

# Evidence to recommendations: COVID-19 mitigation in the aviation sector

Interim guidance  
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## Background

The current COVID-19 pandemic is having a large-scale impact on international travel and trade, particularly in the aviation sector. In the absence of synthesized evidence-based public health recommendations, key stakeholders - including Member States, the general public, the aviation industry and its affiliates – are understandably turning to WHO for guidance to manage the safe and effective recovery of air travel, particularly for travellers. Thus, the risk-based application of public health measures to mitigate the transmission of the SARS-CoV-2 virus before, during and after air travel is an issue for which urgent messaging and guidance are needed.

The [guideline development group \(GDG\) for WHO International Travel and Health](#) [1] was established in February 2019 to revise the WHO International Travel and Health (ITH) document (the "green book"), which was last issued in 2012. The GDG is a group of experts selected in their personal capacity, following rules and protocols laid out in the WHO guideline development handbook [2], which ensures their independence and impartiality in the performance of systematic reviews and development of guidance. The scope of this GDG is international travel and health, including all aspects of public health measures at points of entry<sup>1</sup> as well as risk-mitigation strategies for both travel-acquired infectious and non-infectious diseases, including primary and secondary preventive and therapeutic interventions. Using the ITH GDG for COVID-19 guidance as it relates to aviation takes advantage of the knowledge and expertise within an existing group.

WHO is now conducting systematic reviews of the scientific literature and assessing high-quality data in grey literature on the effectiveness, safety, and potential harms of various public health mitigation measures for SARS-CoV-2 transmission implemented before, during, and after air travel, including at points of entry. The resulting knowledge products will be published as a series of scientific briefs or interim guidance documents as applicable.

## Related WHO Recommendations

WHO published an interim guidance document, "Management of ill travellers at points of entry", on 19 March 2020 [3]. The scope of that interim guidance encompasses advice on the process of detection, reporting, and management of ill travellers suspected to have COVID-19 at land, sea, and air points of entry. Additionally, WHO published interim guidance around the operational considerations for managing COVID-19 cases or outbreaks in aviation [4] on 18 March 2020, which is intended to guide "... any authority involved in public health response to a public health event in aviation, including International Health Regulations (IHR) National Focal Points (NFP), health authorities at airports, local, provincial and national health surveillance and response systems, as well as civil aviation authorities, airport operators, aircraft operators, airports, and airlines". Finally, WHO earlier published a Handbook for the Management of Public Health Events in Air Transport [5].

However, WHO guidance specifically addressing the range of available public health measures as they relate to COVID-19, SARS-CoV-2 transmission, and aviation across the air traveller journey is presently lacking.

## Methods

In response to requests from stakeholders for topical guidance in October 2020, the ITH Steering Group drafted a list of the most urgent COVID-19 and aviation questions around which guidance was needed and formatted them according to the standard "PICO"<sup>2</sup> framework. The PICO questions were further refined by an External Review Group (ERG) of stakeholders. On 28-30 October 2020, the [ITH GDG](#) [6] was reconvened and included methodologists and experts in evidence synthesis to consider the scope, target audience, and final nine questions (Table 1) to be addressed by the methodological teams and the GDG.

<sup>1</sup> Under the IHR 2005, the term 'point of entry', e.g., international airports, seaports and ground crossings, includes points of exit.

<sup>2</sup> The PICO framework is a standard mnemonic used in evidence-based-medicine to capture the elements of interest when crafting a question around a health intervention, and particularly informs literature search strategy. P stands for population, I for intervention, C for comparison (comparator), and O for outcome(s).

**Table 1. Questions to be addressed in scope of work of ITH GDG**

1. What is the effectiveness of a. hand hygiene, b. physical distancing, and/or c. wearing a mask (with or without a face shield and/or eye protection) alone or in combination, in preventing SARS-CoV-2 transmission between air travellers?
2. What is the effectiveness of a maintained, tested, and functional environmental control system (ECS) while aircraft passengers are on board in preventing SARS-CoV-2 transmission to air travellers?
3. What is the effectiveness of disinfection/cleaning protocols (on-board, airports) in preventing SARS-CoV-2 transmission to travellers during air travel?
4. What is the effectiveness of screening by observation, temperature check, and/or health declaration forms of air travellers (passengers and/or crew) on departure and/or arrival in preventing the transmission of SARS-CoV-2 to air travellers?
5. What is the effectiveness of various approaches to isolation and/or monitoring and/or quarantine of air travellers (passengers and/or crews) on arrival in preventing the importation and transmission of SARS-CoV-2 into destination country?
6. What is the effectiveness of microbiological detection (PCR and/or rapid diagnostic testing and/or “sniffer” dogs) of SARS-CoV-2 pre-departure and/or upon arrival in air travellers in preventing the on-board transmission and/or importation of SARS-CoV-2 into the destination country and impact on quarantine duration?
7. What is the effectiveness of contact tracing in preventing the international transmission of SARS-CoV-2 from infected aircraft passengers?
8. What is the effectiveness of risk communication in preventing the international transmission of SARS-CoV-2 from aircraft passengers?
9. What is the effectiveness of suspension of commercial air transport and/or restricted access to air arrivals on rates of SARS-CoV-2 transmission?

An analytic framework capturing the high-level outcomes, impacts, and considerations of the work of the GDG is highlighted in Figure 1.

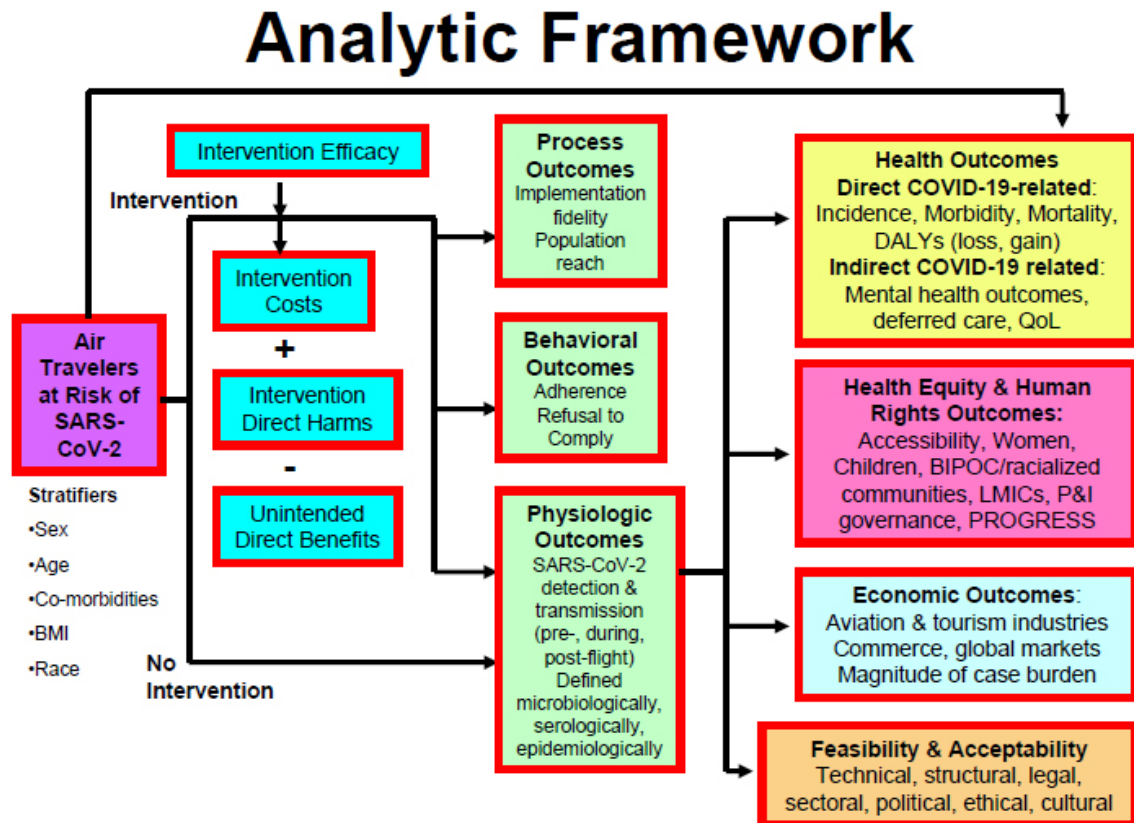
Once the PICO questions were finalized, a lay sub-group of the ERG was engaged to provide feedback on the wording of the questions, as well as priorities, concerns, comfort level, and thoughts as they broadly relate to COVID-19 and the civil aviation sector.

The reviews will be conducted by teams of experts in knowledge synthesis, supported by three methodologists. For the first phase of the work, they will produce three systematic reviews of the scientific evidence around the efficacy, safety, and potential harms of specific public health measures applicable to COVID-19 risk mitigation before, during, and immediately after air travel. The main outcomes will relate to cases of SARS-CoV-2 detected or averted or introduced at the destination. Other important outcomes relate to travellers' behaviour (e.g., adherence to recommended mitigation strategies) and potential harms/safety of the interventions. Data will also be summarized on other critical decisional factors such as the balance of benefits and harms, feasibility, tolerability, acceptability, and consequences, the latter of which may occur at the level of the individual traveller (e.g., health equity and human rights considerations such as accessibility), sectoral level (e.g., aviation, tourism), or economic level. One systematic review team addressing four of the nine PICO questions will provide an update to a Cochrane collaboration [systematic review](#) published on 16 September 2020 [7], which addresses those particular questions. Rigorous standard methodological registration, searching, reporting, risk of bias assessment, synthesis, and analysis will be adhered to according to each systematic review protocol.

The GDG will review each study or report ultimately determined by systematic review teams as contributing important and relevant evidence. Included studies will be examined by the GDG for reporting of data according to the key health equity stratifiers outlined in the WHO Handbook on Health Inequality Monitoring [8]. Those stratifiers, listed according to the acronym 'PROGRESS', include but are not limited to: place of residence; race or ethnicity; occupation; gender and sex; religion; education; socioeconomic status; and social capital or resources. Where possible, data will be synthesized and graphically represented according to the PROGRESS factors. With recognition that health equity outcomes will reflect the differential application of public health interventions for risk mitigation of SARS-CoV-2 transmission and air travel, the GDG will adhere to the [WHO INTEGRATE framework](#)<sup>3</sup> for the evidence-to-decision process [9]. Adherence to INTEGRATE will facilitate systematic consideration of evidence-to-decision factors and outcomes, with the aim of synthesizing such factors quantitatively, qualitatively, or in narrative format. Reliance on expert consensus to support statements of the GDG will occur only in the absence of such syntheses. Knowledge products reporting on syntheses addressing PICO questions will be produced in a timely manner. The order in which the briefs are produced will be informed by process considerations (e.g., feasibility of rapid data synthesis and consensus around a particular public health measure) as well as stakeholder feedback provided through the existing channels of ERG and lay perspective ERG sub-group.

<sup>3</sup> WHO-INTEGRATE is an evidence-to-decision framework encompassing seven key criteria to be systematically considered, discussed, and addressed during the process of guideline development for health interventions.

Figure 1. Analytic Framework



Abbreviations: BIPOC, Black, Indigenous, persons of colour; BMI, body mass index; DALYs, disability adjusted life years; LMICs, low- and middle-income countries; P&I, privacy and information; QoL, quality of life.

## Review of the evidence

Given that the COVID-19 pandemic is quite recent, much of the data that have been synthesized to date around air travel and coronaviruses pertain to the severe acute respiratory syndrome (SARS) and the Middle East Respiratory Syndrome (MERS), which have limited direct generalizability to COVID-19. Further, many of the studies directly related to SARS-CoV-2 and COVID-19 are based on mathematical modelling, data from which have yet to be rigorously validated. The state of currently synthesized evidence is limited methodologically and by imprecision, indirectness, and publication bias, coupled with a dearth of information about the critical decisional factors such as health equity and human rights considerations. All these factors affect the translation of evidence syntheses into recommendations and highlight the need for the scope of work undertaken by the ITH GDG and described here.

## Limitations

Anticipated limitations of this work include: a lack of high-quality reported interventional trials directly related to COVID-19 and aviation; anticipated low certainty caused by bias, inconsistency, imprecision, and indirectness of available published data that are broadly applicable to the topic; and a proliferation of small, anecdotal, or case-series level observational data that will be challenging to synthesize rigorously. A dearth of high-quality studies reporting on the specifics of and adherence to in-flight protocols (compared with those followed both before boarding and after disembarkation) is expected. Another major limitation will be the anticipated absence of reported health equity and human rights stratifiers in both intervention and non-intervention-based studies as they relate to COVID-19 and aviation.

## Knowledge gaps

As mentioned above, much of the synthesized literature pertaining to transmission of coronaviruses in the context of aviation is directly related to or extrapolated from studies of SARS, MERS, and other viral pathogens. Synthesized direct high-quality evidence is lacking. A considerable knowledge gap remains about how likely it is that high-quality scientific data will be reported or stratified by the PROGRESS factors needed to meaningfully address operational efficacy, health equity and human rights considerations in this body of work. A full literature mapping of factors conventionally regarded as "evidence-to-decision" considerations as they specifically relate to health equity and human rights will be undertaken during the second phase of the GDG work.

## Conclusions

This document describes the high-level process that WHO will undertake to synthesize the available scientific and publicly available evidence on the effectiveness, safety, and potential harms of various public health mitigation measures for SARS-CoV-2 transmission implemented before air travel, at points of entry, and during and after air travel.

## Plans for updating

WHO and the ITH GDG continue to monitor the situation closely for any changes that may affect this scientific brief. Should any factors change, this brief will be updated accordingly. It is anticipated that vaccine licensure and availability in many jurisdictions will potentially affect the work plan and processes described here. The landscape of the effect of vaccine availability on other public health measures for COVID-19 as they relate to aviation will be addressed at the next update. A thematic analysis of stakeholder feedback, informing refinement of scope and question development, will also be included in a subsequent iteration.

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WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

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