Considerations on COVID-19 Testing

Summary

- Testing for COVID-19 should not be a necessary condition for reopening borders and/or resuming air service operations where infection rates between two countries are similar and stable or decreasing. The measures contained within the ICAO 'Take-Off' guidance provide multiple layers of protection to mitigate the risk of transmission during air travel and the importation of COVID-19 through air travel;

- An 'effective' COVID-19 test does have the potential to be a useful risk equalization measure where the rate of new infections in the origin country is significantly higher than in the destination country and/or where the rate of new infections in at least one of the countries is increasing rapidly;

- A test prior to departure could reduce the risk of importation by up to 90%, enabling air travel to be opened up between a large number of countries without a quarantine requirement;

- While infection rates are currently increasing in most world regions, many states are erring towards seeing testing as a standard requirement. While this makes sense in the current context and is consistent with our position, a requirement for testing should be a temporary measure and only in place for as long as it is justified by the evolution of the pandemic in the relevant states. The time, cost and inconvenience involved in getting a test carried out are a potential barrier to air travel demand and testing should therefore only be required where and for as long as necessary.

Onset of COVID-19 and virus detectability

A majority of studies agree that the average time from exposure (infection) to symptom onset (known as the incubation period) is approximately 4-5 days, with a range from 2-12 days. There is evidence that the virus can be detectable, and therefore an infected person may be contagious, up to 48 hours prior to symptom onset.

During the initial phase of the incubation period the virus is not detectable by the gold standard polymerase chain reaction (PCR) test and therefore an infected person would test negative for the virus during this period. However, they would test positive once the virus becomes present in the upper respiratory tract.

From a risk mitigation perspective, a key parameter is the proportion of infected travelers who would test negative and consequently be allowed to travel, despite being infected with the virus. Statistical modelling analysis estimates that as many of 90% of infected passengers would be detected by a single test prior to departure.

Overview of currently available COVID-19 tests

The mainstay of testing for current infection (presence of virus) in the community is a PCR test which involves taking a sample (either via a nasal swab or a saliva sample) and amplifying the genetic material in a laboratory until it can be detected and confirmed. Testing with nasal swabs is invasive and uncomfortable and requires the sample to be taken by a trained person (usually a health care worker) who is also equipped and competent with personal protective equipment (PPE). Saliva-based testing technology provides significant advantages, with the ability to collect samples at a much higher volume and with less discomfort.

The RT-PCR test is the 'best' test currently available and is approved by WHO. PCR testing takes a minimum of around 2.5 hours which is determined by the time taken to extract and amplify the genetic material – and therefore this timescale cannot be shortened. It will generally take longer than this for results to be available (this is according to Thermo Fisher, whose methods / tests / reagents have been involved in about 50% of all of the tests of possible PCR tests worldwide).

Many alternative technologies, which can use other components of the virus (antigens) such as surface proteins, are in development. Technology for molecular tests and alternative antigen tests, is advancing rapidly, and may be able to deliver comparable levels of reliability to the existing PCR tests. If validated by a reputable scientific organization these could reduce disruption to travelers by removing the need to get a test carried out prior to travel.

In addition to molecular PCR and antigen tests that test for presence of the virus, many tests for antibodies to the virus are also being developed. Due to uncertainties around immunity and difficulty in interpretation, these are not considered appropriate for aviation safety at the current time.

Criteria for an 'Effective' at-airport test

In order to be able to be used as part of the travel process (either at departure or upon arrival) a test would need to meet the following criteria:

1. Be able to be performed at speed, particularly if testing is to take place at the airport (results well inside an hour);

2. Support testing at sufficient scale (several hundreds of tests per hour if testing is to take place at the airport) for this to be practical. The use of saliva for taking samples rather than nasal or throat swabs would facilitate this and would also be expected to improve passenger acceptance;

3. Demonstrate extremely high reliability when compared with standard PCR technology:

   - Very low false negative rate (much less than 1%). This is likely to be the requirement of the public health authority for the destination country;

   - Extremely low false positive rate (much less than 1%), because any significant percentage of false positives will result in large numbers of passengers having to cancel their travel, possibly when already at the airport.

   The reliability of any test should be certified by reputable national or international authorities, whether scientific, therapeutic, or public health (e.g. FDA in the US or Institut Pasteur in Europe).

In addition to these technical criteria, cost is also an important dimension. Some tests that are currently being offered at airports cost in excess of US $200. Such high cost will doubtless be a barrier to travel and limit recovery of air travel and economic sectors that depend on air travel. Where testing is a mandatory requirement, the World Health Organization's International Health Regulations (IHRs) state that neither passengers nor carriers should bearthe cost of testing.

Ensuring acceptance of a pre-departure test by the destination country

Based on the current state of testing technology, testing at the airport is not feasible. As a result, IATA's existing position that testing should be done prior to travel and within 48 hours of departure.

This leaves the challenge of implementing a procedure for ensuring against fraud i.e. the risk of travelers presenting a fraudulent negative result. This is an important pre-condition for the acceptance by the destination country of a test carried out prior to departure in the origin country

The test would need to be carried out by a medical expert or a validated entity, approved by the public health authority of the origin country. The test result would need to be provided in the form of an authenticated confirmation, which the medical expert/validating entity would then communicate to the border control authorities of the origin and/or destination countries as required.

Analogous to the current e-visa and travel authorization processes in many countries, airlines would need to confirm that customers have communicated a negative test result to the destination country as part of the check-in process. However, airlines would be neither responsible nor liable for ensuring the validity of the document.

Ideally, there could be a standard format underpinning this process, but development of such a standardized solution should not be a prerequisite for opening of borders. Similarly, the verification / authentication process should be performed in such a way to minimize delays and disruption on departure and arrival.

Pre-departure testing is preferable to testing on arrival as it increases passenger certainty and avoids the possibility of a passenger (and possibly their close contacts) being stranded at destination. It also further minimizes the risk of the virus being transmitted during travel to or from the airport. However, where pre-departure testing is not widely available in the origin country, the possibility for the passenger to take the test on arrival should be offered.

Risk monitoring and testing requirements

IATA's position is that testing should not be a requirement for travel where relative infection rates between two countries are similar) or where the origin country has a lower rate of new infections than the destination country) and where infection rates in both countries are stable or decreasing.

An 'effective' COVID-19 test does however have the potential to be a useful risk equalization measure where the rate of new infections in the origin country is significantly higher than in the destination country. Statistical modelling analysis suggests that testing prior to departure could detect up to 90% of infected travelers. This means that a single test prior to travel could equalize risk between origin and destination country where the initial risk differential ratio is as high as 10:1. This would be an important step in opening up a large number of bilateral air travel markets without the need for quarantine or testing on arrival.

For example, taking the average number of new infections per 100,000 inhabitants within the Schengen area in the previous 14 days to be approximately equal to 15 at the time of writing, this could enable markets to open with new infection rates as high as 150 infections per 100,000 inhabitants in the same period.

However, two important caveats are required:

- The metrics used in these calculations are sensitive to the rate of testing in a given country. Countries are also taking into account the mitigation measures adopted within country as part of their decision-making on bilateral reopening;

- Given that public health authorities are focused on addressing the public health crisis, they may be expected to be more risk averse than the scenario outlined above.

These caveats notwithstanding, a single test prior to departure has significant potential to accelerate demand restart. Dual testing could detect up to 99% of infected passengers. This 99% detection rate could eliminate the need for quarantine even for country pairs with the highest asymmetrical infection rates.

While infection rates are currently increasing in most world regions, many states are erring towards seeing testing as a standard requirement. While this makes sense in the current context, and is consistent with our position as long as mandatory quarantine is avoided, a requirement for testing should be a temporary measure and only in place for as long as it is justified by the evolution of the pandemic in the relevant states. The time, cost and inconvenience involved in getting a test carried out are a potential barrier to air travel demand and testing should therefore only be required where and for as long as necessary.

Conclusions and IATA's Position

Based on the current state of testing technology, we do not see any credible alternative to the existing policy position that could be implemented in the short-term:

- The measures contained within the ICAO 'Take-Off' guidance already provide multiple layers of protection to give governments confidence to reopen borders and passengers the confidence to resume travel.

- A COVID-19 test prior to travel has the potential to be a useful risk equalization measure where the rate of new infections in the origin country is significantly higher than in the destination country;

- If testing is required, it should be a PCR test (preferably saliva-based) carried out in the 48 hours prior to travel and thus not at the airport. Data transmission relating to the sharing of results with the state of arrival should be between passengers and governments.

Thinking ahead to the possibility of an at-airport test, there are several criteria that a test should meet in order to be considered as effective:

- Testing can be conducted at scale – so as not to create an artificial ceiling on capacity;

- Results can be delivered quickly – in order to avoid unnecessary delays or congestion within the airport environment;

- Very high levels of accuracy, both in terms of sensitivity (minimal number of false negatives) and specificity (minimal number of false positives).

- In addition, any at-airport testing would need to be cost-effective and should not constitute a barrier to travel:
  - Where a test is mandatory, no charge should be applied as per the WHO International Health Regulations;
  - Where a test is offered on a voluntary basis, it should be charged at cost-price.

Any test that does not meet these criteria may have unintended consequences, causing more problems than it solves and would most likely limit the recovery in air travel demand.