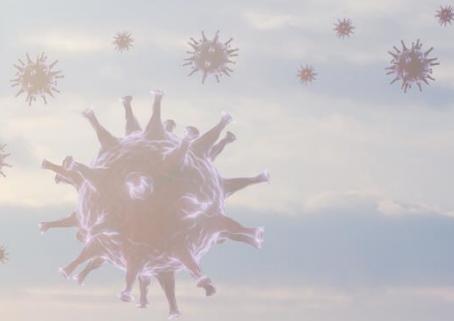




معهد الصحة العالمية



# **BEYOND THE PRESENT**

## **Roadmap for Relaxing COVID-19 Control Measures**

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### **A Focus on Air Travel**

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# PREFACE

In the first issue of this series, GHI introduced a generic guide to support countries in relaxing COVID-19 control measures and lifting lockdowns. The report highlighted key principles upon which any relaxation strategy should be based (gradual, smart, contextualized, and reversible), and a robust 3T-I (test, trace, treat and isolate) system which must be implemented in each country to facilitate containment efforts for any future outbreaks when control/lockdown measures are lifted (1).

To date (18th of May 2020), more than 4.8 million people have been infected with the virus causing more than 317,000 deaths worldwide (2). In the absence of a curable medication and an effective vaccine, non-pharmacological interventions were adopted and epidemiological modelling were applied by many researchers to inform strategies against a surge in COVID-19 caseload and overwhelmed healthcare systems.

Governments have adopted strict policies, ranging from social distancing to partial and full lockdowns. Although these control measures have been beneficial in decreasing the number of cases and deaths worldwide, they have been disruptive to businesses and detrimental to the economy on the short-term. To avoid further economic loss, governments have started planning or implementing lockdown exit strategies. The main concern is the resurgence of the virus once the interventions are relaxed. A vigilant plan must therefore be set-up to achieve an optimal balance between health and economic protection.

We have previously discussed a sector-specific phased-approach to relaxing control measures and lifting lockdowns. In this report, we focus on air travel, one of the

sectors to suffer the most due to COVID-19. Long-range ties, such as international highways and airline transportation, allow the spread of the virus to previously uninfected areas. They expose faraway contacts who otherwise would not have been at risk of the infection. Air travel is a major driving force increasing the frequency and reach of epidemics and spreading infections into non-endemic areas. In recent years, it has contributed to several epidemics, including the Middle East Respiratory Syndrome (2012), the H1N1 influenza pandemic (2009) and the Severe Acute Respiratory Syndrome (2002) (3). The travel restrictions enforced by the Chinese government were estimated to have decreased the daily rate of case exportation by 81.3% on average, delaying the importation of cases into unaffected areas and allowing countries to prepare their public health response (4). Reducing travel was predicted to be more effective than reducing local transmission in curbing the spread of COVID-19 (5). Therefore, lifting lockdowns and internally relaxing control measures might be adequate steps as long as air travel is restricted.

Policymakers will have to take exceptional measures to ensure that air travel can adapt to the new lifestyle and safely regain its function without increasing the risk of viral transmission. Therefore, innovations must be developed to respond more effectively to potential future risks. This document guides policymakers through the recovery phase of air travel services to prevent a second epidemic peak of COVID-19 or to decrease its impact.

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**Precautionary Measures for Air Travel  
Protection Post-Lockdown/Relaxation Phase**



It is expected that air travel would resume as the rates of new COVID-19 infections significantly decline. There is no specific timeline for when air travel would be resumed. Many expect this to happen sometime in mid to late summer 2020.

Before considering lifting the ban on air travel, authorities must ensure the country has the required resources to implement strict measures at airports and in airplanes. These measures include the disinfection of facilities, the redesigning of passenger flow, and the digital transformation of airports.

## Disinfection of Facilities



The most evident but elemental step in reducing viral transmission is the cleaning and disinfection of facilities and surfaces. Authorities must ensure that the required resources are constantly available for the frequent disinfection of arrival gates, buses and other locations handling passengers. Aircrafts must also be cleaned and disinfected after every journey.

High-tech and innovative products have already been implemented in few airports to support in the process. In Pittsburgh International Airport, self-driving robots equipped with ultraviolet lights are being developed to clean floors (6). In Hong Kong, several technologies were implemented to

decrease transmission of COVID-19, including a CleanTech disinfection facility, antimicrobial coating of surfaces, and autonomous cleaning robots (7). The robots have been deployed in both airports to ensure floors or public areas and passenger facilities are deeply cleaned and disinfected using ultraviolet or air sterilizers.

The other technique used for the disinfection and prevention of transmissibility is the application of an invisible antimicrobial coating to all surfaces that passengers frequently come in contact with also labeled as “high-touch surfaces”, such as handles, seating areas, buses, check-in kiosks and counters, toilets, baggage trolleys and elevator buttons (7).

The CleanTech facility is a full-body disinfection booth where people would get disinfected through a 40-second procedure. Before entering the facility, passengers would need to get their temperatures checked. The interior part of the booth is coated with antimicrobials which remotely kill micro-organisms on humans and clothing through photocatalysis and using nano-needles. The facility also sprays sanitizer on the individual who enters it for instant disinfection. The channel is kept under negative pressure to isolate it and to prevent cross-contamination between the outside and the inside environments, preventing COVID-19 from escaping the facility and destroying it (7).



## Redesigning Passenger Flow



It should be recommended for passengers to follow social distancing guidelines by keeping physical distance between travelers and staff at check-in and boarding (8). However, social distancing at airports might create extremely large boarding queues which would be an issue due to the lack of space at airports (9). Plans must therefore be put in place to more effectively manage queues.

Strategies that have been previously introduced by airports and airlines to reduce wait times and optimize passenger experience could be effective in preventing queues at boarding. Delta Air Lines launched a virtual queuing feature on their app to notify passengers when their seat is boarding (10). Gatwick Airport and EasyJet are investigating the effectiveness of boarding by seat number to fasten boarding (11).

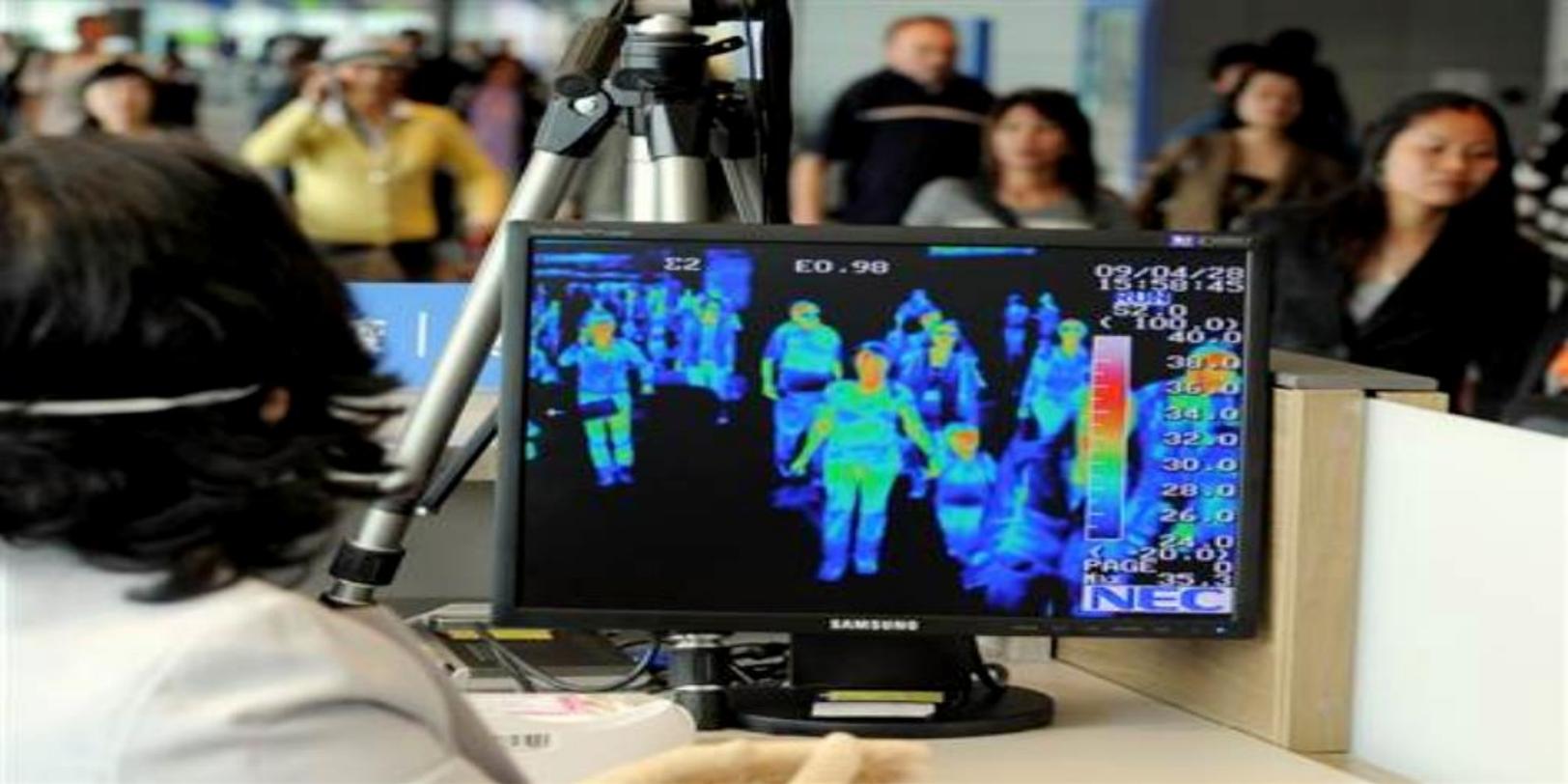
To avoid overcrowding passengers in these areas, signs, floor markings and other products should be used to encourage larger physical space between people. Passenger flow should be planned from the curbside outside the entrance of the airport and all the way through check-in up to the gate.

## Passenger Automation

Airport authorities should reorganize airports to adapt to the new norm to facilitate containment efforts for any future outbreaks. They should promote the utilization of electronic devices to limit human interaction. Prior to the COVID-19 crisis, there was a growing trend in passenger automation, the movement of passengers throughout airports using technology, to improve passenger experience. However, there should be a more significant shift in dependence on technological innovation and artificial intelligence post-COVID-19 to decrease the risk of future outbreaks. Airports should transform their systems and focus their resources on digital technology (12).

Procedures at airports should focus more on becoming contactless to further avoid interaction between personnel and passengers, such as self-serve bag drop systems, and biometric check-in screens, e-gates, and boarding procedures using facial recognition. These contactless procedures could be implemented at check-in, immigration and security.





There is a necessity to screen not only outbound borders for international travelers, but also inbound borders. Airport authorities should install automated thermal scanners to remotely read passenger temperatures on arrival and departure, allowing them to either proceed with their journey or to be redirected for further screening. However, temperature screening alone is not a sufficient technique to contain COVID-19 as infected individuals may be asymptomatic (13).

Ethihad airlines have started planning their contactless self-service technologies to screen passengers by estimating their vital signs at airport touchpoints, such as at the check-in kiosk, bag drop, and security and immigration gate. Technologies, such as a user interface using voice recognition control and a method to scan passports without having to place them on a machine, have also been developed to enable touchless use self-service devices (14).

### Key Messages

- ❑ Airport facilities and airplanes cabins must be frequently disinfected.
- ❑ High-tech and innovative products could be developed to assist with the disinfection process to minimize human contact.
- ❑ Airports should be redesigned to improve passenger flow and implement social distancing.
- ❑ Airports should become automated and shift to contactless procedures to minimize the risk of viral transmission.
- ❑ A multimethod approach is required for an optimal air-travel protection response.



## New Air Travel Regulations



## Reorganizing Flight Plans

Reopening of airports must be done gradually with staged restoration of international travel and passenger traffic. During the first phase, airlines should start by assessing their networks by determining their optimal size and dimensions.

To avoid crowding airports, flights should be staggered throughout the day. When flights are scheduled at different times, the number of passengers at any certain time at check-in, security checkpoint, passport control and gates would be reduced; therefore, mitigating the risk of viral transmission. This would also allow implementing social distancing measures at the airport without creating long queues.

## Decreasing Aircraft Capacity

Decreasing seat occupancy on board of airplanes is another measure that could be considered but that should not be implemented on its own. Airlines should decrease airplane capacity by around 30 to 40% to allow for increasing physical space between passengers. However, modern airplanes are designed with narrow seats to increase profitability which would consequently decrease the distance between passengers to around 45cm. Blocking the middle seat would result in around 66.7% occupancy on the airplane. (15). Therefore, keeping an empty middle seat between two passengers should complement other precautionary measures as it is not enough to maintain proper social distancing.

## Implementing New Practices



Customary behavior change



Protective barriers for employees safety



Inside aircraft changes



Cabin Baggage restrictions

Customary behavior during travel will have to be altered by implementing new regulations in airports and airplanes. Gloves and masks should be made mandatory to all employees who attend work, and hand sanitizer as well as other sanitary products must be made available to staff at all times. The distribution of facemasks at airport entrances should be carried out to prevent contamination of surfaces and contagion through droplet release. Passengers should be requested to wear the facemasks at the airport and on board of the aircraft (16). Other measures to consider include installing Plexiglas and other protective barriers at check-in and passport control desks to ensure employee safety, and to allocate isolation rooms for passengers suspected to be COVID-19 positive (17).

Inside aircrafts, several rules could be applied to mitigate the risk of transmission, such as removing magazines and other reading materials from seat pockets, modifying food and beverage packaging, and simplifying catering procedures to reduce crew movement and interactions with passengers. In addition, airline authorities are advised to restrict cabin baggage allowance and limit it to laptops, handbags, and baby items (8, 18).

### Key Messages

- ❑ Airports should gradually regain their functions.
- ❑ Seat occupancy should be decreased on board.
- ❑ Precautionary measures should be implemented in airports and airplanes, such as wearing masks.



The E-Health Passport is a virtual certificate reporting the health state of individuals. The use of this certificate is a recent approach to the relaxation of social distancing measures. The E-Health Passport could be employed when lifting travel bans to overcome the high-risk of viral transmission during air travel. It would specifically inform airport authorities if passengers are infected or are at risk of being infected with the virus, in which case individuals won't be allowed on board and will be asked to self-quarantine.

This plan could be implemented on two different levels. The first is to test for COVID-19 and the second is to test for individuals' immunity against the virus.



## COVID-19 Testing Schedule

Several tests must be conducted to ensure passengers are safe for travel. PCR testing for COVID-19, by laboratories contracted with national embassies, three days before departure to allow for flight cancellations in case of positive cases is an appropriate strategy (19, 20).

Rapid COVID-19 testing should also be conducted upon arrival to the final destination. Rapid PCR tests that detect antigens and therefore active infections with

COVID-19 were developed, providing results in two to three hours (21, 22).

Testing for COVID-19 antibodies to complement PCR testing, if implemented, can be conducted at any time considering that it certifies that the individual has immunity against the virus (23).

## COVID-19 Test Certificate

In this case, airport or health authorities would test all passengers for COVID-19 to check for possibly infected individuals. Rapid testing for the virus is often recommended as a complement to the thermal scan screening technique due to a significant increase in the probability of case detection (24).

All passengers arriving at Hong Kong are tested for COVID-19 and have to wait up to 12 hours for their results (25). Vienna Airport offers Rapid PCR testing to provide arriving and departing passengers with medical certificates proving they are COVID-19 free (22).

The Canary Islands will implement the E-Health Passport strategy and receive the first touristic pilot flight in July. The Hi+Card app will be used to certify that passengers are free of COVID-19 (26).

## COVID-19 Immunity Passport

Some governments including Chile, Germany, Italy, the UK, and the USA have proposed implementing COVID-19 immunity passports (27). This document would certify that the individual is immune to SARS-CoV-2 and therefore not a threat to the population or themselves. This system requires a

negative test for COVID-19 and a positive blood test for COVID-19 antibodies using Antibody Rapid Test Kits (21).

Some technologies which can act as immunity passports are already in place such as apps with QR codes (23). The apps would store the user's immune status data which would be obtained from healthcare authorities. Upon arrival to the airport, the QR code would be scanned to check for the passenger's immunity status.

Australian authorities have also suggested using health passports labeled as "Pacific Passports" as they would only allow travel to neighboring countries such as New Zealand. The latter has been considered to be taking similar approaches to Australia in managing COVID-19 and therefore allowing a travel agreement between the two countries (28).

## Challenges of Immunity Passports

This proposal is not free of challenges. Technical, social and equitable barriers emerge among others when discussing the validity of the immunity passport.

First, it is still not very clear whether patients who survive COVID-19 are protected against a second infection and how long their immunity against the virus would last. It is also unclear whether there would be a risk of

cross-reactivity between antibodies for SARS-CoV-2 and other coronaviruses, leading to false-positive results (23).

Second, the risk of false-positive and false-negative results might increase depending on the timing of the antibody test (29). The accuracy and reliability of the test require further validation.

In the event of a false-positive result, the individual might be erroneously led to thinking they were immune to the virus, further leading them to changing their behavior despite being susceptible to infection (27). The person could possibly get infected and pose a health risk to themselves and others.

Third, immunity passports might be discriminatory against those who are unable to afford getting tested or skipping work; therefore, creating a perverse incentive for those individuals to seek out the infection and become immune to it (18).

### Key Messages

- E-Health passports are virtual certificates indicating the passenger's health status.
- Immunity passports would be the optimal solution to halt viral spread if not for their scientific and discriminatory challenges.



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