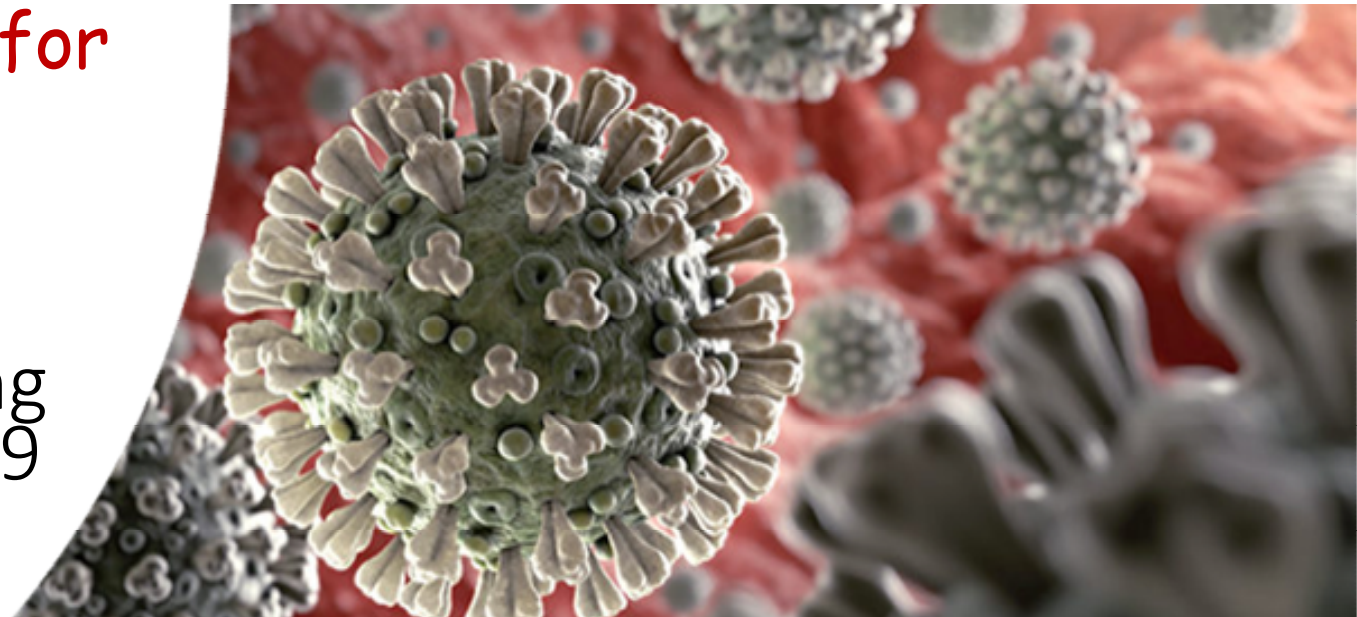




Airports, Airlines, Trains and Buses: Interventions for safety

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ICAN Chair*

Preventing and controlling transmission of COVID 19 infection



Outline

- Introduction
- Overview of aircraft ventilation systems
- Objectives of IPC
- General considerations
- Before arriving at airport
- At the Airport
- Boarding
- On the Aircraft
- Disembarking
- What to do with a passenger who is ill
- The 2-row rule
- Mass transit: Trains and Buses
- Case studies

Introduction

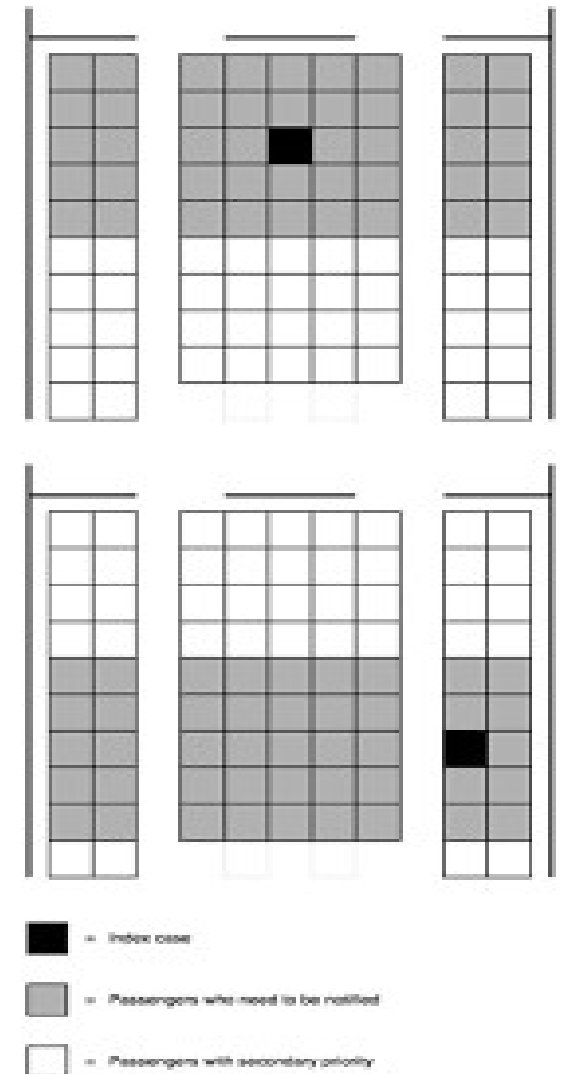
- Over 4.54 billion passengers travelled globally in 2019
- 76.6m to/from Africa
- Africa has 731 airports and 419 airlines
- Confined environment increases the potential risk of infection especially droplet and airborne infection
- Global travel allows for new diseases to spread rapidly
 - 2003 – SARS that killed >80,000 in 37 countries
 - 2009- H1N1 estimated that affected >200M individuals with estimated mortality of between 150 – 500k in the first year
 - 2020 – Covid 19 - 12,964,809 confirmed cases with 492,660 in Africa and 570,288 deaths – WHO (2.17pm 14/07/2020)

AIRPORT SCENARIOS for close contact

- Airports create an environment for close contact with individuals for extended periods of time. Most passengers arrive 2-3 hours before their flights.
- Close contact for extended periods of time while seated prior to boarding
- Close contact with people in neighbouring gates while waiting to board
- Close contact on many queues -security screening, checking in, waiting in rest rooms, queuing at airport shops, queuing in jetway space as you board the plane, as you disembark, in baggage claim area,

Risk of transmission in aircrafts

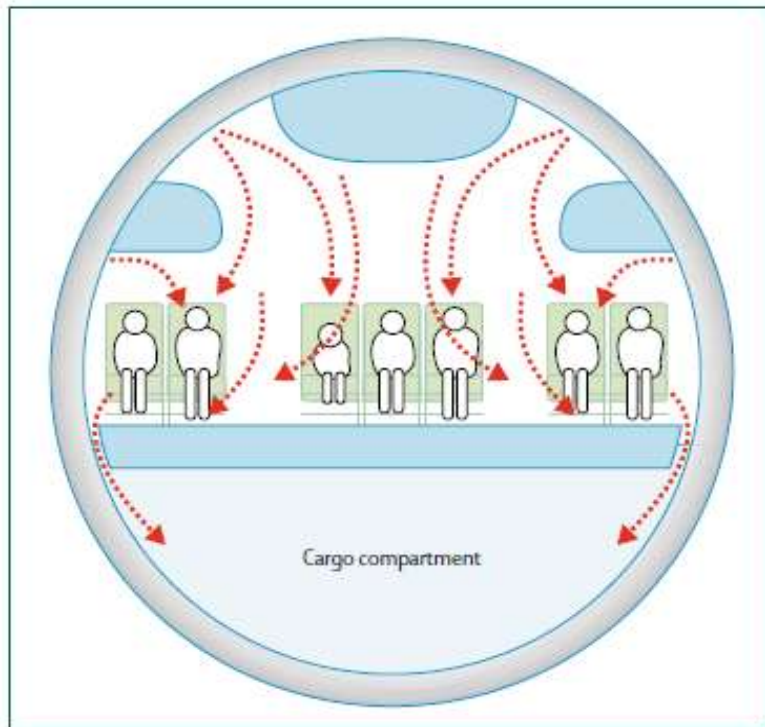
- Risk of transmission while in airplane is considered low because of its ventilation system
- Those close to the person infected person are most at risk within two rows on all sides including own
- Risk greatly reduced to passengers seated 15 seats from the infectious source
- Airlines do not allow **KNOWN** infected cases or those with infectious diseases on board



Factors affecting transmission risk of COVID in Aircrafts/ A

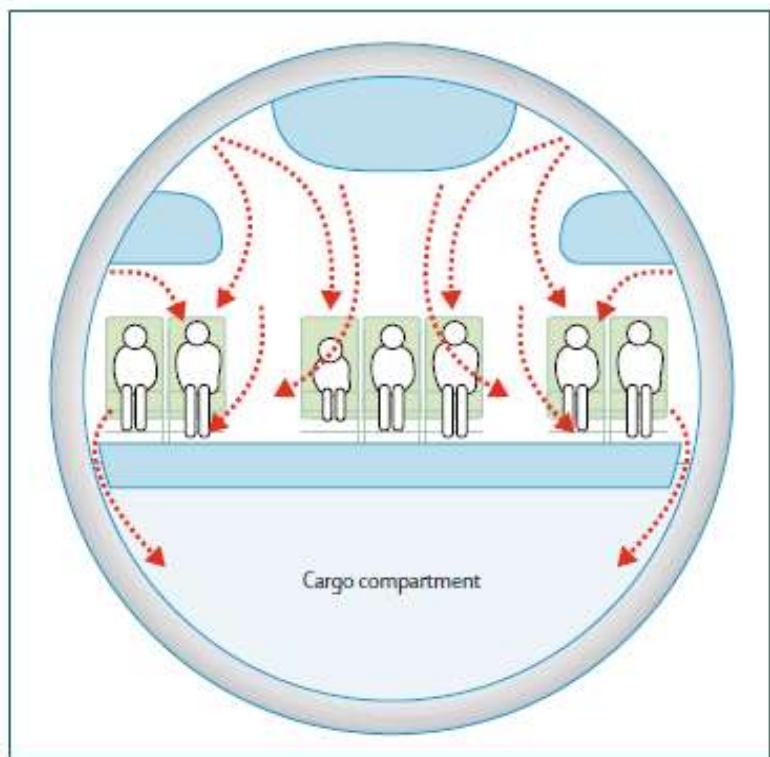
- ▶ Many people in close proximity in a closed space.
- ▶ Number of organisms expelled into the air
- ▶ Concentration of organisms (volume of air space and ventilation)
- ▶ Proximity to source
- ▶ Immune status of exposed person
- ▶ Duration of exposure
- ▶ Airflow system

Airflow in Aircrafts



- Cabin air circulation is continuous. Air is always flowing into and out of the cabin with a mix of approximately 50% outside air and 50% filtered re-circulated air
- There is between **15 to 20 cubic feet of total air** supply per minute per person in economy class and about **20 to 30 air changes per hour**.
- The total air supply is essentially sterile and particle-free because modern airplanes have air filtration systems with HEPA filters
- HEPA filters used on commercial airlines have a particle-removing efficiency of 99.97% at 0.3 micron which remove about 99% of micro-organisms

Airflow direction in Cabin



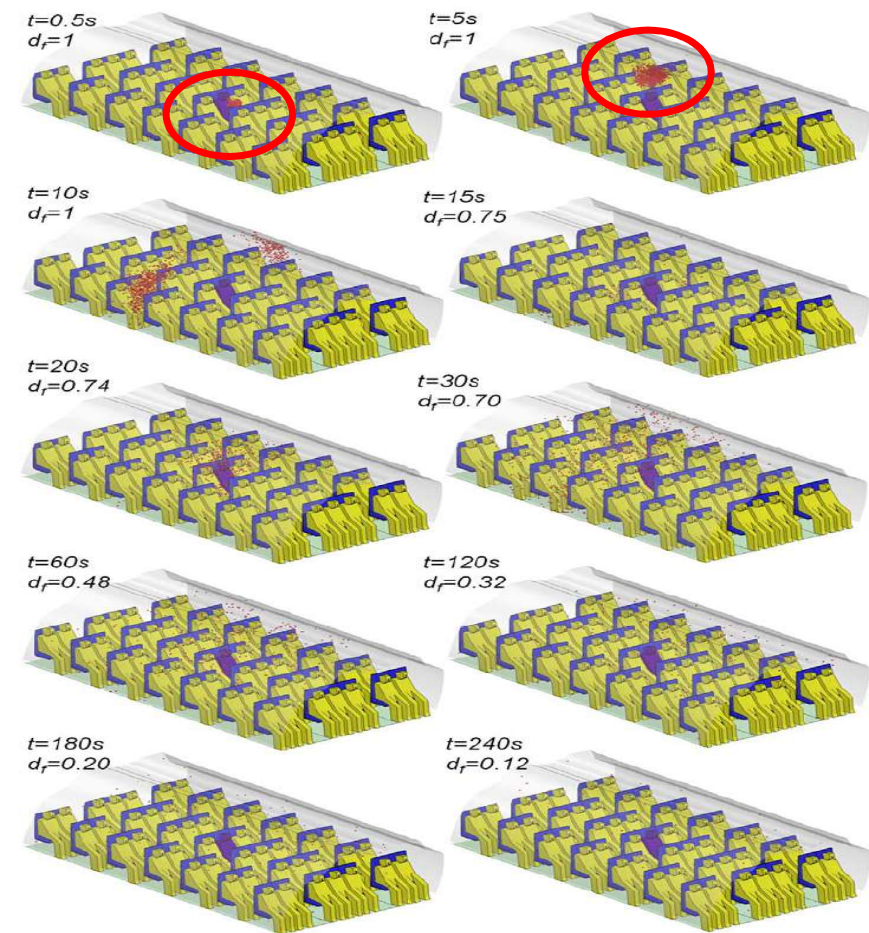
- Air circulation patterns are laminar (Side-to-side) enters from overhead circulates and exits near the floor
- There is very Little front-to back (longitudinal) airflow
- Air circulation pattern divides air flow into sections within the cabin usually about every 7 rows thereby limiting the spread of airborne particles
- Airflow also provides temperature control and minimizes temperature gradients within the cabin.

Airline response based on risk 5 stages recognised

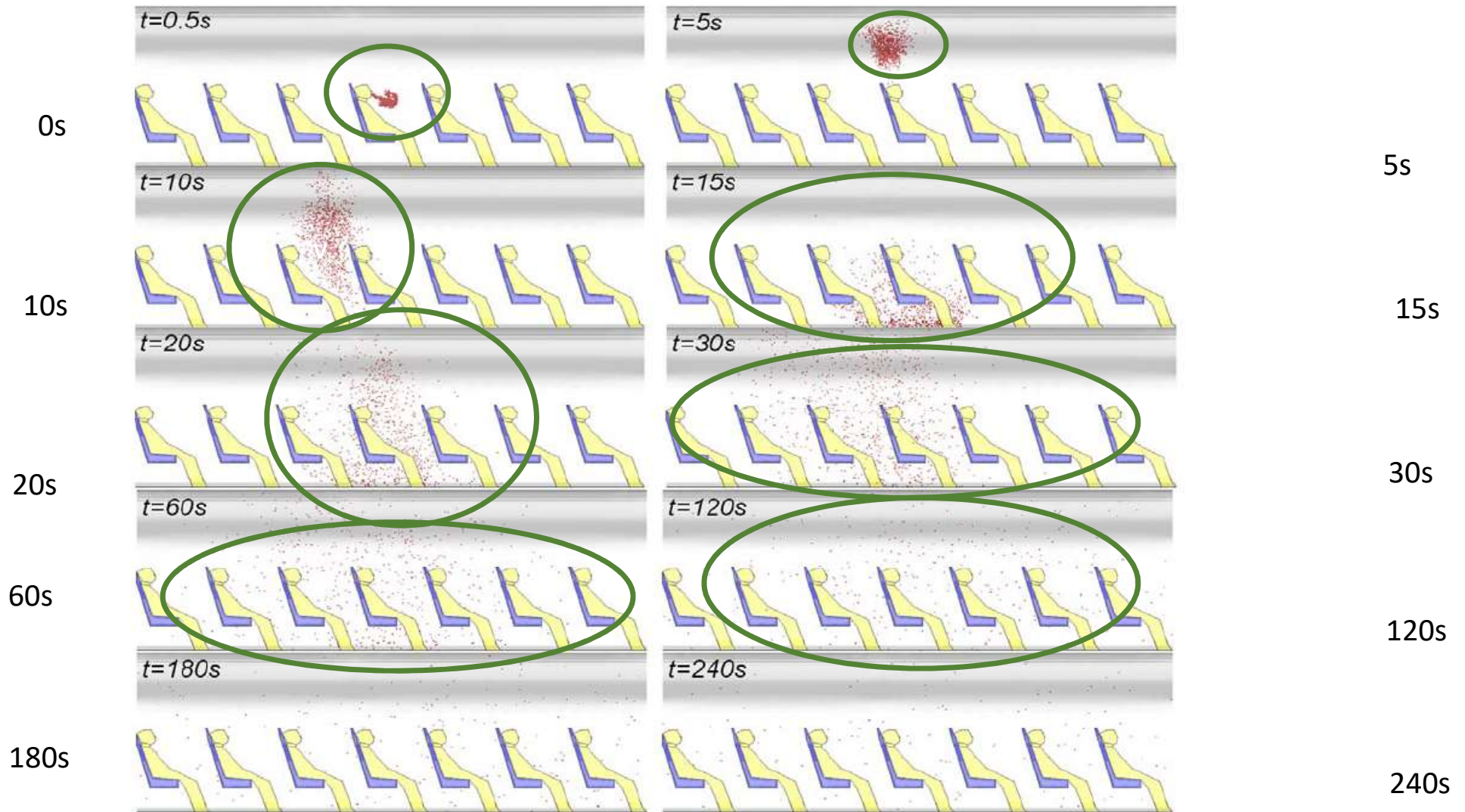
- Stage 0 - travel restrictions and only minimal movement of passengers between major domestic and international airports.
- Stage 1- Initial increase of passenger travel. This initial stage will coincide with relatively low passenger volumes, allowing airlines and airports to introduce aviation public health practices appropriate to the volume. There will be significant challenges as each stakeholder community adapts to both increased demand and the new operational challenges associated with risk mitigation Health measures for travel required at airports will need to, at a minimum match those from other local modes of transport and infrastructure
- Stage 2 – Increasing passenger load, reduced transmission threat from improved containment. Some restrictions to be lifted
- Stage 3 - virus outbreak has been sufficiently contained in a critical mass of major destinations worldwide as determined by health authorities, Containment sufficient to reduce National risk levels. Good test and contact tracing. No vaccine or drug
- Stage 4 - Begins when specific and effective pharmaceutical interventions readily available in most countries. There may be a set of residual measures/mitigations that could be retained, although these too should undergo a periodic review process

What happens in a cabin when we cough?

- Study: Traced the droplets exhaled from a single cough,
- Findings
- The droplets were contained in **the row before, at, and after the index patient within 30 s**
- Then dispersed uniformly to all the seven rows in 4 minutes
- **BUT** within one minute total airborne droplet fraction reduced to 48%,
- By 4mins only 12% of the total droplet fraction was still airborne




Distribution of a single cough



Guidance Documents on Infection Prevention and control

Operational considerations for managing COVID-19 cases or outbreak in aviation
Interim guidance
18 March 2020

 World Health Organization

Background

This document is based on the evidence currently available about coronavirus disease (COVID-19) transmission (human-to-human transmission primarily via respiratory droplets from, or direct contact with, an infected individual). It should be used in conjunction with WHO's Handbook for the Management of Public Health.

The target audience is any authority responsible to a public health event. International Health Regulations (IHR), ICAO health regulations or airport national health surveillance and risk control aviation authorities, airports, airports and airlines.

Awareness of aviation personnel

Airport operators, aircraft operators should provide guidance to crew recognition of signs and symptoms ground personnel should be further to prevent transmission of COVID distancing, hand hygiene, environmental cleaning, waste disposal mask, avoidance of contact respiratory symptoms, and seeking signs and symptoms develop.

Medical first responders should be respiratory symptoms (and also contact contamination to others).

Personnel should be trained on how to use and remove personal protective equipment in close contact with others when providing first aid should use protection (face shield or goggles).


WHO advice and technical guidance available on the WHO website.

Advice for crew and ground staff areas where local or community is reported.

- Be familiar with local protocol management of ill travellers and in the context of COVID-19.
- Take precautionary measures to avoid transmission in public private transport when possible.

contact with other people while moving between the airport and ground transportation.

- Minimize time spent in public areas, applying social distancing whenever out in public by maintaining a distance of at least 1 metre (3 feet) from other people.
- Wash hands frequently with soap and water or use



International Civil Aviation Organization

Council Aviation Recovery Task Force (CART)

Take-off: Guidance for Air Travel through the COVID-19 Public Health Crisis

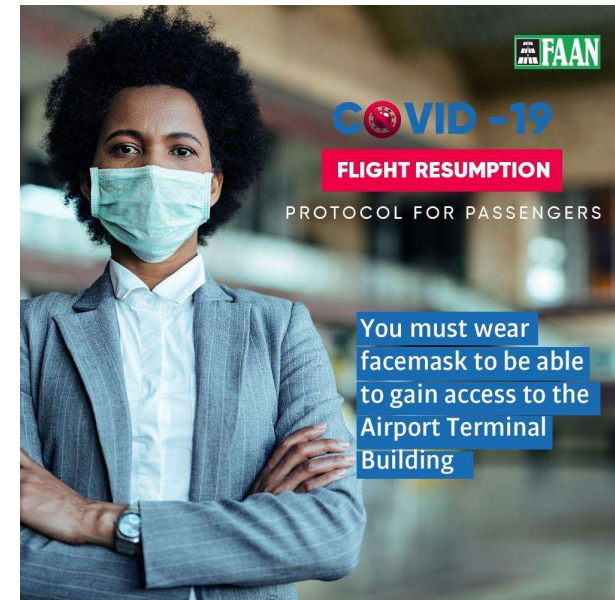
Montréal, Canada, 27 May 2020

ATTACHMENT

- Contact reduction measures
- Good hygiene
 - Cough etiquette
 - Physical distancing
 - Good hand hygiene
 - Avoid touching ones face with unclean hands
- Infected and Sick people should not travel

General considerations for Infection Control

- Public education
- Contact reduction measures
- Face coverings and masks
- Environmental cleaning and disinfection
- Health screening
- Contact tracing



Airport

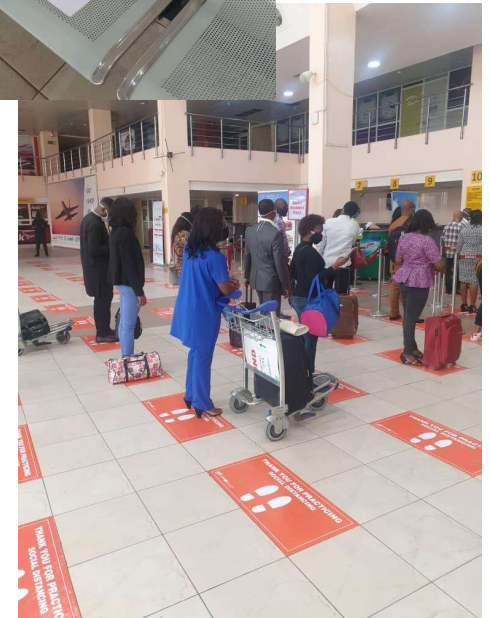
- Contact reduction Strategies
- Administrative controls
- Increase Pre airport activities
- Engineering controls
- To screen out the sick and keep passengers and staff safe

Pre- arrival at the airport

- Encourage online checking in
- Health screening forms and information on COVID-19 signs and symptoms should accompany tickets and filled forms on health status submitted prior to date of travel
- Advance information to limit accompanying persons to the airport
- Passengers may be required to arrive at the airport masked and a required number of masks may be required
- Passengers will be advised on longer screening processes.

At airports

- Passengers may be scheduled to arrive at different times to reduce crowds on the departure floor
- Additional outdoor waiting areas may be provided
- Kerb side baggage drop-off may be increased to reduce waiting time in departure lounge
- Increased signages to encourage passenger flow and infection control measures
- Floor signages to encourage physical distancing
- Physical barriers should be installed at counters to protect staff that interact with passengers
- Seats may be removed or separated to create adequate distance between passengers
- Passengers should be encouraged to check in all luggage including hand luggage. Bags that fit under the seat may be exempt
- Hand sanitisers should be at various places in the airport eg
- Constant public awareness information should be available – posters, electronic media,

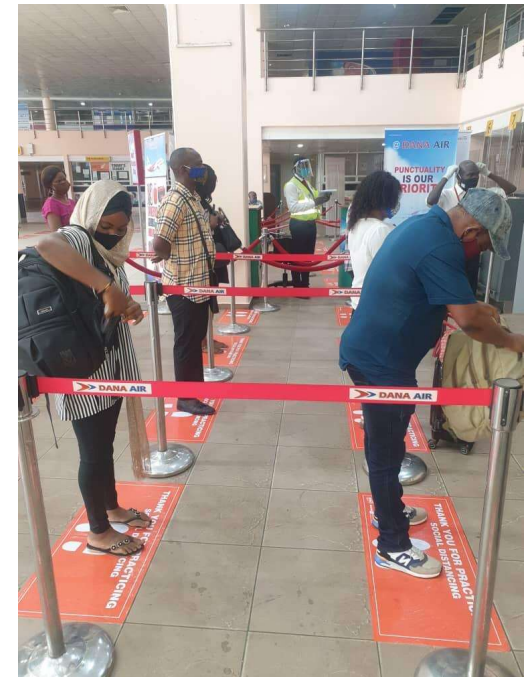


At Airport – Passenger screening

- Only passengers that have been cleared to fly should come to the airport
- Passengers may be required to have their temperature taken. The sensitivity of this for identifying passengers with infected COVID-19 is limited since many people transmit the virus before they are symptomatic
- Screening areas should preferably be before entry into airport
- Staff taking temperature should use a non-contact thermometer and have no contact with the passenger
- Staff should maintain at least a 1.5m distance from the passenger
- Should preferably be behind a barrier
- Screening area should have hand sanitiser
- All passengers with temperatures $\geq 38^{\circ}\text{C}$ should be referred for further screening
- Staff screening must be masked.

Checking in, Immigration, ticketing,transit and ticketting desks, embarkation

- These are places where long queues occur
- Try to have all forms filled before arrival at the airport
- Have automated check in where possible
- Floor signage to create physical distancing
- Signage in prominent places focused on good hygiene practices and physical distancing
- Signage on Masking
- Passengers should board by rows with the last rows boarded first
- Passengers should stay seated till their rows are called



On board aircraft

- All passengers should be masked
- Passengers should stay seated unless essential to do otherwise
- Cabin crew should include COVI-19 preventive messages in their safety demonstrations
- Guidance material on Good hygiene practices, physical distancing, minimising contact with surfaces, hand hygiene
- Limiting contact between crew and passengers – On line duty free may be stopped and passengers encouraged to purchase online before flying
- Passengers should be encouraged to use toilets closest to them where possible
- One toilet to be reserved for staff
- There should be protocol for managing ill passengers and unruly passenger

Universal Precautions kit

- Must be carried on aircraft that are required to operate with at least one cabin crew
 - Dry powder that can convert small liquid spills into a sterile granulated gel
 - Disinfectant wipes for surface cleaning
 - Face/eye mask (separate – goggles and medical mask or combined – face shield)
 - Gloves (disposable)
 - Protective apron
 - Full-length long-sleeved gown (if available)
 - Biohazard disposable waste bag (if available)

Managing an ill passenger

- If a passenger develops symptoms during a flight
- Ask the ill person to wear a medical mask and practice respiratory hygiene when coughing or sneezing.
- provide tissues to cover mouth if person cannot tolerate the mask; discard tissue immediately into a biohazard disposal waste bag or plastic bag(considered biohazard) Wash hands with soap and water
- Separate the ill person from the other passengers by minimum of 1 meter (usually about two seats left empty in all directions, depending on the cabin design) from the seat occupied by the suspected case.
- Preferable to move passengers away Where possible

Managing an ill passenger (2)

- Designate one crew member to serve the ill person, preferably a crew member trained in infection prevention and control
- If possible, designate one toilet for use only by the ill person.
- Personnel in close contact with symptomatic persons (e.g. when providing first aid) should wear a medical mask, eye protection (face shield or goggles) and gown
- Wear disposable gloves when tending to an ill traveller or touching body fluids or potentially contaminated objects and surfaces.
- Remove gloves carefully to avoid contaminating yourself, dispose of them and other disposable items that had contact with ill person in a biohazard bag
- Wash hands with soap and water or alcohol-based hand rub (if not visibly dirty).

Managing an ill passenger (3)

- Crew should make sure not to touch other service utensils or cutlery after tending to an ill traveller.
- Crew members should be provided with instructions for communicating with an ill person suspected of COVID-19
- It is also important for crew members to be aware that it is ok to touch or comfort a suspected or a confirmed COVID-19 case on the condition that they are wearing appropriate PPE.
- The Pilots must inform airport control as early as possible before arrival at the destination airport of all cases of illness suspected to be infectious or pose a public health risk. - International Health Regulations (2005),

Arriving and Transitting Passengers – Disembarkation

- Passengers should stay seated till their row is asked to disembark
- Disembarkation will be by rows from the front rows to the last row
- To reduce waiting times all border control forms should be distributed and filled on board
- Airports should create as many booths as possible to reduce queing times at border control

Arriving and Transitting Passengers - Airport

- There should be adequate signage promoting preventive messages and patient flow
- Floor signages to ensure physical distancing at least 1-2m apart
- Access to arrival hall should be limited to staff crew and arriving passengers
- Family members should be encouraged to wait in their cars or designated outdoor area where physical distancing is assured
- Passengers are encouraged to exit immediately health authority.
- Airport trolleys should be cleaned after use by wiping down with 60% alcohol between passengers

Disembarkation of suspect case

- Personnel should wear a medical mask, eye protection, gloves, and gown when loading suspected COVID-19 patients into the ambulance. And perform hand hygiene
- If more than one suspected case is being disembarked, personnel should change their PPE between each patient to avoid possible cross-contamination.
- Ill passenger should be transferred to a waiting ambulance
- the driver of the ambulance should not move close to the suspects nor be involved in loading them into the ambulance. If there is no contact with infected patient he does not require PPE.
- If the driver assists with the loading of the suspected COVID-19 patient the driver should wear PPE, including a mask, gloves, gown, and eye protection. He should doff before and perform hand hygiene before re-entering the drivers compartment

Disembarkation of suspect case

- Transport staff should frequently clean their hands with alcohol-based hand rub of at least 60% alcohol or soap and water before putting on PPE and after removing PPE.
- All used PPE should be disposed off as infectious waste.
- Symptomatic travellers will be assessed at the designated facility of the airport and transferred to a designated health care facility.
- Contacts will be followed up according to instructions from the local public

Training of Crew members

Provide adequate training for crew and ground staff on

- Recognition of signs and symptoms of COVID 19 and
- Prevention strategies:
 - Physical distancing, hand hygiene, respiratory etiquette, environmental cleaning, waste disposal, when and how to use a mask, avoidance of contact with people presenting respiratory symptoms,
 - Seeking medical advice early if they develop signs and symptoms suggestive of COVID 19
 - How to Doff and Don personal protective equipment (PPE).
 - How to handle a sick person to prevent transmission to others

Training of Crew or Ground staff

- Avoid rush hours in public transport and use private transport when possible,
- Minimize time spent in public areas, applying social distancing whenever out in public by maintaining a distance of at least 1 meter (3 feet) from other people.
- Wash hands frequently with soap and water or use an alcohol-based hand rub if hands are not visibly dirty. Avoid touching eyes, nose, and mouth
- Self-monitoring: immediately isolate yourself according to local health procedures, wear a mask, report the situation to your employer, and seek medical attention If you develop fever, cough, or difficulty breathing, .
 - The aircraft operator should report it to the local health authority immediately.
- If symptoms develop during flight, Wear a medical mask, discontinue your duties as soon as it is safe to do so, inform other crew,
- Report to traffic control and follow the measures required for a suspected case,

PPE for Crew members

This will be on basis of risk

Cabin crew should minimise interaction with passengers

All cabin crew should be masked. May require gloves, gown and eye protection depending on level of contact with passengers

Cleaning

- Write a plan for enhanced cleaning and disinfection plan
- Ensure all crew and ground staff are aware of the plan
- Ensure staff can dilute disinfectant
- Frequently touched surfaces should be cleaned more often
 - Airport information desks, passengers with reduced mobility (PRM) desks, check-in areas,
 - immigration/customs areas, security screening area, boarding areas, etc.
 - Escalators and lifts, handrails.
 - Washrooms, toilets and baby changing areas.
 - Luggage trolleys and collection points: cleaned with dispensable wet wipes or disinfectants and disposed of safely
 - Seats prior to security screening and in boarding/check-in areas.
 - Parking shuttle buses and airside buses.

Cleaning in aircraft

- During short layovers, special attention should be given to
- high touch areas,
- shared facilities
- if there was a suspect case - the zone of risk in the cabin area should be cleaned and disinfected.
 - seats, headrests, table tops, handsets, windows, window shades, video monitors
 - Other materials coming in contact with the suspected case including the lavatory used by the ill passenger

Cleaning in aircraft after exposure

- All cleaning staff should wear PPE, Gowns , eye protection, utility gloves and medical mask
- Surfaces must be wiped with disinfectant after cleaning with detergent
- The disinfectants must not be corrosive or detrimental to aircraft components. The disinfectant should be applied according to the label instructions (e.g. concentration, method and contact time).
- There should be no spraying of disinfectants
- Ventilation systems should be kept running while cleaning crews are working aboard the airplane

Cleaning and disinfection following symptomatic case

- Surfaces should be cleaned with detergent followed by regular household disinfectant containing 0.1% sodium hypochlorite (that is, equivalent to 1000 ppm).
- Surfaces should be rinsed with clean water after 10 minutes contact time for chlorine.
- In case a surface has been soiled with respiratory secretions or other body fluids, wipe the surfaces with absorbent (paper) towels first, dispose of towel, and then clean and disinfect
- Any contaminated items e.g. hand towels, gloves, masks, tissues should be placed in a disposable bag and disposed of as infectious waste.
- Ambulance or transport vehicles should be cleaned and disinfected regular household disinfectant containing 0.5% sodium hypochlorite (i.e. equivalent to 5000 ppm or 1-part bleach to 99 parts of water) should be applied. With contact time of at least 1 minute then rinse off with clean water.
- As an alternative to bleach, ambulances may use hospital-grade disinfectant products according to manufacturer's instructions

Possible transmission risk reduction aspects of transmission in Airline

- Passengers face forward with limited face-to-face interactions
- Seats provide a barrier to transmission between rows
- Air flow from ceiling to floor further reduces the potential for transmission
- High air flow rates reduce spread spread in the same way as in other indoor environments
- High Efficiency Particulate Air (HEPA) filters on modern aircraft help to keep air clean with high fresh air levels

- **Measures to Reduce the already low risk of onboard transmission**

- IATA recommends mandatory face-coverings for passengers and masks for crew as one of several actions to reduce the already low risk of contracting COVID-19 on board aircraft.
- In addition to face coverings, these layers of temporary biosecurity measures being proposed include:
 - Temperature screening of passengers, airport workers and travelers,
 - Boarding and deplaning processes that reduce contact with other passengers or crew,
 - Limiting movement within the cabin during flight,
 - More frequent and deeper cabin cleaning; and
 - Simplified catering procedures that lower crew movement and interaction with passengers.
- When proven and available at scale, testing for COVID-19 or immunity passports could also be included as temporary biosecurity measures.
- IATA does not recommend restricting the use of the 'middle seat' to create social distancing while onboard aircraft.
- Evidence, although limited, suggests that, the risk of virus transmission on board aircraft is low even without special measures.

Public transport – General

- Do not use public transport if you are feeling unwell, except in an emergency.
- All passengers should be masked
- People most at risk, (older age or those with underlying illness) should avoid public transport if possible if not should avoid rush hour
 - Use a medical mask if they must go out
- Passengers experiencing any symptoms that may be caused by COVID-19, such as respiratory symptoms or a fever, must not travel on public transport and are encouraged seek medical assistance as soon as possible
- All passengers to maintain physical distances as much as possible

Public transport

- Maintain good hand washing and cough/sneeze hygiene. Passengers may wish to carry their own hand sanitiser or cleaning wipes.
- Maintain physical distancing whenever possible and avoid contact with the driver and other passengers.
- Consider the most efficient route to minimise the duration of travel on public transport.
-

While transporting passengers

- Encourage passengers to maximise physical distancing to the extent possible.
- Operators should where possible operate at less than full capacity 60% has been suggested
- Keep windows open
- If there is airconditioning consider turning it off and opening all windows to encourage air exchange
- Restrict access to areas immediately around drivers, e.g. the first row of seats on buses.
- If appropriate, request passengers to enter and exit through separate doors to allow for unidirectional flow throughout the carriage.

Passenger terminals and platforms

- ☐ Ensure cleaning and sanitising of high touch areas and bathrooms,
- ☐ Provide appropriate signage to point to available hygiene facilities (e.g. bathrooms, hand sanitiser dispensers).
- ☐ Consider passenger movement flow around the terminal or platform that supports the above, whilst
- retaining continued access for people with a disability or reduced mobility.

Cleaning and hygiene

- Display signage and posters at terminals and stations, and inside vehicles, to encourage passengers to practice good hygiene before, during and after using public transport.
- Ensure cleaning and sanitising of all surfaces, doors, bathrooms and high traffic or high touch areas,
- Provide additional hand sanitising stations for workers, and passengers where possible,
- Put in place procedures to closely monitor the health of all employees and provide training and regular communication on symptoms and actions if unwell, with at least daily reporting or check-ins by supervisors.
- Ensure workers do not attend work if feeling unwell, and seek medical assistance if experiencing respiratory symptoms or a fever.
- Ensure all workers are advised of workplace hygiene standards and are maintaining good hand washing and cough/sneeze hygiene.
- Ensure all workers maintain physical distancing and avoid sharing equipment wherever possible.
- Regularly monitor and review the implementation of hygiene measures to ensure they are being followed and remain effective.

PPE

- It is not recommended that PPE (such as gloves, eye protection and face masks) is routinely used outside of healthcare settings to protect against COVID-19.
- Wear Masks on public transport
- If you are of increased risk of severe illness take private transportation or avoid peak periods if possible
- If infected avoid public transport. If it happens use a medical mask (
- Where there is community spread a barrier (Perspex or glass) can be installed to protect

Finally

- Avoid non-essential travel
- Avoid buses trains especially if above 60 or have underlying disease
- Wash your hands frequently or use an alcohol hand rub
- Avoid touching your face
- Maintain physical distancing and Wear a mask

References

- Aircraft Interior cleaning https://www.who.int/ihr/ports_airports/aviation_guide_p2_en.pdf
- Cristian Ionuț Panait Guidance on aircraft cleaning and disinfection in relation to the COVID-19 pandemic European Union Aviation Safety Agency(EASA) Issue02 | 30.6.2020
<https://www.easa.europa.eu/sites/default/files/dfu/EASA%20Guidance%20on%20aircraft%20cleaning%20and%20disinfection-issue%202.pdf>
- WHO Operational considerations for managing COVID-19 cases or outbreak in aviation Interim guidance <https://apps.who.int/iris/bitstream/handle/10665/331488/WHO-2019-nCoV-Aviation-2020.1-eng.pdf?sequence=1&isAllowed=y>