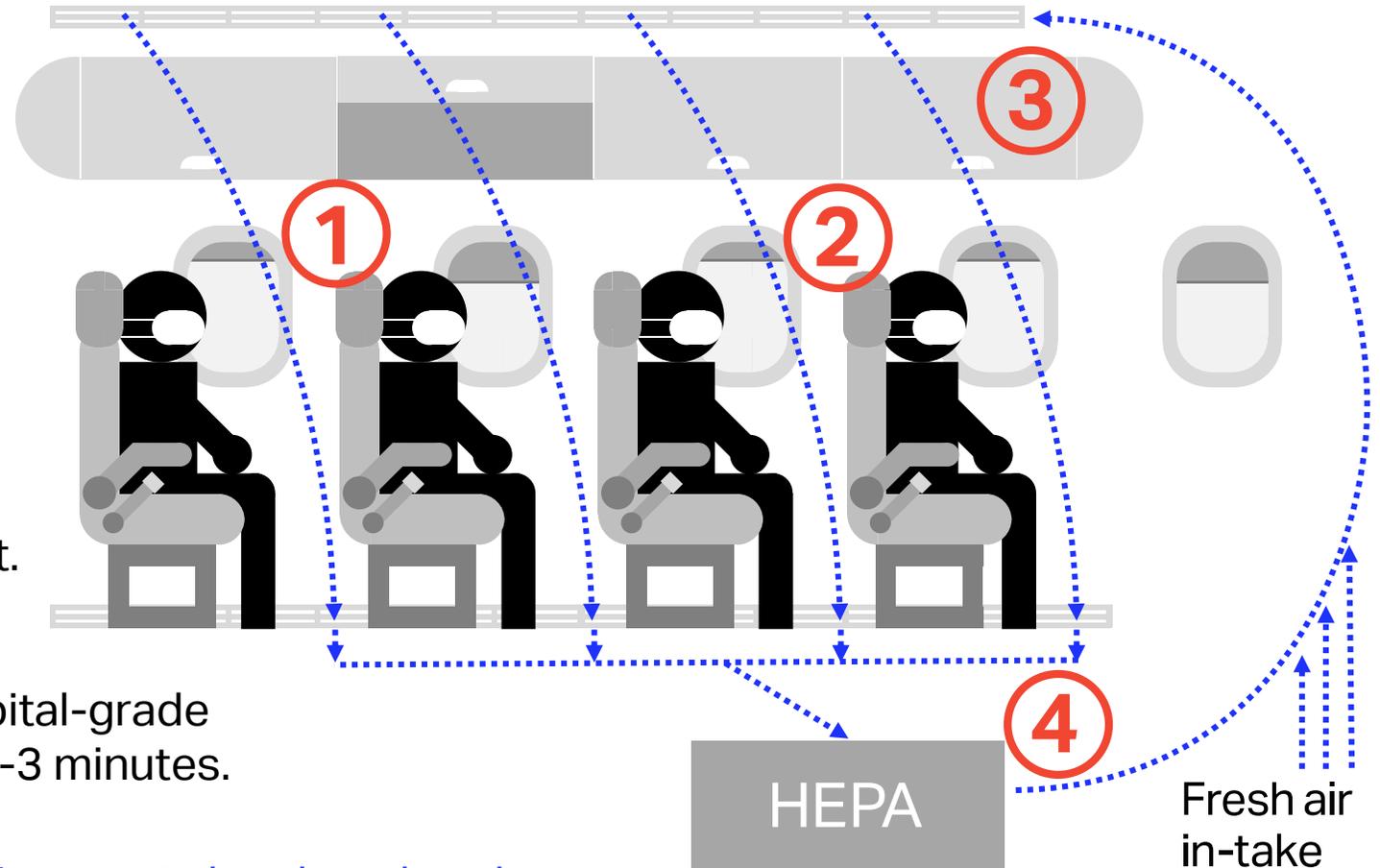
What does this tell us?

- **44 cases among 1.2 billion**
 - **1 case for every 27.3 million travelers**
- **Even if we missed 90% of infections in this count...**
 - **It would be 1 case for every 2.73 million travelers**

Perhaps the more important question is why is it so rare?

Factors lowering the risk of COVID-19 transmission onboard aircraft

- ① Seats and passengers face forward meaning limited face-to-face interactions.
- ② Seat backs act as a solid barrier.
- ③ Research to date suggests airflow exchange rates and direction are less conducive to droplet spread than other indoor environments, or modes of transport.
- ④ Modern jet airliners deliver high air flow and replacement rates, combined with hospital-grade HEPA filters. Cabin air is exchanged every 2-3 minutes.



Unlike other modes of transport, the cabin environment already makes the transmission of viruses difficult and we have seen little evidence of onboard transmission.

Manufacturer's presentations



Bruno Fargeon
Airbus



Dan Freeman
Boeing



Luis Carlos Affonso
Embraer

What have we learned?

- Risk of COVID-19 transmission on board appears to be low
 - Reflecting design characteristics of the aircraft
 - Enhanced by mask-wearing
- In addition, precautions along the travel experience will help people to travel, safely in the COVID-19 pandemic

Safety from departure to arrival



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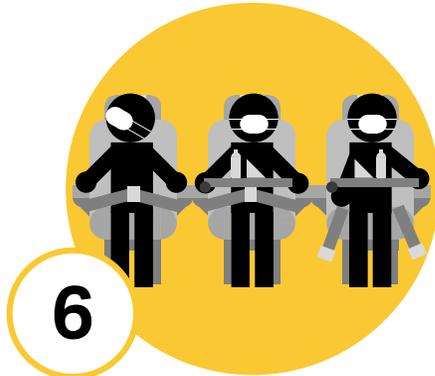
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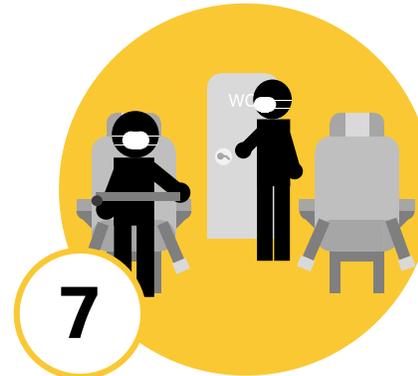
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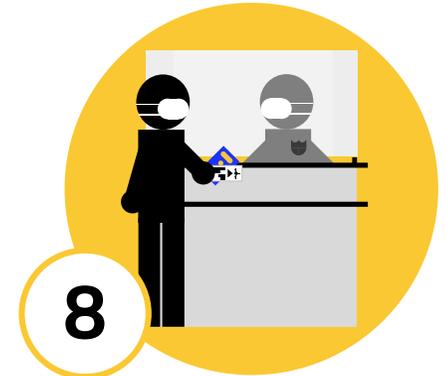
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Some of the many industry and academic collaborations

