

Multilayer risk management for COVID-19: A risk-based approach to public health measures in international travel





MULTILAYER RISK MANAGEMENT FOR COVID 19: A RISK-BASED APPROACH TO PUBLIC HEALTH MEASURES IN INTERNATIONAL TRAVEL

Introduction and background

While travel restrictions have helped delay or reduce importation of the SARS-CoV-2 virus to some degree, they have caused societal and economic disruption and impacted billions of lives. Two years into the pandemic, and with growing access to resources for managing COVID-19, sustaining the return in international travel in safe manner is an important step towards normality.

When maintaining international travel, it is important to consider the appropriate public health measures. Measures such as testing, vaccination requirements, quarantines, and total border closures form the package of measures available to control the circulation of SARS-CoV-2 caused by international travel.¹

Nevertheless – due to the disruptive nature of stringent public health measures – their application must align with the risks posed by international travel in the exportation and importation of the SARS-CoV-2 virus in each specific epidemiological and public health context. Therefore, a risk-based approach to public measures in international travel is important, reducing the impact of the risk to a residual level that is considered acceptable by national authorities, and which contains the viral evolution of the virus to move towards an end of the pandemic.

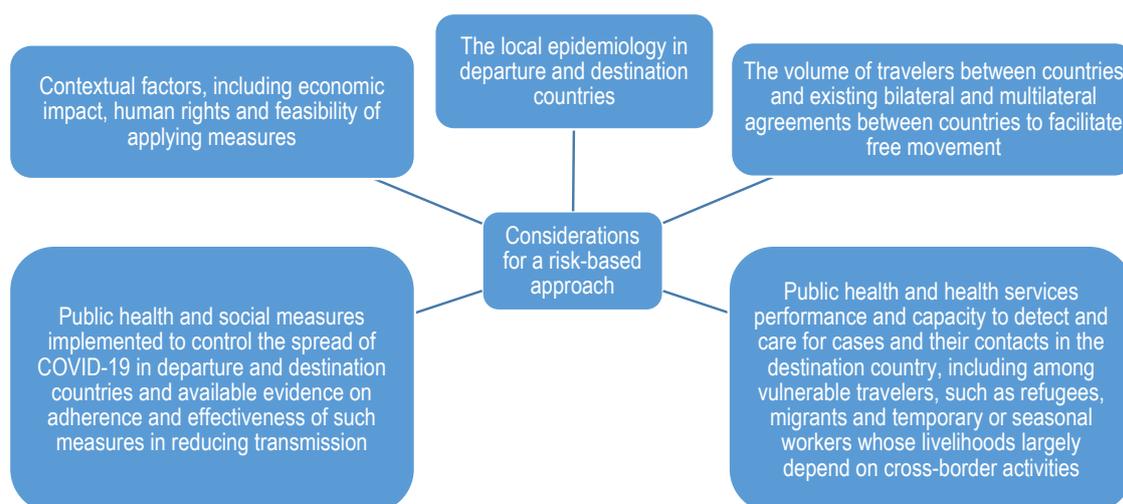
1. A risk-based approach to public health measures in international travel

Adopting a risk-based approach to public health measures in international travel in the context of the COVID-19 pandemic is essential, to provide key guidance on the stringency of measures in proportion to risk. When determining the risk posed by international travel in the transmission of the SARS-CoV-2 virus, the World Health Organization recommends the approach should consider a host of factors (Figure 1).

Considerations of particular importance include the evolving epidemiology situation, including the emergence and circulation of variants of concern (see Section 2), and the volume of travellers between arrival and departure destinations. In addition, the approach should consider the testing capacity of health services to detect COVID-19, and to effectively care for COVID-19 patients within hospitals and ICU units, noting the decoupling of the incidence and hospitalisation and ICU occupancy as individuals who are most at risk become immunised.

¹ The World Health Organization takes the following position with regard to public health measures; i) Testing as a screening procedure for all travellers is only supported in instances where it is justified for public health reasons, ii) COVID-19 vaccination encouraged but not mandatory as a requirement for exit or entry as per the COVID-19 International Health Regulations Emergency Committee, iii) Quarantine of travellers only where justified for public health reasons, and with emphasis on unintended consequences iv) Border closures are not promoted (WHO, 2021^[1]).

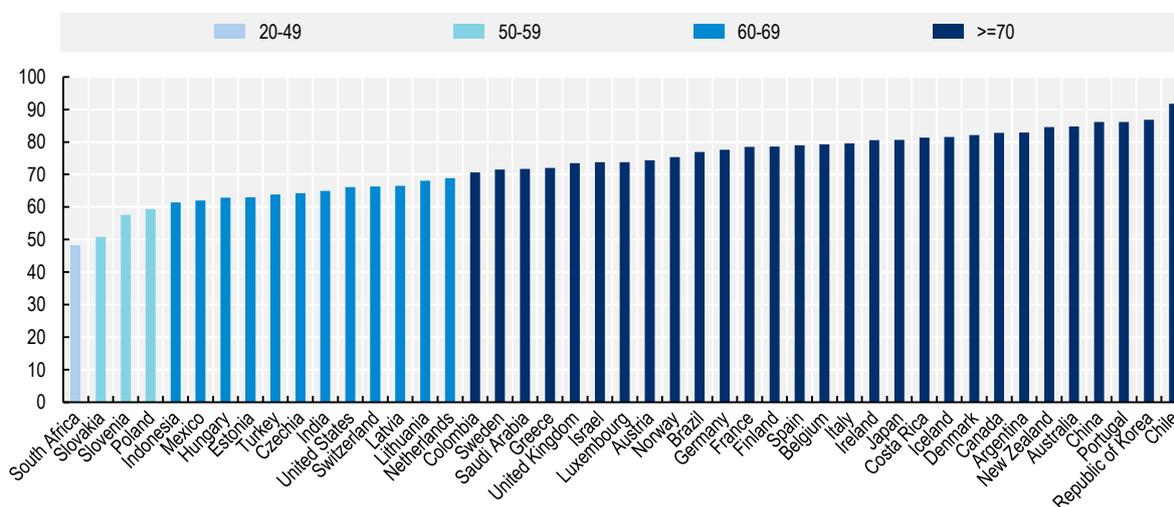
Figure 1. Considerations for implementing a risk-based approach to international travel



Source: WHO (2021^[11]), “Technical considerations for implementing a risk-based approach to international travel in the context of COVID-19”, <https://apps.who.int/iris/bitstream/handle/10665/342212/WHO-019-nCoV-Risk-based-international-travel-2021.1-eng.pdf>.

Local public health measures implemented to control the spread of COVID-19 are also vital in determining travel-associated risk. Most importantly this includes the roll-out of vaccination campaigns to determine vaccine-acquired population immunity (Figure 2), alongside infection induced immunity. Other criteria include the efficacy of vaccines in the face of new variants, and particularly important, coverage rates of high-risk populations.

Figure 2. Persons fully vaccinated per 100 population, OECD and G20 countries, as of June 2022



Source: World Health Organization Coronavirus (COVID-19) Dashboard.

A critical step in a risk-based approach is assessing the real time epidemiological situation of the incidence and prevalence of COVID-19 across geographical areas. Notable epidemiological indicators mostly used in 2020 and 2021 include:

- **Notification rate** – the total number of newly notified COVID-19 cases per 100 000 population in the previous 14 days at regional level,

- **Test positivity rate** – the percentage of positive tests among all tests for COVID-19 infection carried out during the previous week,
- **Testing rate** – the number of tests for COVID-19 infection per 100 000 population carried out during the last week.

Assessing the epidemiological situation may become more challenging as countries testing programmes evolve, resulting in lower overall numbers of tests performed and consequently cases detected. Differences in testing rates may need to be taken into account with greater emphasis than previously in the choice of epidemiological indicators. For example, since February 2022 the European Centre for Disease Prevention and Control (ECDC) classifies countries according to an indicator which is based on the 14-day notification rate, weighted by the vaccine uptake of the region (European Centre for Disease Prevention and Control, 2022^[2]).

Based on the assessment of epidemiological criteria and the broader range of considerations, public health measures can be established proportionate to the travel-associated risk of the importation and exportation of COVID-19. For example, testing of international travellers – such as pre-departure or post-entry testing – would be applicable to a situation of high risk, and may be combined with mandatory quarantine on arrival. However, such measures may not be necessary in situations where the risk is lower, or the health care capacity to absorb cases is higher. A risk-based approach should consider lifting testing and quarantine measures for individuals who are fully vaccinated or have recently recovered from COVID-19 infection.² Complete border closures or suspension of travel may only be applicable in situations of very high risk.

Finally, a risk-based approach to international health should always consider the available evidence on the effectiveness of public health measures in preventing transmission of SARS-CoV-2 virus and new variants in the context of international travel. A priority is reviewing the public health effectiveness and broader socio-economic impact of public health measures which have the greatest economic and societal burden, such blanket travel bans and border closures.

2. Applying a risk-based approach in international travel to the emergence of new SARS-CoV-2 variants of concern

Like all viruses, SARS-CoV-2 changes over time. While most mutations will have no impact, some mutations change the properties of the virus. This can lead to variants which are more transmissible, cause more severe disease, and/or impact the performance of vaccinations.

During the COVID-19 pandemic, clinically significant mutations of the SARS-CoV-2 virus have emerged at a concerning pace, and will likely continue while the virus spreads through populations. In addition, viral evolution resulting in more transmissible variants is a primary factor preventing the end of the pandemic (WHO, 2022^[3]). A larger pool of infected people in countries where the pandemic remains uncontrolled provides a larger “laboratory” for viral variants competing for genetic dominance, leading to a greater rate of mutation. COVID-19 vaccination programmes act as a means to reduce transmission of SARS-CoV-2, decreasing viral replication and the frequency of mutation and thereby the potential emergence of new variants (OECD, 2021^[4]).

Given the continuous emergence of new variants, variants are classified – depending on their risk to global public health – into variants of concern (VOC), variants of interest (VOI), and variants under monitoring (VUM). New variants are of concern if they are more virulent, more transmissible, or more resistant to vaccines, diagnostics or treatment than other variants. As of June 2022, the World Health Organization

² Current World Health Organization guidance is full vaccination at least 2 weeks prior to travelling or infected in the past 6 months and recovered (WHO, 2021^[1]).

has designated five variants of concern; with Alpha, Beta, Delta, and Gamma designated as previously circulating VOCs, while Omicron is a currently circulating VOCs (WHO, 2020^[5]).

In response to the Omicron (B.1.1.529) variant – first reported to the World Health Organization in November 2021 – governments were quick to reinforce stringent travel restrictions aimed at delaying the introduction of the new variant to unaffected areas. In particular the emergence of the Omicron spurred the renewal of screening, and quarantines and border closures or travel bans on international arrivals in OECD and G20 countries (Figure 3). Notably, South American, North American, and European countries put in place stringent international travels controls in response to the Omicron variant.

Lessons learned from the response to Omicron help move towards a risk-based approach to the emergence of new VOCs. In the early stages of the emergence of new variants, imposing travel restrictions may delay the onset of infections, providing vital time for governments to strengthen domestic public health measures, such as scaling up vaccine coverage, contact tracing and surveillance.

Nevertheless, the response to VOCs such as Omicron brought into the question the efficacy of stringent international travel restrictions, in particular border closures, as an appropriate response measures. Emerging evidence points to the diminishing value in delaying the introduction of variants in many countries. This was since the rate at which variants entered into domestic circulation exceeded the capacity or the willingness of most governments to implement reactive travel policies. Once variants are circulating locally, persistently stringent travel restrictions will have extremely limited impact on the local epidemic (Kucharski et al., 2022^[6]).

Moreover, blanket travel bans – which are unlikely to prevent international spread of the SARS-CoV-2 virus – are economically destructive, placing a heavy burden on lives and livelihoods. In addition, travel bans can adversely impact global health efforts, discouraging countries to share and report vital epidemiological and sequencing data, damaging an early warning system for the rest of the world (WHO, 2021^[7]).

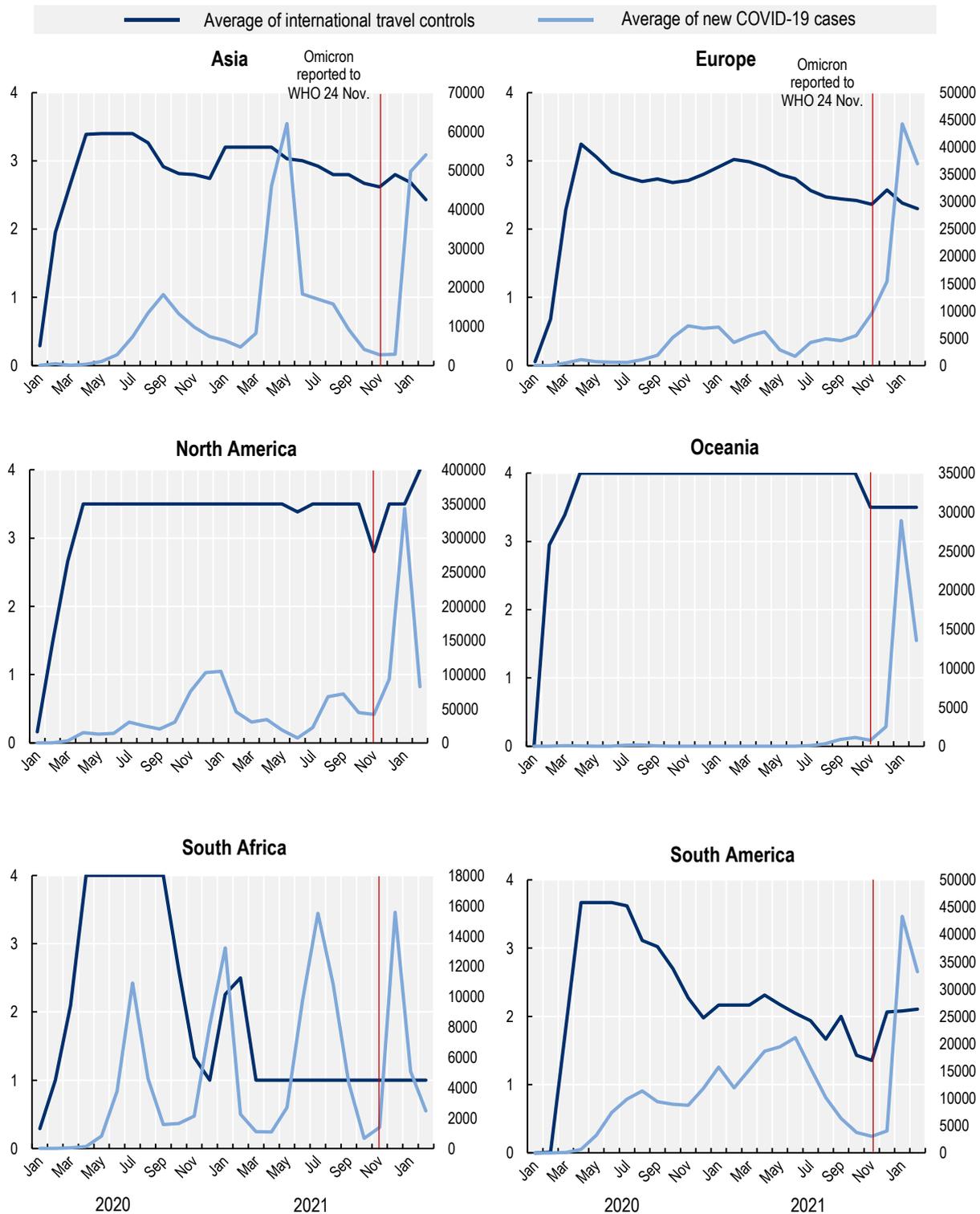
Moving towards a new structured response to VOCs requires countries to apply an evidence and risk based approach when implementing travel restrictions. As discussed in section 1, travel restrictions must be fully justified and proportionate to the threat posed by new VOCs to the further importation or exportation of cases and to population health.

Notably, the response to new VOCs will depend on their nature, taking into account the challenges of new variants on vaccination, treatments, testing, and quarantine (Table 1). For example, the extremely high transmissibility of Omicron meant that international spread was almost inevitable, while the lower virulence lead to fewer hospitalisations. Looking forward, careful attention should be placed on the characteristics of new VOCs, to prevent overwhelming health systems and to protect the most vulnerable. In the face of uncertainties around the characteristics of new variants, periodic assessments should be done regularly to incorporate new scientific evidence as it emerges to limit the duration of precautionary and restrictive measures.

Table 1. Key challenges in the response to new variants of concern

| | Challenges with new variants |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Characteristics of new variants | - Transmissibility - Virulence |
| Vaccination and treatments | - Impact on vaccine efficacy and escape variants - Share of population vaccinated - Impact on the efficacy of treatments and therapeutics |
| Testing and surveillance | - Reduced detectability - Sufficient diagnostic testing, in particular PCR testing, to identify imported cases of new variants - Maintaining surveillance and sequencing efforts to understand circulating variants |
| Quarantines | - Impact on incubation period |

Figure 3. International travel controls and COVID-19 cases in OECD and G20 countries



Note: 0 – No measures, 1 – Screening, 2 – Quarantine arrivals from high-risk regions, 3 – Ban on high-risk regions, 4 – Total border closure. Graph shows the average travel controls in each region.

Source: The Oxford COVID-19 Government Response Tracker, and World Health Organization Coronavirus (COVID-19) Dashboard.

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Points for discussion

- More than two years into the pandemic, what are the most appropriate tools for risk assessment that will contribute to proportional responses for international travel?
- How to maintain a minimum level of testing and surveillance to identify key trends in transmission?
- How can countries obtain further alignment and consistency in the co-ordination of health measures requested from travellers – testing, vaccination, and quarantine?
- Which policies can be used to limit the duration of precautionary and restrictive measures around the characteristics of new variants, given the uncertainty around them?

