SANITARY & SARS-COV-2 CONTAINMENT MEASURES AT AIRPORTS

Authors

Professor Ashley Woodcock
University of Manchester

Professor Jørgen Vestbo
University of Manchester

Professor Thomas Benfield
University of Copenhagen

June 2020

Executive Summary

There has been a pandemic of **severe acute respiratory coronavirus-2 (SARS-CoV-2)**, which causes a severe multi-system disease with pneumonia. DOI: 10.1056/NEJMcp2009575.

The vast majority of individuals infected with SARS-CoV-2 have mild to moderate flu-like symptoms and recover fully within days to weeks. The risk of hospitalisation and death is associated with specific risk factors (e.g. elderly, male, obesity, diabetes, high blood pressure, cardiac disease, dementia).

Both hospitalisation risk and mortality increase with age and concomitant illness, but for an individual older than 60 years, although hospitalisation is in the range 10-20%, risk of death is less than 5%. Young individuals are rarely hospitalised, and there are very few deaths in younger people with no apparent risk factors.

The **transmission** of SARS-CoV-2 is primarily through close person-to-person contact (e.g. within families), and by touching contaminated surfaces where infectious virus can remain viable for several days. In a healthcare setting, it can be spread in the form of droplets during coughing in patients with pneumonia. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200326-sitrep-66-covid-19.pdf.

In contrast, in community situations, airborne viable live virus has not been detected. This is confirmed by examining the rate at which the virus spreads. The reproduction number (R) is a way to rate a diseases ability to spread. Viruses like measles that spread primarily through the airborne route and cause explosive epidemics, have an R number of 10-15. SARS-CoV-2 has an R number of less than 3, indicating that it is not primarily spread through the airborne route. DOI: 10.1001/jama.2020.7477.

All passengers should be considered at risk of carrying SARS-CoV-2, because small numbers of them will be carrying the virus without symptoms. The risk will vary widely between different regions and countries, and will fluctuate with time, before finally declining. In May 2020 in Europe up to 3% of the population is carrying SARS-CoV-2 on a throat swab PCR, with zero or minimal symptoms.

- **Every airport** and airline should make the maximum feasible effort to avoid virus transmission between passengers during air travel.

- **Every traveller** should take the maximum feasible precautions to avoid virus transmission to and from fellow travellers and airport staff.

Transmission of SARS-CoV-2 in Airports

The main mode of transmission is by **touching a contaminated surface (e.g. door handles), and then touching the face and mouth.** Therefore, we have placed an **emphasis on hand hygiene** (hand gel with or without gloves), and on **frequent cleaning of all surfaces** to prevent cross infection from surfaces. DOI: 10.1056/NEJMc2004973.

Person-to-person droplet transmission only occurs with coughing and is infrequent. We recommend **facemasks or visors** to control droplet spread from coughing in an infectious patient. They also reassure passengers. DOI: 10.1001/jama.2020.7477; DOI: 10.1136/bmjopen-2014-006577; DOI: 10.1093/annhyg/meq044; *J Occup Environ Hyg*. 2014;11(8):509-518.

Airborne transmission of live virus is considered to be a rare or very rare event in community areas such as an airport, outside a healthcare setting.

Physical Separation

Passengers should respect fellow passengers and are responsible for maintaining **physical separation** between individuals and family groups, and with airport staff whenever possible.

There is no requirement for separation of families from the same household or smaller groups travelling together.

Balance of Risk

The measures we recommend provide the current best balance of risks, and reassurance to passengers. As evidence evolves and risk declines, these measures can be relaxed in line with guidance from local/national authorities.

Long-term Impact

There will be long-term improvements in hygiene measures in airports and on aeroplanes to minimise the transmission of all infections. The etiquette of air travel will change to emphasise the concept of physical separation and related new habits. Both airports and airlines will adopt new standards, and passengers will have to accept their own responsibility to minimise cross infections.

Air Travel

Airline travel has declined. It is likely that it will gradually increase in frequency as the SARS-CoV-2 pandemic fades and more countries re-open for travel. It may not reach previous levels of passenger travel before 2023.

Airports

- Can be crowded and often stressful.
- Involve significant and close interaction with staff and with other passengers.
- Currently it takes on average 60 minutes to traverse an airport – infection safety measures may add

to this but every effort should be made to minimise the time spent in airport terminals. If transit is efficient, it will minimise the number of waiting passengers within the airport, and reduce both risk and stress. It is likely that air travel will recover in a phased manner.

In order to restore air services fully, and to minimise the risk of transmission of SARS-CoV-2:

- What measure need to be put in place in airports, and on planes?
- What measures do passengers have to accept to be safe to travel?
- What additional measures are needed to build the confidence of passengers to travel?

Presumptions

- Each passenger could be carrying SARS-CoV-2, but without any symptoms or temperature. DOI: 10.1056/NEJMe2009758.
- Some passengers with mild symptoms might still attempt to travel.
- Some passengers will be in groups from the same household.
- The main cross infection is from contaminated surfaces, and emphasis on personal hand hygiene, with an option of wearing gloves.
- The opening of shops and restaurants within the airport will follow national guidance. They are often crowded and access and use should be managed.
- There is no evidence for airborne live virus, except in droplets due to coughing/sneezing. While general use of facemasks will reduce the need for social distancing, local rules may be enforced by national authorities.
- Masks control droplet spread for coughers only (surgical masks are adequate).
- No indication for screening by serology. DOI: https://doi.org/10.1016/S2213-2600(20)30247-2.
- Current “point of care” screening tests for virus too slow, too imprecise; too many false negatives. DOI: 10.7326/M20-1495.

Recommendations

1. Access to airports
2. Measures within airports
3. Protection of individual passengers
4. Audit and accompanying follow-up

1. ACCESS TO AIRPORTS

Access will need to be regulated and restricted. The aim is to have passengers spread over as wide a time possible, to reduce queuing, and to minimise the number of direct contacts.

Only passengers and staff should be allowed inside airport terminals, and relatives should only be allowed in rare cases (e.g. dropping off children flying unattended).

Electronic ticketing and boarding passes should be used in order to minimise staff at airports, reduce lines of passengers and exchange of papers.

Apps used by airports and airlines should include general instructions for using the airport and information on symptom awareness. Posters at entry will also raise awareness and provide information and recommendations.

2. MEASURES WITHIN AIRPORTS

Alcohol hand gel disinfection to be used universally, with or without gloves, also for children. A liberal supply of hand gel is required at entry and throughout the airport.

Passengers advised to use **alcohol hand gel** after every contact point e.g. shops, food vendors.

Gloves reduce hand-face contact. However, they do not reduce the need for hand alcohol gel and extra gloves will need to be provided at bathrooms and at points through the airport in case of damage.

Passengers should wear face masks or visors.

Surgical facemasks are adequate to block the droplet spread from coughing. Clear face visors have at least same effect and an option for better communication (e.g. for use by those travelling with hearing disabled family or group members).

Physical Separation

- Travellers are responsible for maintaining physical separation from other groups and individuals, and their baggage (i.e. no physical contact).

- Groups from the same household or individuals travelling together (2-4 persons) do not need to maintain physical separation *within the group*.

The combined use of hand hygiene, facemasks and physical separation, removes the need for specifying and enforcing an arbitrary “social distance”.

Touch Points

It is essential to minimise any “touch points”. As previously mentioned, this will involve electronic check-in only, signage on one-way passage paths through the entire airport, and signage to “use elbow” at doors wherever possible.

Cleaning

All areas to have visible increased frequency of cleaning and disinfection. Particular attention is needed for boarding pass scanners, trolleys, handles, elevators and hand rails, as frequently as is feasible. There must be increased cleaning and disinfection in staff areas and hand alcohol gel easily available in all office areas. Ventilation must be optimised, especially to reduce excess humidity.

Toilet areas

Toilet areas should be managed to avoid over-crowding. There should be notices

to advise 30 seconds hand-washing with soap.

Shops and Restaurants

Opening of shops and restaurants should follow local/national guidance. They should be managed to avoid over-crowding and to enable passengers to maintain **physical separation**.

Security

Queues should be managed to enable passengers to maintain **physical separation** between separate groups and individuals when entering and going through security.

Security staff must be checked on arrival at work for symptoms every day.

Security staff with close personal contact searches must wear gloves and face visors.

Baggage searchers should wear gloves which are changed regularly; i.e. after any interaction with a passenger involving physical contact.

Trays must be kept clean using alcohol or soap between each use (UV light in line could be considered).

Boarding Gates

Longer time for boarding with staff present at each gate 30 minutes prior to boarding, to enable passengers to maintain **physical separation** between separate groups and individuals.

Electronic boarding passes should be used.

Staff to minimise handing of travel documents and to use gloves or hand gel if needed.

Boarding of plane in strict order with from back to front to enable passengers to maintain physical separation.

Rules in gate areas and planes should be visible on posters in gate areas and be announced by gate staff.

Arrivals/Customs

Gel should be available on entry to the arrivals hall.

Automatic passport machines where possible.

Customs officers should wear visors and gloves with frequent gel application.

Baggage belts should be actively managed to maintain the distance from the belt, and to enable physical separation.

3. RESPONSIBILITY OF INDIVIDUAL PASSENGERS

All bookings, check-in, boarding pass to be done electronically.

Stay Alert: Maintain **physical separation** from the next passenger.

Acknowledgment that passenger understands the rules and will comply with them.

Requirement to use either hand alcohol gel and/or gloves (according to passenger preference) throughout the airport.

Passengers to use App to provide information ahead regarding exposures and symptoms, to be repeated at day of travel (and for auditing purposes 5 and 14 days post arrival).

Patients able to cancel flights because of COVID symptoms without cost.

Coloured masks for passengers with long-standing cough related to chronic respiratory disorders (e.g. chronic cough, asthma, COPD, bronchiectasis).

4. AUDIT AND ACCOMPANYING FOLLOW-UP

Requirement of passengers to provide information ahead regarding exposures and symptoms, to be repeated at day of travel (and to respond to an automated request for symptoms 5, 14, and 30 days post arrival).

Real-time data sharing with authorities (national as well as ECDC) and researchers.

Consider research into the effectiveness and acceptability of different control measures.

APPENDIX

Aeroplanes

- Aeroplanes pose significant challenges. Passengers are seated side by side. Boarding and departing the plane can have passengers and staff in close proximity.
- The discipline of safety on board planes is valuable to maintain physical separation, even when plane is full. The very low humidity on board plane will rapidly kill any viable airborne virus. The frequent air exchanges (up to 20 times/hour) will minimise any droplet spread.
- Board the plane from the back rows of the plane towards the front.
- After landing - strict enforcement of passengers to remain seated. Passengers only able to leave seat when seat row is announced by cabin crew, from the front towards the rear.
- Provision of cleaning sachet to each traveller.
- Keep masks on.
- Crew use masks, gloves, hand gel.
- Sequencing of toilet visits.
- Clean tables and roof lockers between flights and every 24 hours, therefore minimise risk for cross contamination of surfaces.
- Seat family group together with no need for physical separation within the group.
- Seat separate individuals, and between groups, so as to maintain physical separation as far as possible.

BIOGRAPHIES

Professor Ashley Woodcock

University of Manchester

Professor Ashley Woodcock was appointed as Associate Dean for Clinical Affairs, University of Manchester, in August 2016.

He is a Professor of Respiratory Medicine at the North West Lung Centre, University Hospital of South Manchester. He is a Consultant Respiratory Physician at the University Hospital of South Manchester, where he is the Clinical Director for Respiratory Medicine.

Professor Woodcock graduated with an intercalated first-class honours in physiology and an honours degree in Medicine from The University of Manchester in 1975. He then worked in London and Brunei, returning for clinical and research training at the Royal Brompton Hospital.

He was appointed an NHS Consultant Physician in Manchester in 1985, and became Professor of Respiratory Medicine at The University of Manchester in 1998. He was been Chairman of the Clinical Assembly of the European Respiratory Society, Chairman of the Royal College of Physicians Tobacco Committee and President of the British Thoracic Society.

Professor Woodcock was awarded the OBE in 2006 for services to the environment and was Co-Chair of the Medical Technical Options Committee to the United Nations Montreal Protocol for 20 years between 1995 and 2015.

In 2015, he was appointed Co-Chair to the Technology and Economic Assessment Panel to the Montreal Protocol. He shared the Nobel Peace Prize in 2007 with the International Panel for Climate Change and Al Gore. He was awarded the Fellowship of the Academy of Medical Sciences in 2008 and was made a Fellow of the European Respiratory Society in 2014.

Professor Woodcock has a wide range of patient-focused clinical research interests and has authored over 300 original publications. Together with Professors Adnan Custovic and Angela Simpson, he established the Manchester Asthma and Allergy Study, which is a cohort of over 1,000 children followed prospectively from birth through the first two decades of their life so far to investigate the genetic-environmental aetiology of allergy and asthma.

More recently, he has developed an interest in cough, supporting Professor Jacky Smith to develop a world-leading research group. The Cough group have developed an ambulatory cough monitor with appropriate patent protection.

Professor Jørgen Vestbo

University of Manchester

Jørgen Vestbo is a Professor of Respiratory Medicine and an honorary consultant at the North West Lung Centre, Manchester University Hospital NHS Foundation Trust. He is Lead for the Respiratory Theme of the NIHR Manchester BRC.

His professional training consisted of specialist training in Internal Medicine and Respiratory Medicine in university hospitals in Copenhagen. He obtained a DrMedSci degree from the University of Copenhagen in 1992.

He has taken part in developing international guidelines for the diagnosis and management of COPD for The American Thoracic Society/European Respiratory Society, and as member of the Board of Directors for the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2006-2013. He is a member of the Scientific Committee of GOLD which he chaired 2009-2013. He served as President of the European Respiratory Society (ERS) 2015-16, and he is currently Chair of the ERS Advocacy Council.

Jørgen Vestbo is a Fellow of The Academy of Medical Sciences, The Royal College of Physicians, and the European Respiratory Society.

Professor Thomas Benfield

University of Copenhagen

Professor Thomas Benfield is a Professor of infectious diseases at the Department of Clinical Medicine, University of Copenhagen, and attending Physician at the Department of Infectious Diseases, Hvidovre Hospital, Copenhagen. He is Assistant editor of The Journal of the Danish Medical Association. He graduated from University of Copenhagen in 1992.

Professor Thomas Benfield is trained in internal medicine and infectious diseases in Copenhagen. He was offered a fellowship at Critical Care Medicine Dept., National Institute of Health, USA.

He develops basic and clinical research within HIV/AIDS, hepatitis C, sepsis and pneumonia. His clinical and research focus on sepsis, pneumonia, hepatitis and HIV. He is an Investigator and sub-investigator of clinical phase I-III trials of antiretrovirals, vaccines and more recently direct-acting antivirals for HCV. He has vast experience in clinical management of patients infected with sepsis, HIV, hepatitis B and C.