



From Science to Policy

Provision of technical and strategic guidance based on evidence by WHO

Background paper 3

The
Independent
Panel

FOR PANDEMIC
PREPAREDNESS
& RESPONSE



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This paper includes an overview and analysis of the role of WHO in evidence curation and conveying during the COVID-19 pandemic and an assessment of the adequacy and timeliness of mechanisms used. It is based on a comprehensive document and literature review, experts’ consultations and a roundtable discussion on “From Science to Policy” held by The Independent Panel on January 14, 2021. In addition, in-depth analysis on temporary recommendations, with a focus on travel-related measures and on community face masks have been included.

This paper has been prepared by the Secretariat to the Independent Panel for Pandemic Preparedness and Response as background for the Panel. The views expressed herein do not necessarily represent the views of the Panel.

1. Overview on WHO's guideline development and dissemination processes

In 2019 WHO created a **new science division** and a **new department for norms and standards** in order to improve processes and the development of guidelines to be able to publish evidence-based, timely, relevant and impactful scientific recommendations. A quality assurance mechanism had been established earlier within the science division to ensure that all guidelines and normative products of WHO fulfill the high standards in terms of process, methods, reporting and presentation as well as impacts.

The process of **developing evidence-based guideline documents** for clinicians, public health experts and policymakers follows rigorous, standardized procedures, making sure that their compilation is transparent and based on evidence, and that any potential conflicts of interest are made explicit. All guidelines of WHO go through a thorough planning, developing and clearance process supported by the **Guidelines Review Committee**. To ensure the highest quality and impact, the process goes through multiple steps involving the Guideline Steering Group, Guideline Development Group, External Review Group, and Guideline Review Committee. It often takes a few years for a new WHO guideline from planning to publication due to these multiple steps and players. The whole process is described in detail in WHO's Handbook for guideline development (1).

The COVID-19 outbreak brought a new urgency to WHO's normative work, especially as it soon became a public health emergency of international concern, when Member States and international partners could not wait for a few years to get WHO's guidance. **Timeliness** had become as important as the **accuracy of guidance documents**. Hence a **fast-track process** needed to be implemented, which was based on past experiences with influenza or other coronaviruses (e.g., MERS). To reduce time from evidence synthesis to publishing recommendations, WHO established a **Rapid Review Group** in February 2020, and a **Publication Review Committee** in March 2020, based on a "**Health Emergency Interim Guidance (HEIG)**" approach as described in the WHO Handbook on Guideline Development (1). Through these actions multiple steps were reduced to four elements: 1) Evidence generation 2) accelerated systematic review, 3) formulation of recommendations, and 4) developing and publishing guidance. This 'fast-track' process enabled WHO to reduce the guidance development time from a few years to a few weeks. To **shorten the time from new evidence to new guidance** even further, WHO **harmonized** the Rapid Review Group, Guideline Development Group and Publication Review Committee to work "in parallel" in order to **develop rapid recommendations**.

The **Rapid Review Group** completed more than 109 evidence reviews related to COVID-19 for quick development of guidance, of which 18 remain "active" for regularly updates to inform **living recommendations**. The **Publication Review Committee** (PRC), which is a new mechanism for a PHEIC, established in response to past criticisms of uncoordinated and voluminous guidance from WHO, is in charge of quality assurance of all WHO COVID-19 related publications. The committee is ensuring the strategic publication of technical documents, the quality assurance in spite of the accelerated process and the consolidation of guidance by theme. Throughout 2020, the PRC has been meeting three times per week, reviewing more than 1000 publications on COVID-19 with a turn-around time of 48-72 hours. WHO emphasizes that due to the parallel work of the standing rapid review group and the guideline development group, the **timelines of guidance development was significantly improved**. The development of guidance on the use of corticosteroids (2) took 72 days from the access to clinical trial data in June to the publication in September 2020, showing the improved speed of the processes involved. The new ultra-fast-track process, which was implemented

in October 2020, proved that this time could be even halved as, e.g., the time for the development of the Remdesivir guideline (3) was only 36 days. For this purpose, data has been used from the **“Solidarity” Clinical Trial for COVID-19** which is an international clinical trial to help find an effective treatment for COVID-19. This trial was launched by the WHO and partners and is one of the largest international randomized trials for COVID-19 treatments, enrolling almost 12 000 patients in 500 hospital sites in over 30 countries, and evaluating the effect of drugs on 3 important outcomes: mortality, need for assisted ventilation and duration of hospital stay (4).

One key challenge for WHO is to produce guidance documents without delay as soon as new evidence becomes available. The organization aims at making guidelines, when applicable, close to “real-time”, which it believes would be possible by using a **“living guidelines”** approach based on **living systematic reviews** and **living recommendations** (Figure 1). This approach has already been used in the development of guidance for COVID-19 therapeutics in the past few months and WHO is currently piloting **living guidelines** for new guidelines for COVID-19 response, tuberculosis, malaria or maternal and perinatal health (5).

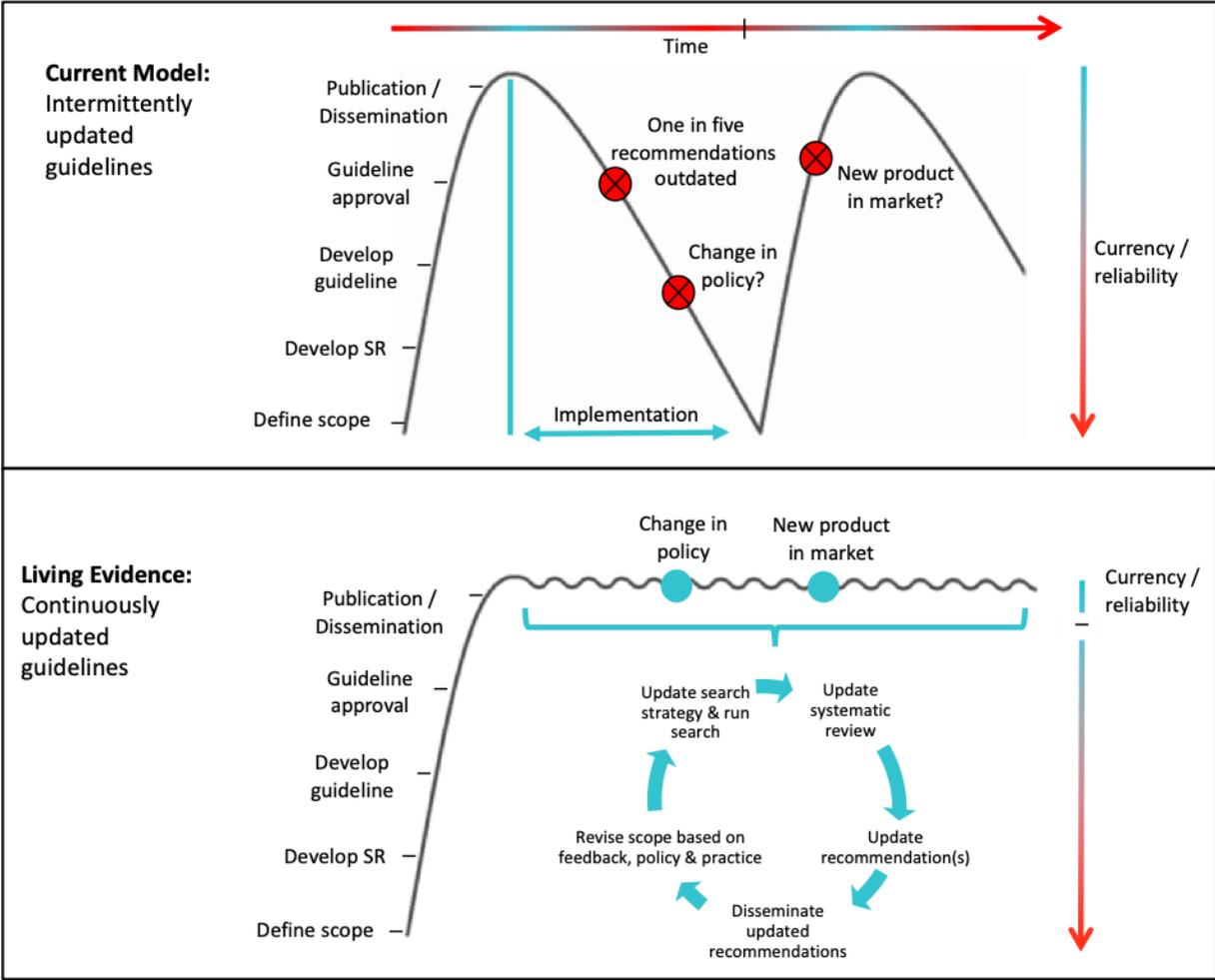


Figure 2: Living guidelines approach; Source: WHO, Science Division, January 2021

In addition to the development of guidelines and recommendations WHO has supported other stakeholders by harmonizing evidence synthesis and retrieval through the **Evidence Collaborative** for COVID-19 (6) together with more than 90 partners and by establishing a **WHO COVID-19 literature database** with 250,000+ citations, across 7 languages and with an open access policy (7).

2. Public Health guidelines

Public Health guidelines published by WHO during the COVID-19 pandemic covered a broad range of aspects supporting the coordination of the national responses, community engagement (WASH, IPC, schools etc.), surveillance measures, including testing, contact tracing or isolation, preparation of health systems and protection of the health workforce as well as travel restrictions and quarantine policies. Many of these were mainly based on existing publications prepared for similar situations, such as MERS-CoV outbreaks. No specific guidance has been issued on physical distancing, an aspect which shaped professional and public discussions throughout the pandemic, but recommendations for physical distancing have been consistently included in IPC guidance documents from January 2020 onwards. Most of the public health guidelines have been revised at least once in 2020. Some guidance documents, e.g., on surveillance (7), inbound travel (7) and masks in the context of COVID-19 (5) have been revised/updated several times.

The **development and revision of public health guidelines** has been supported by pre-existing or newly established formal and informal groups of international, multidisciplinary experts, both from within WHO and from external partners, such as WHO collaborating centres. Several networks and organizations external to WHO have been involved in the process of developing guidance for COVID-19 related issues. These include international public health institutions, e.g., the European Centre for Disease Prevention and Control (ECDC) or the Africa CDC, UN organizations such as UNICEF (e.g., on community masks, school measures) or ILO (workplace measures), national public health institutions like US CDC or Public Health England as well as technical advisory groups and networks, e.g., the Global Outbreak Alert and Response Network (GOARN), EDPLN or GLAD-HP. In addition, WHO Regional and Country offices were consulted and contributed to the development of public health guidelines in different ways.

WHO has several **ongoing reviews** of published literature, e.g. on immunity and the modes of transmission of SARS-CoV-2 and on the effectiveness of non-pharmaceutical interventions on transmission of the virus. The evidence included systematic reviews, randomized control trials, experimental studies, observational studies and ecological studies, and all available literature considering influenza, and other respiratory and human coronaviruses (including SARS-CoV, MERS-CoV) as well all available literature on SARS-CoV-2. WHO routinely evaluates the evidence on the effectiveness of the use of different public health measures, such as the use of masks, and their potential harms, risks and disadvantages, as well as their combination with other measures, such as hand hygiene, physical distancing and other IPC measures, and assesses the quality of each study. These reviews are conducted by groups internal and external to WHO. For all recommendations planning and executive clearances were obtained from the COVID-19 Publications Review Committee.

Guidance documents are published on the WHO website, sent to Regional and Country Offices, and further distributed through a wide range of networks, both internal and external to WHO (UN agencies, other international organizations, WHO collaborating centres, academic partners and networks). In addition, the **general public** is informed on relevant recommendations through press conferences, expert interviews, specific documents (e.g. posters) and visualization tools on WHO's website as well as through social media campaigns.

WHO also attempts to **monitor the implementation and adjustment of public health and social measures**. There are great variations as to the implementation of WHO's advice, e.g., with respect to school measures, including closures and reopening, across the different stages of transmission. There is no formal mechanism to track implementation, but feedback has been received from regional offices on implementation and challenges. For some areas, such as IPC, the Infection prevention and control focal points in the WHO regional offices have provided some information on the implementation of the guidance documents at weekly meetings. In addition, some Member States present on the response to COVID-19 at the national level during the weekly Member State briefings.

WHO attempts to monitor whether countries are using the recommended case definitions, by looking at national case definitions, which some are not (e.g. including probable cases in their 'confirmed' count; or including those who are positive with a rapid antigen detection test as a confirmed case, without further laboratory confirmation). And not all information requested to be reported to WHO actually gets reported (e.g., for case report forms (CRF), not all countries have submitted CRFs, many have not reported all their cases, many fields are blank even when the forms are submitted; and very few countries have joined the weekly aggregate surveillance).

Feedback on the recommendations has been received directly from Member States, other WHO offices, UN agencies, other international organizations, WHO collaborating centres, academic partners, networks, and other constituencies involved. The feedback received has been used to inform updates to the guidance documents and more structured work has begun on collecting further feedback.

According to WHO country representatives, **balancing multiple, urgent requests for guidance from a wide range of constituencies and the need to meet quality standards remain challenging**. With all novel pathogens, there is a lack of scientific studies on that pathogen at the start of an outbreak. Therefore, evidence is limited and based on similar pathogens – in this case SARS-CoV, MERS-CoV and pandemic influenza. For SARS-CoV-2, there was limited evidence and sometimes inconsistent evidence, e.g., on the effectiveness of masks in the prevention of SARS-CoV-2 transmission in healthy populations. Access to primary data also remains limited for many areas, such as contact tracing. This seems to reflect the fact that the operational requirements are such that only few jurisdictions can properly exploit the large amount of data (of variable quality) that they generate. The absence of systematic reporting, e.g., on health care worker exposure and infection, made development of guidance difficult, particularly in the initial stages of the pandemic, in which the prevention of infections, especially in health care workers, is of utmost importance. Therefore, it would have been useful to establish a mechanism for collecting data on health care worker exposure based on the risk assessment.

The same **challenges** that are always present when developing guidance, e.g., on surveillance measures, have also been observed by WHO country representatives in the COVID-19 response: getting the balance between sensitivity and specificity; making it useful across high- and low-resource settings; being technically accurate but simple; making it standardized enough to allow comparability between countries but flexible enough to accommodate differences in context; balancing the desire of special interests' groups to have their data collected as part of the surveillance, versus keeping the information demands at a reasonable level for the end-user. Further,

there have been considerable challenges in managing the scale and scope of data required in a pandemic, particularly the cleaning, evaluation and analysis of case-based surveillance data. According to a WHO representative, there was a reluctance by regional offices to make the surveillance data public, preventing publications and useful information to be made available to the scientific community in due time.

While feedback has been received on the guidance documents from a variety of users, it would be useful, according to a WHO country representative, to have a **mechanism in place to collect direct, practical feedback about the implementation of the guidance** and how the specific technical advice has been used and incorporated into national/sub-national policy documents. Mechanisms for rapid prospective learning from the ground, e.g., activation of **national advisory groups** that would look at the wider impact of disruptive events on the maintenance of essential services, might also be beneficial **to take experiences in different contexts into account**. Countries are varied in risk profiles, epidemiological situation, response capacities, and other contextual factors. Thus, a risk and evidence informed approach needs to be adopted in developing of, e.g., travel related guidance. There appears to be a gap between global guidance development and local adaptation of recommendations, which needs to be addressed in order to support countries, partners and local settings.

In addition, according to other WHO country representatives, preparing a **data-sharing agreement** for surveillance during a pandemic signed by Member States and Regional Offices prior to the pandemic would have been beneficial, as reporting through IHR had been insufficient in the context of a pandemic. Further resources to manage the sheer scale of data in a pandemic would also be required. For an operational strategy such as contact tracing, a small number of **key performance indicators** should have been proposed upfront and systematically collected. At the moment there is still no consensus on a proper set of indicators which, as a consequence, is making a systematic analysis almost impossible. In the area of testing, WHO has already **integrated implementation research and rapid evidence-gathering** into all of its activities. For example, rather than looking only to data from research groups on the operational impact of assay implementation, WHO has established "monitored implementation" protocols for novel methods (such as antigen detection rapid diagnostic tests) to measure the impact of testing implementation on the health system.

3. Clinical guidelines

Between January and November 2020, WHO produced a total of 20 interim guidelines and scientific briefs on the clinical management of COVID-19 disease. Due to the lack of direct evidence on the effective clinical management, indirect evidence and good practices generated from MERS-CoV response in 2015-2019 had to be adopted during the first few months of 2020. A comprehensive clinical guidance document was published on May 27, 2020, as Member States were asking for detailed guidance on patient care (8). Since then, a "living guideline" approach has been adopted, relying on living systematic reviews and living recommendations, which, according to WHO representatives, made the update of clinical guidance much more responsive and faster.

The **guideline development** followed a clearly defined, stepwise process. The WHO secretariat developed a concept for a comprehensive guidance document for clinical management, using previously published guidance on different clinical aspects (e.g., ventilator use), including best

practices and recommendations used for previous outbreaks of emerging infectious diseases such as MERS-CoV or pandemic influenza. The WHO secretariat nominated a Guideline Development Group (GDG), selecting panel members with a balanced regional, gender and specialty representation. Multiple sessions were convened with panel members to review consecutively the entire document drafted by experts, especially from the of WHO Emerging Diseases Clinical Assessment and Response Network (EDCARN). WHO also nominated clinical and methodological chairs to support the GDG which used rapid evidence reviews provided by the Rapid Review Group (RRG). In addition, external peer review was carried out before finalization.

The clinical guidelines were published on WHO's website and in the WHO Academy APP. The **comprehensive May 2020 clinical guidance document**, for example, was downloaded between 21.000-48.000 times per month from June until November 2020 (8). The clinical guidance documents were also disseminated through WHO's regional and country offices as well as their clinical networks within the countries. According to an analysis conducted for the WHO HQ Quality, Norms and Standards Department, based on interviews of ten WHO country representatives, the uptake of the guidelines was good and positive feedback had been received. The authors of the analysis emphasize that to improve dissemination and impacts, there is an urgent need to provide **translation of emergency guidelines into local languages** in addition to the six UN languages.

4. Temporary Recommendations

Following the WHO DG's declaration of a PHEIC, he must issue Temporary Recommendations in accordance with the International Health Regulations (2005). Temporary Recommendations are defined as *"non-binding advice issued by WHO pursuant to Article 15 for application on a time-limited, risk-specific basis, in response to a Public Health Emergency of International Concern (PHEIC), so as to prevent or reduce the international spread of disease and minimize interference with international traffic"* (Article 1) and can include *"health measures to be implemented by the State Party experiencing the public health emergency of international concern, or by other States Parties"* (9). Temporary recommendations are issued by the DG on the advice of the Emergency Committee, but do not go through the same development process as technical guidance published by WHO. They have the same status, in as much as they are both non-binding advice from WHO to its Member States / IHR States Parties but are not developed in the same way. The temporary recommendations may be modified or extended as appropriate, while the PHEIC is ongoing and / or when it has ended and automatically expire three months after their issuance.

22 & 23 January 2020 – 1st IHR EC meeting: No PHEIC declared; Advice given to WHO, the People's Republic of China, other countries and the global community

In early January 2020 the number of cases and deaths related to COVID-19 rose quickly and an increasing number of countries were affected. Of particular concern was the prospect of human-to-human transmission, which would herald rapid spread, but had yet to be definitely determined. Hence, the WHO DG convened a meeting of the IHR Emergency Committee on 22 January 2020, but its members were divided equally as to whether the event constituted a PHEIC based on available evidence and sought more information from Chinese authorities. The DG requested the IHR EC to continue its deliberations for a second day ~~adjourning the EC to the next day~~. On 23 January, Chinese authorities provided new information on cases and *"strong containment measures"*. The Committee

“welcomed the efforts made by China to investigate and contain the current outbreak”, but several members considered that it would still be *“too early to declare a PHEIC, given its restrictive and binary nature”*. At that point WHO did not recommend any broader restrictions on travel or trade but suggested exit screenings at airports in China as part of a comprehensive set of containment measures. All countries were encouraged to implement measures to detect cases of coronavirus, including at health facilities. The EC advised that it would be ready to be reconvened ~~reconvene~~ within approximately 10 days or earlier (10).

30 January 2020 – 2nd IHR EC meeting: PHEIC declared and Temporary Recommendations issued

As the number of cases and affected countries continued to climb, the WHO DG reconvened the IHR EC on January 30, within 7 days of the first meeting. The IHR EC advised that events constituted a PHEIC. The DG accepted the advice, declaring a PHEIC and issuing Temporary Recommendations under the IHR (11). The Temporary Recommendations expressly did not include restrictions on travel and trade. Countries were therefore encouraged to prepare for containment, including surveillance, early detection, isolation and case management, among other response measures as well as to share information fully with WHO per obligations under the IHR (12).

Following the meeting, the WHO DG gave a statement explaining the reasoning behind the decision to declare a PHEIC and outlining the Temporary Recommendations as advised by the IHR EC. The WHO DG particularly emphasized that there would be *“no reason for measures that unnecessarily interfere with international travel and trade”*. WHO did not recommend limiting trade and movement and called on all countries to implement decisions that were *“evidence-based and consistent”*. In addition, he offered WHO’s advice and support to any country, especially those with weaker health systems, to accelerate the development of vaccines, therapeutics and diagnostics and to combat the spread of rumors and misinformation. Countries were encouraged to get prepared and to prevent transmission of the virus as well as to *“share data, knowledge and experience with WHO and the world”*. Furthermore, he called for *“all countries to work together in a spirit of solidarity and cooperation”* (11). More specific advice was set out in the published Temporary Recommendations to the People’s Republic of China, all countries and the global community.

30 April 2020 – 3rd IHR EC meeting - PHEIC continues & new Temporary Recommendations issued

The DG convened the 3rd meeting of the IHR EC with an expanded membership to reflect the nature of the pandemic and the need to include additional areas of expertise. The IHR EC met on 30 April and issued its statement on 1 May (13). The WHO DG declared that the outbreak of COVID-19 continued to constitute a PHEIC and issued the Committee’s IHR EC’s advice to States Parties as Temporary Recommendations under the IHR. The DG also accepted the IHR EC’s advice that WHO should work *“to identify the animal source of the virus through international scientific and collaborative missions”*. Among other duties, he said that WHO would *“continue to call on countries to implement a comprehensive package of measures to find, isolate, test and treat every case, and trace every contact”*, as it had done *“clearly from the beginning”* (14).

31 July 2020 – 4th IHR EC meeting - PHEIC continues & new Temporary Recommendations issued

In its 4th meeting the IHR EC unanimously agreed that the pandemic would still constitute a PHEIC and the Director-General issued the advice offered as Temporary Recommendations under the IHR (15). The Committee put forward advice to the DG concerning the needs for countries to continue to implement to bring the virus under control. These ranged from sharing best practices, to enhancing

political commitment and leadership for national strategies and localized response activities driven by science, data, and experience. It was also recommended that countries should engage in the ACT-Accelerator, participate in relevant clinical trials, and prepare for safe and effective therapeutics and vaccine introduction (16).

29 October 2020 - 5th IHR EC meeting – PHEIC continues & new/revised Temporary Recommendations issued

The Director-General convened the IHR EC on COVID-19 for a 5th time on 29 October 2020, resulting in a continuation of the PHEIC and the publication of adapted Temporary Recommendations (17). Reflecting on the IHR EC meeting in a media briefing, the DG highlighted that it would remain important for governments and citizens *“to keep focused on breaking the chains of transmission”*. Governments should continue to focus on *“tackling the virus and avoid politicization”* and should *“keep investing in the health system and workforce and improving testing, tracing and treatment of all cases”*. It would also be time to prepare for new COVID-19 vaccines and WHO and governments must work together *“to develop rollout strategies, train health workers and ensure clear communications with the general public about vaccination”* (18).

14 January 2021 – 6th IHR EC meeting - PHEIC continues & new/revised Temporary Recommendations issued

In its 6th meeting the IHR EC unanimously agreed that the COVID-19 pandemic would still constitute a PHEIC, requiring a coordinated international response, recognized the progress made by WHO and States Parties in implementing the previous Temporary Recommendations and advised on extending these. States Parties were advised not to require proof of vaccination against COVID-19 as a condition of entry or exit, given the unknowns about effectiveness of vaccines in reducing transmission and limited access to vaccines globally. In addition, additional advice was provided to the Director-General, focusing especially on SARS-CoV-2 variants, vaccines and health measures in relation to international traffic (19). The DG noted in a press briefing on January 15, that some countries were seeing spikes in cases with multiple factors driving transmission risk, because of a lack of success of the collective actions at breaking the chains of transmission at the community level or within households. He warned that the *“gap between intent and implementation at the county and individual level”* must be closed as there was immense pressure on hospitals and health workers (20).

15 April 2021 – 7th IHR EC meeting - PHEIC continues & new Temporary Recommendations issued

The 7th meeting of the IHR EC was held on April 15, 2021, with the official statement being released only 4 days later, on April 19. The Committee remained concerned about the ongoing pandemic and emphasized the urgent need to ensure access to appropriate supplies of diagnostics, treatments and vaccines for all. In addition, it noted that many of the past recommendations would remain relevant to current global response efforts. The IHR Secretariat should review past advice and temporary recommendations and *“bring to the committee a proposal for the process of new issuance, termination, or modification of advice and temporary recommendations in a consistent manner”* (21).

Advice by the IHR EC to the WHO DG and IHR States Parties

Following its six meetings so far, the IHR EC provided specific advice both to the WHO and to Member States (MS), which the WHO DG accepted, and which – following the declaration of a PHEIC on January 30 - were then published as Temporary Recommendations under the IHR. Advice has been given for different overarching areas, such as leadership and coordination, essential health

services or risk communication, not following a particular order. For this analysis the Temporary Recommendations were therefore sorted into main categories as presented in table 1.

IHR EC	1st Meeting		2nd Meeting		3rd Meeting		4th Meeting		5th Meeting		6th Meeting		7th Meeting	
Date	22-23 January 2020		30 January 2020		30 April 2020		1 August 2020		29 October 2020		15 January 2021		15 April 2021	
Advice of the IHR EC to the DG	NO PHEIC		PHEIC		PHEIC		PHEIC		PHEIC		PHEIC		PHEIC	
Advice to	DG	MS	DG	MS	DG	MS	DG	MS	DG	MS	DG	MS	DG	MS
Leadership & Coordination														
Evidence-Based Response Strategies														
Research														
Surveillance, Alert & Contact tracing														
Risk communication & Community engagem.														
Diagnostics, Therap. & Vaccines														
Essential Health Services														
Health measures for international traffic														
Source	Statement 23 Jan (10)		Statement 30 Jan (12)		Statement 30 April (13)		Statement 1 August (16)		Statement 30 October (17)		Statement 15 January (19)		Statement 19 April (21)	

Table 1: Meetings of the IHR Emergency Committee regarding the outbreak of novel coronavirus disease (COVID-19), overview on the announcement of a Public Health Emergency of International Concern (PHEIC) and of Temporary Recommendations issued by the WHO DG

An overview of the key Temporary Recommendations is shown in the following table.

IHR EC advice / Categories	Advice for WHO	Advice for Member States
Leadership & Coordination	Most of the advice simply reflects the core mandate and main functions of the organization	The advice is rather general, calling for more multilateral cooperation and engagement without any follow-up mechanism in place
Evidence-Based Response Strategies	Most of the advice reflects its normative and standard setting role, which fulfilment during a global health crisis should be self-evident	The advice became a bit more specific, when nationalism, weak leadership and distrust in scientific evidence increasingly became a problem

Research	The advice supported the efforts of WHO and the international community to conduct more research on the origins and transmission of SARS-CoV-2. It also emphasized the need for more research on the effectiveness of public health measures, an essential area where strong scientific evidence is still lacking	Member States are encouraged to specifically conduct more research on transmission routes and the evolution of the virus, reminding them of some crucial knowledge gaps
Surveillance, Alert & Contact tracing	The advice is somehow repetitive, indicating the continuation of gaps in national surveillance and global reporting systems and a possible lack of responsiveness by Member States	Similarly, Member States are repeatedly advised to strengthen their surveillance systems and to share information and data with WHO, even nine months after a Public Health Emergency of International Concern had been declared
Risk communication & Community engagem.	The advice is rather unsurprising as the organization is being advised to continue its mandated work and fulfil its dedicated functions during an ongoing pandemic	The advice to Member States is also quite general and self-evident
Diagnostics, Therap. & Vaccines	The advice is emphasizing the need for rapid development and equitable access, especially in support of low- and middle-income countries	Member states are being encouraged to engage in the global research and development approach led by WHO
Essential Health Services	The advice is very unspecific and mainly reminding the organization of fulfilling its core functions	Likewise, Member States are being advised to maintain essential health services throughout the ongoing pandemic as some of these appear to have been directly and indirectly neglected during the COVID-19 response
Health measures for international traffic	The IHR EC did not recommend any travel or trade restriction and advised WHO to reinforce evidence-informed measures consistent with the provisions of the IHR (2005) to avoid unnecessary interference with international travel (<i>see below</i>)	The IHR EC expressly did not recommend any travel or trade restrictions, which was clearly ignored by most countries. Member States were also advised to implement appropriate travel measures with consideration of their public health benefits (<i>see below</i>)

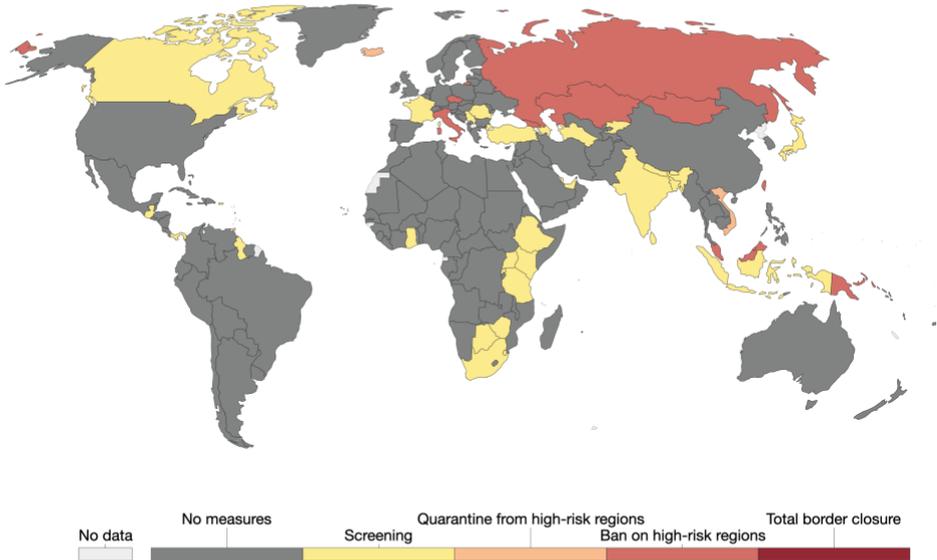
4.1 Advice provided on international traffic

Health measures for international traffic were published by WHO following the determination of a PHEIC as Temporary Recommendations on the advice of the IHR EC. WHO also continued to publish public health considerations on risk-based approaches for international travel, which were issued through the process of Guidelines development described earlier in the paper (via the Publication Review Committee). As COVID-19 was a new disease specific guidance for international travel measures in response to the threat by SARS-CoV-2 had to be developed. WHO's advice for international travel for diseases with risk of international spread is generally based on the International Travel Health (ITH) book (22) and is jointly developed by the IHR Secretariat and the

Border Health Risk Dissemination (BRD) team in the Department of Country Readiness Strengthening (CRS). The advice is then reviewed and discussed with the relevant subject matter experts in WHO HQ and in the Regional Offices, as applicable.

WHO first issued advice for international travel on January 10, 2020 and did not recommend any specific health measures for travelers. In case of symptoms suggestive of respiratory illness before, during or after travel, travelers were encouraged to seek medical attention and share travel history with their health care provider. WHO advised against the application of any travel or trade restrictions on China based on the information that was available on this event at the time (23). Following the first meeting of the IHR EC (Jan 22/23), WHO published an updated advice for international travel on January 24, 2020. This maintained the general precautions for travelers and provided advice about comprehensive exit screenings in Wuhan, China and about comprehensive entry screening in other countries. WHO advised against the application of any restrictions of international traffic based on the information available on this event at the time (24). Another update was provided on January 27, 2020, providing additional technical details about entry screening. Following its second meeting the IHR EC advised the DG that the conditions for a PHEIC were met, but not to recommend any travel or trade restrictions based on the information available at that moment. Similarly, countries were advised not to implement restrictions and were reminded that they need to inform WHO about any travel measure taken, as required by the IHR (2005). Figure 3 shows the international controls in place on January 30, 2020, the day the PHEIC was declared.

International travel controls during the COVID-19 pandemic, Jan 30, 2020



Source: Hale, Angrist, Goldszmidt, Kira, Petherick, Phillips, Webster, Cameron-Blake, Hallas, Majumdar, and Tatlow (2021). "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)." Nature Human Behaviour. – Last updated 17 April, 14:00 (London time) OurWorldInData.org/coronavirus • CC BY

In another update of its travel guidance on February 29, 2020, WHO continued to advise against the application of travel or trade restrictions to countries experiencing COVID-19 outbreaks, despite a "rapidly evolving situation". WHO provided the following reasoning for this decision:

- "In general, evidence shows that restricting the movement of people and goods during public health emergencies is ineffective in most situations and may divert resources from other

interventions. Furthermore, restrictions may interrupt needed aid and technical support, may disrupt businesses, and may have negative social and economic effects on the affected countries. However, in certain circumstances, measures that restrict the movement of people may prove temporarily useful, such as in settings with few international connections and limited response capacities.”

- *“Travel measures that significantly interfere with international traffic may only be justified at the beginning of an outbreak, as they may allow countries to gain time, even if only a few days, to rapidly implement effective preparedness measures. Such restrictions must be based on a careful risk assessment, be proportionate to the public health risk, be short in duration, and be reconsidered regularly as the situation evolves.”*
- *“Travel bans to affected areas or denial of entry to passengers coming from affected areas are usually not effective in preventing the importation of cases but may have a significant economic and social impact.” (25).*

Besides general travel advice and the Temporary Recommendations suggested by the IHR Emergency Committee, the main documents published by WHO on travel-related guidance were:

- Key considerations for repatriation and quarantine of travelers in relation to the outbreak of novel coronavirus (February 11)
- Operational considerations for managing COVID-19 cases/ outbreak in aviation (March 18)
- Management of ill travelers at points of entry (March 19)
- Operational considerations for managing COVID-19 cases and outbreaks on board ships (April 29)

As COVID-19 was a new disease and the available evidence was still limited at the beginning, the WHO guidance for pandemic influenza was used as proxy (*“Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza”* (26)). In addition, early modelling studies on the effectiveness of travel measures were used, supported by the WHO external group of mathematical modelling experts. The WHO Science Division provided rapid reviews particularly in relation to the role of quarantine. Experts from the International Civil Aviation Organization (ICAO), the International Maritime Organization, and the International Air Transport Association (IATA) as well as the STAG-IH were also involved in the process of revising the travel guidance.

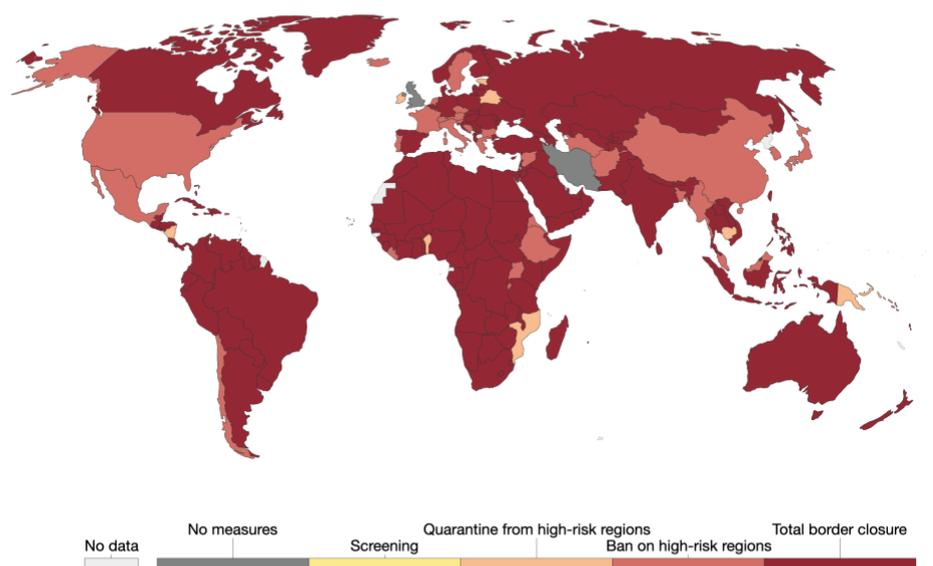
In March 2020, WHO commissioned a Cochrane systematic review on the effectiveness of travel measures to reduce or prevent international dissemination of COVID-19. The authors of the review concluded that the certainty of the evidence for most travel-related control measures and outcomes was very low and the true effects were likely to be substantially different from those reported in the 62 unique studies which were analyzed (49 modelling and 13 observational studies). Additional conclusions of this systematic review include the following (27):

- *“Broadly, travel restrictions may limit the spread of disease across national borders.*
- *Symptom / exposure-based screening measures at borders on their own are likely not effective;*

- *PCR testing at borders as a screening measure likely detects more cases than symptom / exposure-based screening at borders, although if performed only upon arrival this will likely also miss a meaningful proportion of cases.*
- *Quarantine, based on a sufficiently long quarantine period and high compliance is likely to largely avoid further transmission from travelers.*
- *Combining quarantine with PCR testing at borders will likely improve effectiveness.*
- *Many studies suggest that effects depend on factors, such as levels of community transmission, travel volumes and duration, other public health measures in place, and the exact specification and timing of the measure.”*

Following the 3rd meeting of the IHR EC on April 30, 2020, WHO was advised to continue working with countries and partners to enable essential travel needed for pandemic response, humanitarian relief, repatriation, and cargo operations. In addition, the organization should develop strategic guidance for the “*gradual return to normal operations of passenger travel*” and to update recommendations on appropriate travel measures as well as to analyze their effects on international transmission of COVID-19. Member states were advised to “*avoid restrictions on international transport of food, medical and other essential supplies and permit the safe movement of essential personnel required for an effective pandemic response*”. Member states should also implement appropriate travel measures with consideration of their public health benefits, including entry and exit screening, education of travelers on responsible travel behavior, case finding, contact tracing, isolation, and quarantine, by incorporating evidence on the potential role of pre-symptomatic and asymptomatic transmission. In addition, they were advised to continue to review travel and trade measures based on regular risk assessments, transmission patterns at origin and destination, cost-benefit analysis, evolution of the pandemic, and new knowledge of COVID-19 (13). Despite the IHR EC’s advice and WHO’s continued decision not to recommend travel restrictions, most countries had already implemented either a total closure of their borders or banned travelers from high-risk regions. Figure 4 shows the international controls in place on April 30, 2020.

International travel controls during the COVID-19 pandemic, Apr 30, 2020



Source: Hale, Angrist, Goldszmidt, Kira, Petherick, Phillips, Webster, Cameron-Blake, Hallas, Majumdar, and Tatlow (2021). “A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker).” *Nature Human Behaviour*. – Last updated 17 April, 14:00 (London time) OurWorldInData.org/coronavirus • CC BY

In May 2020, WHO established an ad-hoc advisory group of external partners to support the further development of the updated guidance (*“Public health considerations while resuming international travel”*), which was published on July 30, 2020. This guidance document outlines key considerations for national health authorities when considering or implementing the gradual return to international travel operations. Authorities are advised to use a multi-sectoral approach for their decision-making process, ensuring coordination of the measures implemented by national and international transport authorities and other relevant sectors and aligning these with the overall national strategies (28).

Following the 4th meeting of the IHR EC on July 31, 2020, WHO was advised to work with its partners to revise its travel health guidance reinforcing *“evidence-informed measures consistent with the provisions of the IHR (2005) to avoid unnecessary interference with international travel”*. Member states were again reminded *“to regularly update and share information with WHO on appropriate and proportionate travel measures and advice, based on risk assessments.”* In addition they were advised to implement necessary capacities to mitigate the potential risks of international transmission of COVID-19 and to facilitate international contact tracing (16).

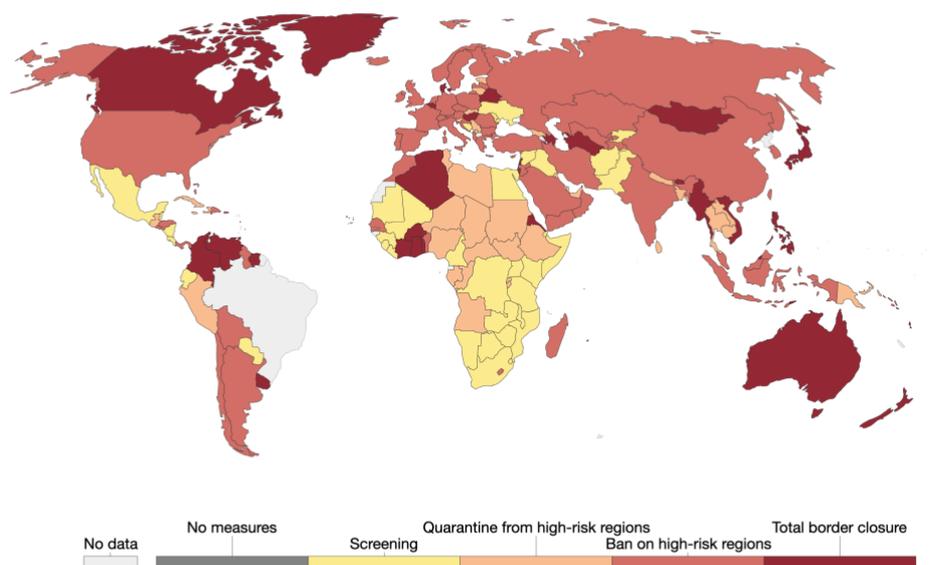
In October 2020, WHO established a Guidelines Development Group for International Travel and Health, including experts from the ITH network, WHO Regional Offices and the WHO Collaborating Centre on Travel Medicine in Zurich, Switzerland, to conduct systematic reviews of the scientific literature and assess 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 IHR EC did not substantially change its travel advice following its 5th meeting on 30 October 2020 (17). Following its 6th meeting on 15 January 2021 WHO was advised to lead the development of risk-based international standards and guidance for reducing SARS-CoV-2 transmission related to international travel. In addition, WHO should rapidly develop and disseminate its *“policy position on the legal, ethical, scientific, and technological considerations related to requirements for proof of COVID-19 vaccination for international travelers”* and encourage Member States to *“implement coordinated, time-limited, risk-based, and evidence-based approaches for health measures in relation to international travel”*. Member States were being advised to *“not introduce requirements of proof of vaccination or immunity for international travel as a condition of entry”* due to the existing critical unknowns regarding the efficacy of vaccination in reducing transmission and the limited availability of vaccines (19).

Uptake of the advice on health measures for international traffic and national responses

International travel has been severely affected since the start of the pandemic due to border closures and restrictions although some countries have since eased measures to allow travel between certain countries again. The current situation on national policies for international travel controls can be seen in Figure 5 (March 31). Most countries implemented travel measures that were more restrictive than recommended by WHO. This is not inconsistent with the IHR, as countries can implement measures, if they consider that these measures offer a higher protection, are based on evidence and if they are reconsidered every three months (IHR, Article 43).

International travel controls during the COVID-19 pandemic, Mar 31, 2021



Source: Hale, Angrist, Goldszmidt, Kira, Petherick, Phillips, Webster, Cameron-Blake, Hallas, Majumdar, and Tatlow (2021). "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)." *Nature Human Behaviour*. – Last updated 18 April, 14:00 (London time) OurWorldInData.org/coronavirus • CC BY

Following reports of atypical pneumonia cases in China that emerged on December 31, 2019, governments began to impose travel restrictions to prevent further transmission of countries across borders. International flights from Wuhan, Republic of Korea, and other affected countries were suspended. On January 23, 2020, lockdown measures were implemented in Wuhan, leading to restricted movement and travel in and out of the city. Similar measures and travel restrictions to and from affected countries were gradually implemented globally although these restrictions are in contrary with WHO's guidance. As of late April, 2020, almost all countries had restricted cross-border travels (Figure 4) (29), despite the WHO being consistent in its guidance on recommending Member States to adopt a cautious approach and to consider the best available evidence in their travel ban decisions (13).

The Independent Panel conducted a study on 28 countries analyzing a range of national responses to the COVID-19 pandemic, including different travel-related measures, ranging from time-bound travel bans to complete or partial border closures to mandatory testing and quarantine measures. At the start of the pandemic, some countries had implemented time-bound restrictions with extensions on border controls while others relied on the evolution of the virus to decide on easing measures. Regardless of the type of approaches, most countries had initially restricted travelers from affected countries with some implementing border closures to all countries. Over time most countries either evolved from limiting entry from affected countries to closing borders to all, or from closing borders to all to reopening borders to some countries with low risk.

In alignment with the advice provided by the IHR EC and WHO many countries have implemented some forms of screening at their borders. Measures include temperature screening using thermal-imaging cameras, health declaration using electronic or physical form, and evidence of COVID-19 testing. Except for very few countries, inbound travelers to all the other countries are required to observe isolation or quarantine (Figure 5). Countries that require travelers to quarantine differ in the

number of days in isolation. Some shifts in policies were observed where countries moved from requiring 14-day to 7-day quarantine period or vice versa.

Overall, all countries had implemented at least measures that restrict travelers from affected countries although they differ in the stringency, i.e., complete and partial travel ban. Over time the decisions on the national level will then have become an extension of the country's overall response strategy.

In summary

Following the advice of the IHR Emergency Committee to declare a PHEIC the WHO DG began to issue Temporary Recommendations in accordance with Article 15 of the International Health Regulations (2005). These were modified or extended following subsequent meetings of the IHR EC, responding to the development and severity of the pandemic and responses by Member States.

Temporary Recommendations were provided for a number of key areas as described and discussed earlier in this paper. Most of the **advice provided by the IHR EC to WHO** was rather general and often simply reflected the core mandate, especially its normative and standard setting roles, and the main functions of the organization. The fulfilment of these functions during a global health crisis such as a pandemic should actually be self-evident. Some advice by the IHR EC to WHO appeared to be repetitive, for example, when indicating the need to address the gaps in national surveillance and global reporting systems and a possible lack of responsiveness by Member States. The advice concerning risk communication and community engagement as well as on essential health services has also been rather unsurprising and unspecific as the organization is being advised to continue its mandated work and fulfil its dedicated functions during an ongoing pandemic.

Similarly, the advice by the IHR EC and the subsequent **temporary recommendations by the DG to the Member States** were rather general, calling, e.g., for more multilateral cooperation and engagement without any follow-up mechanism in place. The advice became a bit more specific, when nationalism, weak leadership and distrust in scientific evidence increasingly became a problem. Member states were encouraged to specifically conduct more research on transmission routes and the evolution of the virus, reminding them of some crucial knowledge gaps. Member States were also repeatedly advised to strengthen their surveillance systems, to share information and data with WHO and to maintain essential health services, even nine months after a Public Health Emergency of International Concern and in an ongoing pandemic.

While the temporary recommendations issued by the DG on the advice of the IHR EC did not recommend any travel or trade restrictions to avoid unnecessary interference with international travel, **most countries clearly ignored** this advice. But many followed the temporary recommendations at least in relation to the implementation of appropriate travel-related measures (e.g., IPC measures, quarantine rules etc.) under consideration of their public health benefits. Countries vary in relation to a lot of determinants, e.g., in their risk profiles, epidemiological situation, travel and trade activities and many other contextual factors. The decision to adopt a complete or partial travel ban will have had a variety of reasons, e.g., the number of imported cases, the existing level of preparedness, including (public) health systems capacities, border closures implemented by neighboring countries, political interests and / or public pressures. While under normal circumstances a risk and evidence informed approach needs to be adopted in developing not

only travel related guidance, which WHO appeared to have used, many national governments choose to react without this evidence-base, rather spontaneously and anxiously observing the situation in other countries and on the international level. As some of WHO's Member States had successfully controlled transmission following the implementation of restrictions to inbound travel as one component of a comprehensive set of measures, other countries most likely followed these examples. Systematic reviews are indicating that travel measures could have played an important role in shaping the early transmission dynamics of the COVID-19 pandemic (30) (27).

5. Specific Guidelines: Community Face Masks

The use of face masks has long been proven to be effective in protecting physicians, nurses and other health-care workers while working with patients. The use of face masks by the general public has been uncommon in many countries before the COVID-19 pandemic, which now has changed substantially as people wear community face masks not only to protect themselves, but especially to protect others from respiratory droplets. There is still limited evidence about the effectiveness of the use of community face masks for protecting the general population (31). This brief analysis is looking at the chronology of available knowledge on transmission pathways of SARS-COV-2, recommendations made, and public guidance provided by WHO and other international organizations and the uptake of these recommendations by national authorities.

Due to a lack of scientific studies on the pathogen at the start of the outbreak, the guidance documents published by WHO in the area of community face masks (see Table 1), have been based on previously developed guidelines on, for example, epidemic and pandemic influenza, and other acute respiratory infections such as the Middle East respiratory syndrome coronavirus (MERS-CoV) infection.

The first version of the guidance document "***Advice on the use of masks in the community, during home care, and in health care settings in the context of COVID-19***", was issued on 29 January 2020 and focused on the use of medical masks in health care settings for health workers, for symptomatic individuals outside of health care facilities, and for those providing homecare to individuals who were symptomatic. The recommendations were based on the basic principles of infection prevention and control (IPC) and the use of personal protective equipment (PPE) for acute respiratory diseases. Varying cultural practices and acceptance of the wearing of masks by the public outside of health settings were recognized. Risks and benefits of masks, safe handling and use of masks were also outlined. The guidance document emphasized the importance of prioritizing medical masks for health professionals. The guidance also stressed that the use of masks alone would be insufficient to provide effective protection from infection and other measures were also needed.

Table 1: Information on transmission modes, recommendations on community face masks and key messages

Date	Stakeholder	Recommendation	Key message
19.01.2020	WPRO	Tweet on human-to-human transmission	<i>"..there may now be sustained human-to-human transmission."</i>
29.01.2020	WHO-HQ	Advice on the use of masks in the community, during home care and in health care settings in the context of the novel coronavirus (2019-nCoV) outbreak	<i>"A medical mask is not required, as no evidence is available on its usefulness to protect non-sick persons. However, masks might be worn in some countries according to local cultural habits."</i>
19.03.2020	WHO-HQ	Advice on the use of masks in the community, during home care, and in health care settings in the context of COVID-19: interim guidance	<i>"A medical mask is not required for people who are not sick. (...) Wearing medical masks when not indicated may result in unnecessary costs and procurement burdens and create a false sense of security..."</i>
29.03.2020	WHO-HQ	Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations	<i>".. airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed."</i>
06.04.2020	WHO-HQ	Advice on the use of masks in the context of COVID-19: interim guidance	<i>"Wearing a medical mask is one of the prevention measures that can limit the spread of certain respiratory viral diseases, including COVID-19. However, the use of a mask alone is insufficient to provide an adequate level of protection, and other measures should also be adopted."</i>
08.04.2020	ECDC	Using face masks in the community - Reducing COVID-19 transmission from potentially asymptomatic or pre-symptomatic people through the use of face masks	<i>The use of medical face masks by healthcare workers must be given priority over the use in the community. (...) The use of face masks in the community could be considered, especially when visiting busy, closed spaces, such as grocery stores, shopping centres, or when using public transport etc."</i>
21.04.2020	African CDC/AU	Community use of face masks	<i>"Medical masks are not recommended for people who are not ill or who are not providing care for patient(s) with COVID-19 in household settings."</i>
05.06.2020	WHO-HQ	Advice on the use of masks in the context of COVID-19 Interim guidance	<i>".. to prevent COVID-19 transmission effectively in areas of community transmission, governments should encourage the general public to wear masks in specific situations and settings as part of a comprehensive approach to suppress SARS-CoV-2 transmission"</i>

09.07.2020	WHO-HQ	Transmission of SARS-CoV-2: implications for infection prevention precautions	Airborne transmission of the virus can occur in health care settings during aerosol generating procedures.
21.08.2020	WHO-HQ	Advice on the use of masks for children in the community in the context of COVID-19	<i>"The benefits of wearing masks in children for COVID-19 control should be weighed against potential harm associated with wearing masks, including feasibility and discomfort, as well as social and communication concerns."</i>
01.12.2020	WHO-HQ	Mask use in the context of COVID-19: Interim guidance	<i>"Outside of medical facilities, in addition to droplet and fomite transmission, aerosol transmission can occur in specific settings and circumstances, particularly in indoor, crowded and inadequately ventilated spaces."</i>

The second version of the guidance document on the use of masks in the context of COVID-19 was issued on 19 March 2020 following a general review of all WHO technical guidance documents for COVID-19 to ensure consistency in content and formatting. No changes to the technical content were made with respect to the first version.

The third version of the guidance document was published on 6 April 2020, introduced the use of masks in community settings and was based on new evidence of transmission by presymptomatic and asymptomatic individuals. It outlined a comprehensive risk-based approach for decision makers to set policies about the use of masks in the community settings based on a number of considerations including the type of masks to be used, the populations to mask, and settings in which risk for transmission was higher. Similar to the first version, it was strongly advised that medical masks and respirators should be prioritized for health professionals. In a response to the Independent Panel WHO noted that, at that time, there was a lack of scientific evidence to support the wearing of a mask (whether medical or other types) by healthy persons in the wider community setting, including universal community masking, to prevent infection with respiratory viruses, including SARS-CoV-2.

The fourth version of the guidance document was published on 5 June 2020. This included updated scientific data from published studies on transmission from symptomatic, pre-symptomatic and asymptomatic people infected with SARS-CoV-2 and studies of mask use in and outside of health care facilities. The guidance included recommendations on the targeted continuous use of medical masks by health professional working in clinical areas in health facilities in geographical areas with community transmission of COVID-19; updated the guidance and practical advice for decision makers on the use of medical and non-medical masks by the general public using a risk-based approach; and new recommendations on non-medical mask features and characteristics, including choice of fabric, number and combination of layers, shape, coating and maintenance. These recommendations on non-medical masks were based also on results of commissioned research conducted by an external institution. WHO emphasized in this version that *"the general public should wear non-medical masks where there is widespread transmission and when physical distancing is difficult, such as on public transport, in shops or in other confined or crowded environments."*

The fifth and latest version of the guidance document was published on 1 December 2020 and included updated scientific evidence on SARS-CoV-2 transmission, all available scientific studies of mask and respirator use by health professionals, and studies of mask use by the general public. The document provides updated guidance on a wide range of mask-related issues and more information on aerosol transmission in specific settings and circumstances. It also includes detailed advice recommending decision makers to apply a risk-based approach when considering the use of masks for the general public. In areas of community or cluster SARS-CoV-2 transmission, WHO advised that the general public should wear a non-medical mask in indoor (e.g., shops, schools) or outdoor settings where physical distancing of at least 1 meter cannot be maintained. In indoor situations, unless ventilation was adequate, WHO advised *“the general public to wear a non-medical mask, regardless of whether physical distancing of at least 1 meter can be maintained”*.

What were the evidence-to-policy processes behind WHO’s guidance documents?

The WHO Health Emergencies Programme (WEP) established an ad-hoc COVID-19 IPC Guidance Development Group and an ad-hoc Experts Advisory Panel for IPC Preparedness, Readiness and Response to COVID-19, as well as a Technical Advisory Group of Experts on Personal Protective Equipment to support the development of the guidance documents. In addition, WHO Regional Offices and external partners such as the European Centre for Disease Control (ECDC), the US Centers for Disease Control and Prevention (CDC) and UNICEF, reviewed guidance documents prior to publication.

WHO is conducting ongoing reviews of published literature on the modes of transmission of SARS-CoV-2 and on the effectiveness of non-pharmaceutical interventions on the transmission. The evidence included (rapid) systematic reviews, randomized control trials, experimental studies, observational studies and ecological studies, and literature considering influenza, and other respiratory and human coronaviruses (including SARS-CoV, MERS-CoV). For SARS-CoV-2, there was limited evidence and sometimes inconsistent evidence on the effectiveness of masks in the prevention of SARS-CoV-2 transmission in healthy populations. WHO routinely evaluates the evidence on the effectiveness of the use of different masks and their potential harms, risks and disadvantages, as well as their combination with other measures such as hand hygiene and physical distancing among others. Draft guidance documents are reviewed by an external review panel of experts prior to publication. Planning and executive clearances were obtained from the COVID-19 Publications Review Committee.

In a statement provided by the WHO Emergency Programme to the Independent Panel, it is noted that *“the surging global demand, driven by panic-buying, stockpiling and misinformation; constrained supply owing to production gaps, limited capacity to expand production and export restrictions resulting in further shortages of personal protective equipment (PPE), including masks, at the global level warranted a guidance document which specifically addressed the use of masks and the rational use of personal protective equipment.”*

Guidance documents were published on the WHO website and distributed through internal (Regional / Country Offices) and external partners, including the Global Outbreak and Response Network (GOARN). Infection prevention and control focal points in the WHO Regional Offices provide information on the implementation of mask policies (universal masking vs. risk-based approach) by Member States on a periodic basis. General public and social media feedback have also been received.

How was the uptake of the recommendations on community face masks by national authorities?

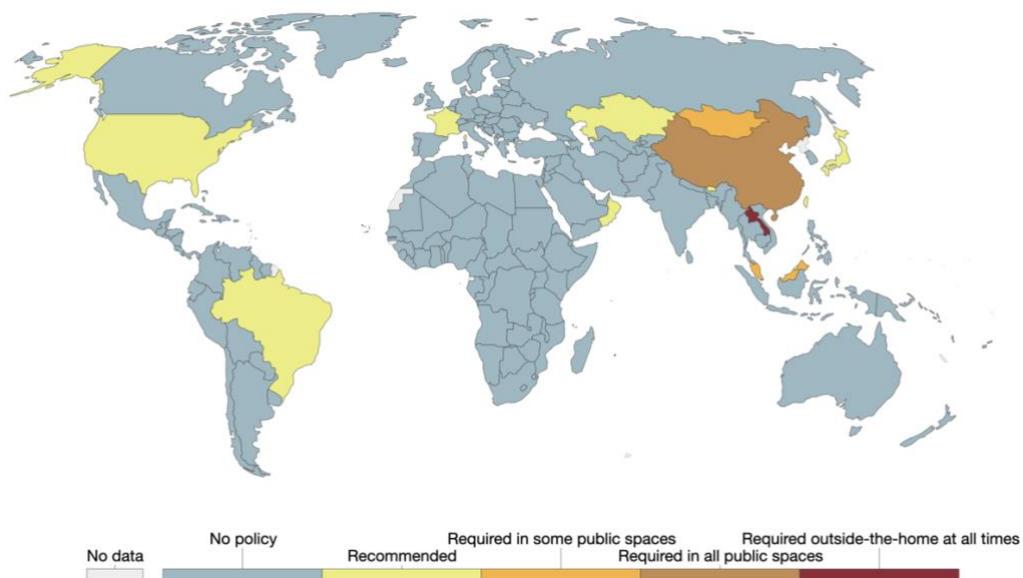
There has been little consensus among countries with respect to advice on community face masks. This difference reflects a combination of cultural norms and evolving evidence for the effectiveness of face masks. Scientific inertia in some countries, the politization of the issue, and the changing advice provided by WHO seemed to not have helped to build such consensus (32). Countries have chosen very different approaches in their advice on community face masks (or face coverings) in outside settings. Some countries did not have any policies, some made general recommendations and others implemented policies for specified shared / public spaces, especially when social distancing measures were not applicable.

Figure 1 shows chart maps of governing policies on the use of face coverings outside-of-the-home at different stages of the COVID-19 pandemic. The creators of these chart maps note that there may be sub-national or regional differences in restrictions and that the policy categories shown may not apply to all sub-national levels. Hence a country is coded as having the respective restrictions if at least some of its sub-national regions have implemented them (33). On March 11, 2020, the day WHO termed the COVID-19 outbreak a “pandemic”, only a few countries had a policy on face coverings in place. As SARS-CoV-2 spread rapidly across the globe and despite WHO still did not clearly recommend the use of masks by healthy people throughout this period, many countries introduced and / or changed their policies before June 5, 2020, the day WHO changed its advice to governments encouraging the use of medical and community masks in certain community settings (34). In April 2021 most countries had a policy in place already and many countries had tightened their recommendations over time, too (Figure 1 a-c).

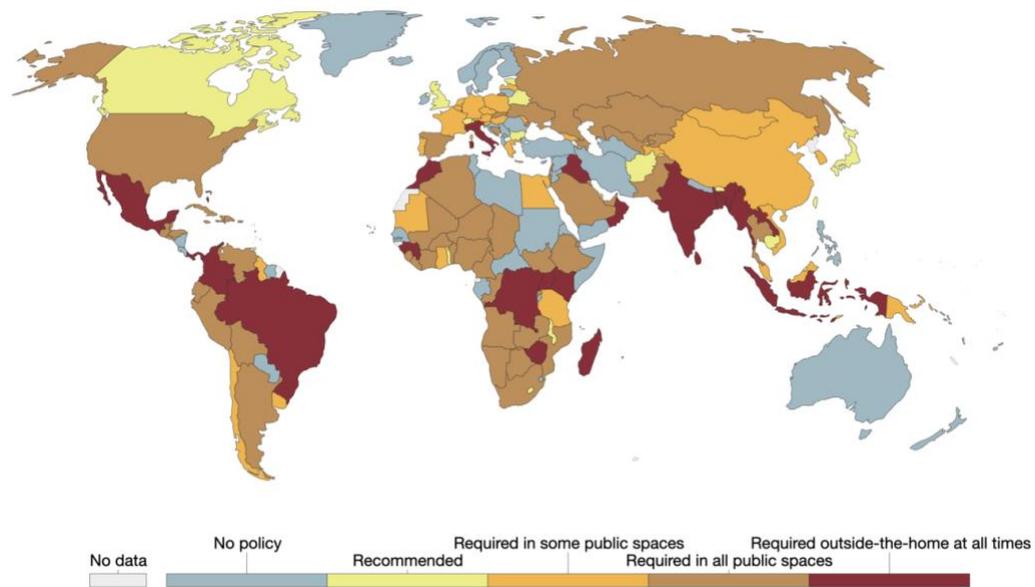
Figure 1: Face covering policies during the COVID-19 pandemic

Source: Thomas Hale, Noam Angrist, Rafael Goldszmidt, Beatriz Kira, Anna Petherick, Toby Phillips, Samuel Webster, Emily Cameron-Blake, Laura Hallas, Saptarshi Majumdar, and Helen Tatlow (2021). “A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker).” *Nature Human Behavior*. <https://doi.org/10.1038/s41562-021-01079-8>; OurWorldinData/coronavirus; CC BY

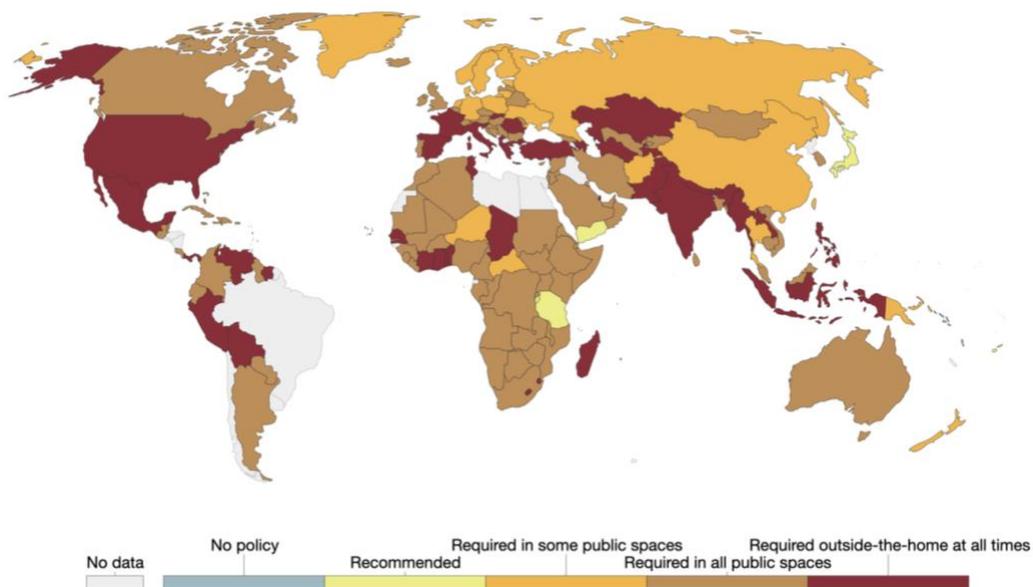
a) March 11, 2020



b) June 5, 2020



c) April 14, 2021



Hence it appears that despite a global debate and diverse messages from scientific and political leadership, most countries introduced policies on community face masks well in advance of the WHO recommendation in June 2020 (35) (36). Countries reported during interviews conducted by the Independent Panel that initial WHO advice on masking led to confusion and hesitancy on establishing policies about when, where, and what type of masks should be worn. In some countries, such as Japan, masking was never mandated due to pre-existing cultural norms of mask wearing when unwell (37).

Despite a similar cultural norm, in November 2020 increasing cases prompted South Korea to pass a law penalizing those who did not wear a mask in public. Similarly, most countries introduced mandatory regulations on mask wearing in step with outbreaks or broader containment strategies.

For example, in Singapore, as well as some states in India, masks were mandatory under all circumstances when leaving home as of April 2020. (38, 39) In Liberia, Mozambique, and Niger masks were compulsory in public places and on public transport as of April 2020. Some countries reviewed had non-mandatory or situation-specific masking policies in early 2020 followed by mandatory masking. For example, in Spain masks were initially only compulsory on public transport but by July were mandatory in all social settings both indoors and outdoors regardless of ability to distance (40).

In summary

It is now widely accepted that community face masks can significantly reduce person-to-person transmission of SARS-CoV-2, although some evidence is still conflicting. While the use of masks in healthcare settings has clearly proven to be essential to protect frontline workers, the evidence supporting masks in non-clinical settings remains both limited and of variable quality (41). But unlike stringent and costly isolation and social distancing measures, mass manufacture and use of medical masks has become cheaper and easier throughout the pandemic. Some authors argue that, *“given the gravity of the pandemic, indirect evidence of benefit combined with the low risk of harm should outweigh the absence of direct evidence supporting mask wearing by the general public”* (42).

Mixed messages and policy U-turns regarding face coverings have unfortunately generated public confusion and challenges to adherence in many countries and regions. Wearing of face coverings to protect others has also been adopted to a much greater extent in Asia and Africa than in Europe or the USA. These differences should be regarded against the background of experiences with past pandemics (43). In some Asian countries, such as Japan, and South Korea, the habit of mask wearing by people with respiratory conditions was already widespread before the pandemic in order to protect others from seasonal viruses. Examples in Asia were not followed by many countries in Europe, although the recommendation to use masks was more widespread even in African countries with lower incidence rates at the same time.

In some countries as per WHO's advice, there were concerns that the use of medical masks in the community might offer a false sense of security, with neglect of other essential measures such as hand hygiene practices and physical distancing and may lead to touching the face under the masks and under the eyes. It would also take masks away from those in health care workers who need them most, especially when masks were in short supply. While many of these concerns raised not only by WHO, but also other national and international public health agencies (e.g., ECDC), such as the fast-rising global demand for medical masks, panic-buying, stockpiling and a lack of personal protective equipment for health professionals, including masks, were reasonable, a precautionary approach would probably have been more helpful in reducing the transmission of the virus and therefore limiting the spread.

This brief analysis on community face masks in the context of the COVID-19 pandemic cannot be comprehensive, of course and clearly has its limitations. For example, it is rather difficult to estimate the level of implementation of a recommendation given, and to assess whether a specific public health measure by itself has been beneficial in the general population in terms of reducing the spread of the virus and its health consequences. Human behavior and socio-economic as well as environmental determinants are influencing the transmission of the virus in many ways. Therefore, only a combination of public health measures, including community face masks, social distancing and hand washing among others can potentially reduce the risk of transmission of SARS-CoV-2 substantially.

6. Are the mechanisms used adequate for a timely response to a pandemic?

WHO HQ has implemented and continuously revised its new processes for the development and dissemination of guidance documents and other recommendations. While the general feedback to WHO’s work in this area is mainly positive, further analysis is needed to understand whether the mechanisms used are still adequate for a timely response to a pandemic. For this purpose, it is important to assess the development, distribution, uptake and implementation of scientific recommendations made by WHO, its Regional Offices, other UN organizations as well as international and national public health agencies over time. Figure 1 shows both the COVID-19 cases reported weekly by WHO Region, and global deaths as well as the number of recommendations made by the different stakeholder groups per month between January 1 and November 14, 2020. To describe the relation between these findings a **model with 5 phases** was developed. These phases differ not only in their duration, but also in the level of scientific evidence available during this time, which can be seen in Table 1. In addition, the main source for scientific guidance and recommendations and the key decision-making authorities, responsible for the development and implementation of recommendations within the different phases, are shown.

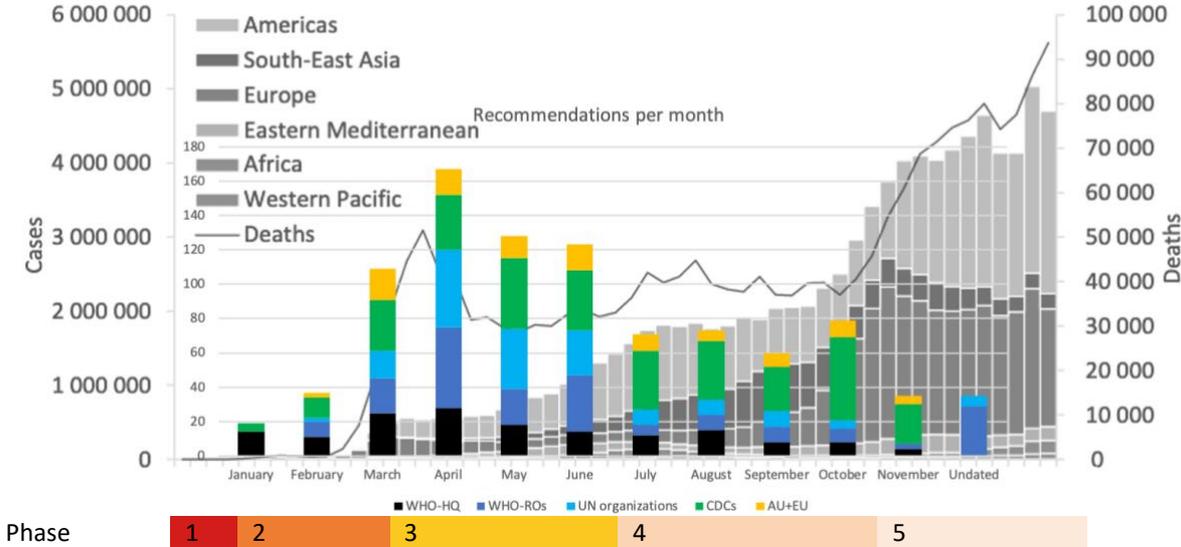


Figure 1: COVID-19 cases reported weekly by WHO Region (grey), and global deaths (as of January 17) and the number of recommendations made by WHO (black), WHO Regional Offices (dark blue), other UN Organizations (light blue), Centres for Disease Control and Prevention (green) and other international organizations (yellow) between January 1 and November 14, 2020). In addition, a phase model has been developed.

The time between the description of the first cases of a viral pneumonia caused by an unknown infectious agent (December 2019) and the first meeting of the IHR Emergency Committee on January 22, 2020, can be categorized as the **very, early phase of the COVID-19 pandemic**. The evidence available was very limited and mainly available to national experts and authorities in China. WHO reacted to signals from different sources and communicated with authorities in China. Between January 10-12 WHO HQ published a comprehensive package of guidance documents for countries, covering topics related to the management of an outbreak of a new disease, such as IPC, laboratory testing and public health measures, which were primarily based on previously published guidelines,

for example, from MERS outbreaks. In this very early phase, the response to a still more or less localized public health crisis, was closely observed and supported by all levels of WHO (HQ, WPRO and CO in China), which also began reaching out to its scientific network.

Phase	Time	Available evidence	Main source for recommendations	Key decisions for implementation taken by	
1	Very early phase	Dec – Jan 22	Chinese authorities & national experts	WHO HQ <i>(based on previously published, related guideline, e.g., MERS)</i>	China, WHO HQ
	1st meeting of IHR EC	Jan 22/23	Limited; no clear evidence on transmission modes	IHR Emergency Committee	WHO HQ → No PHEIC
	2nd meeting of IHR EC	Jan 30	Limited; some more evidence on transmission modes	IHR Emergency Committee	WHO HQ → PHEIC & Temp. recommendations
2	Early phase	Jan 23 – March 11	Chinese authorities & international experts	WHO HQ & WHO Regional Offices / Regional Public Health Institutions	National governments
	WHO Press release	March 11	National authorities, global scientific community	WHO called COVID19 a pandemic	<i>No implications</i>
3	Intermediate phase	March - July	Increasing level of evidence from most stakeholders involved	WHO Regional Offices / UN organizations / Regional and national Public Health Institutions	National governments
	3rd meeting of IHR EC	April 30		IHR Emergency Committee	WHO HQ → Temp. recommendations
4	Stabilization phase	July – October	High level of evidence, supported by clinical trials	WHO HQ, “living” updates for key recommendations & Regional and national Public Health Institutions	National & local governments
	4th meeting of IHR RC	July 31		IHR Emergency Committee	WHO HQ → Temp. recommendations
5	Accelerating phase	October- today	High level of evidence, supported by clinical trials & some systematic reviews on Public Health measures	Regional and national Public Health Institutions	National & local governments

Table 1: Suggestion for a 5-Phase Model for the response to the COVID-19 Pandemic.

In the **early phase of the pandemic** the number of cases and deaths related to COVID-19 started to rise and more and more countries were affected. On January 22, the WHO mission to Wuhan issued a statement saying that evidence suggested human-to-human transmission, but that more investigation was needed to understand the full extent of transmission. The WHO Director-General convened an **IHR Emergency Committee**, but members were equally divided as to whether the event constituted a Public Health Emergency of International Concern (PHEIC) due to the lack of available

evidence, especially on the transmission modes of the virus. At that point WHO did not recommend any broader restrictions on travel or trade but exit screenings at airports as part of a comprehensive set of containment measures. All countries were encouraged to implement measures to detect cases of coronavirus, including at health facilities. The Emergency Committee made several recommendations to prevent the further spread of the virus, which the WHO DG had accepted (10).

Due to the rapid spread of the outbreak, the 2nd meeting of the IHR EC was held on January 30 and the DG declared a **PHEIC**, the highest level of alarm (11) and accepted the IHR EC's advice, issuing this advice as **temporary recommendations** under the IHR (12). These temporary recommendations did not include any restrictions on travel and trade on the basis of available information available, despite the expectation of further international spread of the virus. Countries were encouraged to prepare for containment, including surveillance, early detection, isolation and case management among other response measures to prevent an onward spread as well as to share full data with WHO. WHO offered additional technical advice to national governments on its website and by informing national IHR focal points.

Following the declaration of the PHEIC and until the announcement of the pandemic on March 11, an **intermediate phase** can be described. During this phase an increasing level of scientific evidence was available, a fast-growing number of scientists, networks, national and international public health agencies as well as other stakeholders became involved, some of which worked closely with WHO. The organization held a number of scientific meetings in different areas of pandemic preparedness and response and was leading the evidence curation and coordinating scientific collaborations. In addition, further technical guidance material and scientific briefs were published. Some countries began to set up their own **national scientific advisory committees** and also turned to **WHO's Regional Offices and other regional health authorities**, such as Africa CDC or ECDC for additional advice, more closely related to the regional and national contexts. A great number of recommendations were made by these organizations, especially between mid-March and July 2020. National governments of affected and non-affected countries were in charge of making the key decisions of the implementation of these recommendations for preparedness and response activities during this phase, too.

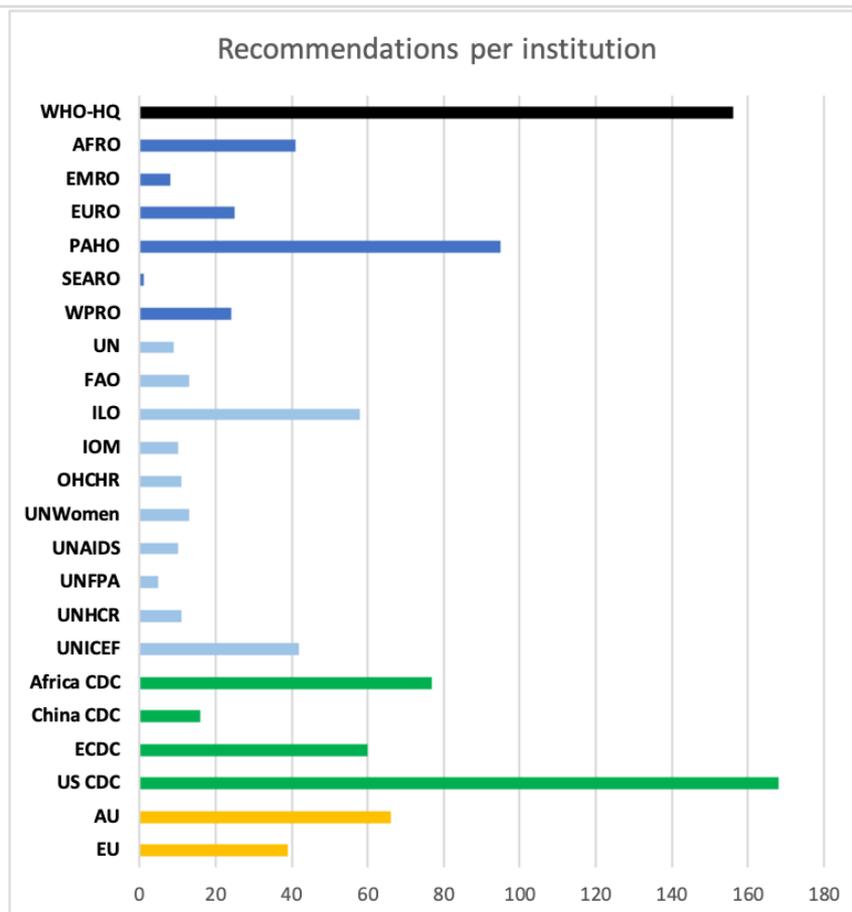
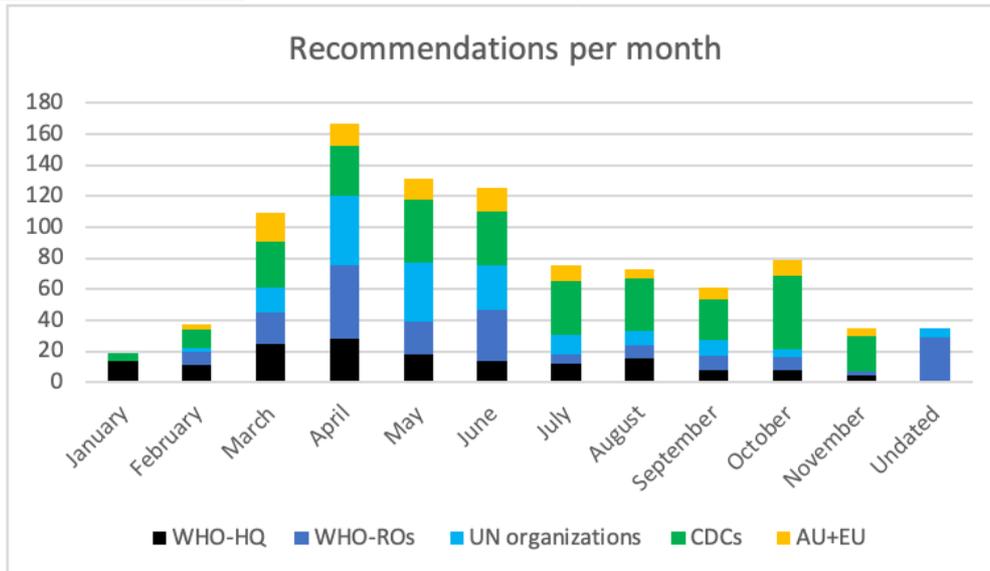
The **fourth phase**, when a large number of countries were affected by the pandemic, but numbers of cases and deaths remained relatively stable, most likely due to the drastic public health measures being taken (e.g., "lockdowns") and the summer season in the Northern hemisphere, can be described as a **stabilization phase**. Huge amounts of evidence had become available, supported by data from more and more clinical trials, which helped WHO and other organizations in their guidance development and updating processes. During this time WHO refined its work by making its processes more effective and by introducing a system of "living" guidance for key recommendations in order to make these available faster. In many countries national responses were reviewed and in countries, e.g., with a federal system like Germany, key decisions on public health measures were taken more on the federal and local levels. Further analysis is needed to assess the uptake of recommendations made by WHO and other international organizations by national and local governments.

This also applies to the current phase, which can be described as an **accelerating phase**. Despite all the recommendations being developed and updated on a much stronger evidence-base, and despite all the restrictive measures taken, numbers of cases and deaths are still rising in many countries.

Implementation of recommendations by national and local governments vary in intensity and duration, similar to their acceptance by the general public. One key issue here is the **limited scientific evidence on the effectiveness of public health interventions** (or “Non-Pharmaceutical interventions”). While large numbers of clinical trials in the search of COVID-19 vaccines and treatments are underway, only a few studies on the effectiveness of public health measures taken are available so far. This is probably due to the multiple recommendations implemented at the same time and the complexity to assess the cause-effect relation, but also to the fact that most scientific funding is primarily going into clinical research and much less into public health research.

International organizations included in this analysis

- WHO HQ, WHO Regional Offices: AFRO, EMRO, EURO, PAHO, SEARO, WPRO
- UN Organizations: UN, FAO, ILO, IOM, OHCHR, UNWOMEN, UNAIDS, UNFPA, UNHCR, UNICEF
- Centers for Disease Control: Africa CDC, China CDC, ECDC, US CDC
- Union of countries: African Union (AU), European Union (EU)



Figures 1 & 2: COVID-19 recommendations (= technical guidance documents) published by WHO, WHO's Regional offices and other international organizations from January 1 to November 14, 2020; number per institution and per month.

Figures 1 and 2 show the number of COVID-19 recommendations published by WHO, WHO's Regional Offices and other international organizations from January 1 to November 14, 2020 per institution (Figure1) and per month (Figure 2). Recommendations included into this analysis are mainly technical guidance documents such as technical, scientific and policy briefs, considerations, interim and risk assessment guidance documents, factsheets, protocols checklists and other tools, which have been prepared for governments, public health authorities and frontline health workers. Advice documents for the general public have not been included. Table 1 provides an overview on the specific area's recommendations were made for by WHO, its Regional Offices and other UN and international organizations.

Table 1: Recommendations made by organizations in specific areas.

	Travel measures	Physical distancing	Lockdowns	Testing	Infection prevention and control	Institutions incl. schools	Essential health services	Communication and engagement	Vulnerable populations	Preparedness	Clinical care
WHO	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AFRO	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes
EMRO	No	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes
EURO	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No
PAHO	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes
SEARO	No	No	No	No	No	No	No	No	No	Yes	No
WPRO	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
UN	No	No	No	No	No	No	No	No	Yes	No	No
FAO	No	No	No	No	No	Yes	No	No	No	No	No
ILO	No	No	No	No	Yes	Yes	No	No	Yes	No	No
IOM	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No
OHCHR	No	No	No	No	No	Yes	No	No	No	Yes	No
UN Women	No	No	No	No	No	Yes	No	No	Yes	No	No
UNAIDS	No	No	No	No	No	No	Yes	Yes	Yes	No	No
UNFPA	No	No	No	No	No	No	Yes	Yes	No	No	No
UNHCR	No	No	No	No	Yes	No	Yes	No	Yes	Yes	No
UNICEF	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Africa CDC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
China CDC	No	No	No	Yes	Yes	Yes	No	No	No	No	Yes
ECDC	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
US CDC	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AU	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EU	Yes	No	No	Yes	No	Yes	No	No	No	Yes	No

Document analysis and roundtable discussion

Based on an **extensive document review**, including more than 350 technical guidance documents by WHO and its Regional Offices, **WHO seems to have been playing a key role in evidence curation and convening** on the global, regional and country level throughout the COVID19-pandemic.

Recommendations included into this analysis are mainly technical guidance documents such as scientific and policy briefs, considerations, interim and risk assessment guidance documents, factsheets, protocols checklists and other tools, which have been prepared for governments, public health authorities and frontline health workers. Advice documents for the general public were not included. WHO published a comprehensive package of these guidance documents for countries in mid-January and a first strategic preparedness and response plan on February 4, 2020, which was updated in April and June. In addition, WHO published a **wide range of recommendations** in all areas related to the response to concerning mass gatherings, precautionary measures in schools and workplaces, measures to protect vulnerable populations, contact tracing and other public health measures as well as clinical guidelines (44). Some of these, e.g., in relation to travel restrictions and the use of masks in healthcare and community settings have been controversial (see 3.5.1).

WHO's Regional Offices have used very different approaches to provide technical and strategic, evidence-based guidance. The WHO Regional Office for Africa (**AFRO**) published a broad range of technical documents in English, French and Portuguese and has been working very closely with the Africa CDC, jointly publishing documents from February 2020 onwards, including an Africa Joint Continental Strategy for COVID-19 Outbreak ((45) on March 5). The WHO Regional Office for the Eastern Mediterranean (**EMRO**) presented a first regional COVID-19 strategic preparedness and response plan for its Member States in February 2020, including recommendations on case finding, testing, isolation, transmission, clinical management and public health measures (46). A small number of further recommendations focusing on health systems and health workers, as well as migrants and other vulnerable groups has been published, too. The WHO Regional Office for Europe (**EURO**) build a set of recommendations for its Member States based on the work of WHO HQ, adding regional specific recommendations, focusing, for example, on migrants, prisoners and other vulnerable groups. In addition, a document on the COVID19 operationalization of the global response strategy in the WHO European Region was presented in September 2020, which was based on WHO's global strategy update (47).

Unlike other Regional Offices, the WHO Regional Office for the Americas (**PAHO**) raised an Epidemiological Alert on the Novel coronavirus (nCoV) on January 16 (48), recommending Member States to inform healthcare workers and to plan for the possible treatment of patients. The organization has published a large number of technical guidance materials throughout the pandemic, focusing on specific regional circumstances as well. In contrast, the WHO Regional Office for South-East Asia (**SEARO**) published only very few recommendations itself, while directly referring its Member States to the WHO HQ recommendations. SEARO presented a strategic preparedness and response plan for the region on January 29 (49). The WHO Regional Office for the Western Pacific (**WPRO**) published a regional action plan to prepare for large-scale transmission of COVID-19 on February 28 (50) and additional technical documents especially in the period between April and June 2020 focusing on essential health services, infection prevention and control (IPC), clinical and care settings.

The WHO Regional Office for Europe (**EURO**) has been working closely with WHO HQ in the guideline development process. As the WHO European region is covering a large geographical area, with some countries being hit by the virus earlier, lessons could be learned, and recommendations shared between countries. This has been supported by EURO through a large number of regional and subregional briefings and meetings and the establishment of a system to listen to the requests from member states (“bottom-up”). In response EURO published about 150 technical documents, some of which were adaptations from WHO HQ guidance documents taking the regional and national contexts into consideration, and others developed by EURO specifically in response to the Member States requests. Using a regional guideline development process allowed EURO, according to a EURO representative, to develop and disseminate recommendations for Member States taking regional specificities into account, “ahead of the pandemic curve”. In a joint undertaking of EURO, the European Commission, and the European Observatory on Health Systems and Policies a **Health System Response Monitor** (HSRM) has been designed in response to the COVID-19 outbreak to collect and organize up-to-date information on how countries are responding to the crisis. It focuses primarily on the responses of health systems but also captures wider public health initiatives ([HSRM](#)). EURO has also published a dashboard quantifying and visualizing COVID-19 measures, including a **Public Health and Social Measure** (PHSM) Index to provide standardized data on the ways in which countries in the WHO European Region have sought to slow or stop the community spread of COVID-19 ([EURO 2020](#)).

The **WHO Regional Office for the Western Pacific** (WPRO) followed a similar approach as EURO, responding to country demands in its very diverse region, including small Pacific Island states and large countries like China. For the Philippines, for example, specific guidance on disaster response within the COVID-19 context has been developed. Mongolia and other countries requested guidance on IPC considerations for handling cargo or for IPC measures in areas with a lack of resources and capacities. Besides these more specific requests and the contextualization of the global recommendations provided by WHO HQ, communication through country offices and (social) media remain of highest importance to WPRO. According to a WPRO representative, the translation of guidance documents and public advice into regional languages is essential for the implementation of recommendations. The balance between timeliness and the quality of the evidence-base in the development and distribution processes of WHO need to be taken into careful consideration, while the uptake and implementation of these recommendations by national governments and populations cannot be guaranteed.

WHO commissioned a **study on the uptake of its norms and standards products and their impact at country level**. This included an assessment of the underlying processes and mechanisms that support the development and dissemination of these documents. According to a small number of WHO country representatives, who have been interviewed for this study, WHO had produced a series of high-quality COVID-19 related guidance documents in a timely manner. The most useful documents were from the following categories: surveillance, laboratory testing, IPC, contact tracing and critical preparedness among others. The interviewees recommended to make guidance documents as concise as possible and geared to the appropriate target audience, urging the inclusion of a policy brief as an essential component of these. Another important finding from the interviews with technical focal points were the significant inconsistencies in the processes for document development, resulting in missed opportunities and reduced impact. A lack of timely translations was

highlighted as one of the most important neglected areas. The interviewees also were of the impression, that current WHO processes often resulted in sub-optimal dissemination and outreach of this critical guidance. The authors of this study conclude that WHO had produced an impressive amount of COVID-19 related documents. However, to have impact at a country level, it would be extremely important to focus on context sensitive policy briefs, timely translations, adequate version management and to understand the user perspective more.

Throughout the COVID-19 response WHO has been **closely cooperating with other UN agencies, multilateral organizations** (e.g., European Commission, African Union), international and national public health institutions and national governments. Participants of a roundtable discussion on “From Science to Policy”, held by the Independent Panel on January 14, 2021, reflected on their organization’s level of cooperation with WHO, emphasizing the great importance of WHO’s leadership in the COVID-19 response in general and specifically the organization’s normative and standard setting role in providing evidence-based, high quality guidelines and recommendations in a timely manner. **UNICEF**, for example, worked closely with WHO on risk communication, water and sanitation, IPC and school measures, asking for WHO’s advice on all health-related matters. A representative from **UNDP** emphasized the importance of WHO in leading the health pillar, interacting and ideally also aligned with the humanitarian and socio-economic response pillars as these have to continue throughout a health crisis, of course. A close coordination between UN and other international organizations with clear roles and mandates as well as a partnership platform were therefore important. **UNFPA** has been complementing WHO existing guidelines on specific aspects and worked with WHO to better address COVID-related effects, such as a rising problem of gender-based violence, the destruction of major programmes to support women, young adults, children and other vulnerable groups.

Representatives from **international and national public health institutions**, such as China CDC and Africa CDC, emphasized the important role of WHO by providing timely guidance based on strong scientific evidence. WHO’s recommendations were also important in order for political leaders to understand why certain scientific findings needed to be translated into public health policies not only during the current pandemic, but also in preparation for similar (virus) outbreaks in the future. It would also be important to better align recommendations on the different levels, as otherwise controversies could lead to a lack of implementation and a decline in public trust. Public health institutions on the global, regional and national levels need to do more work on communications to improve the understanding of scientific evidence of politicians and the general public. In addition, there seems to be a need for independent organization to ensure the implementation of the International Health Regulations (2005) by continuous monitoring and evaluation processes.

A group of **representatives from national governments and public health institutions** who also participated in the Independent Panel’s roundtable discussion mentioned above, agreed on the crucial importance of WHO’s COVID-19 related guidelines for the national policy making process. They also emphasized the importance of timeliness and alignment between guidelines on the global, regional and national levels as the general public would need to understand any differences between and changes of these recommendations to support their implementation. In addition, it was mentioned that a lot of scientific content, even non-peer-reviewed studies, was taken up by the media, which also affected the direct evidence to policy pathway for official institutions in various ways.

In general, the country representatives appreciated the different forms of information received from WHO, such as technical guidelines, FAQ documents or policy briefs as well as media and social media statements, which proved to be very important. They also emphasized the **importance of regional and national contexts**, for example in relation to travel restrictions, IPC or quarantine measures, which needed to be taken into account in the development and distribution of recommendations. Depending on the main goals of national response strategies (e.g., elimination, suppression or mitigation of the virus), adjustments to WHO guidance had to be made as well. It would also be beneficial to include observational studies and experiences made by countries (e.g., on transmission pathways) into further consideration when updating guidance documents. While **WHO's recommendations were extremely useful for countries at the beginning of the pandemic**, countries increasingly used guidance prepared by WHO regional offices and other regional public health authorities in the following months. In addition, many national governments set up their own **scientific expert groups** to support the decision-making processes. The fast-growing number of recommendations from different stakeholders, including a possible duplication of efforts, should lead to a **better coordination between stakeholder and countries** and a coordination platform could be established to support this. In some cases, for example in relation to recommendations for community masks, more transparency in WHO's evidence-base would be helpful. A special focus should also be placed on public health research as the current trials in relation to COVID-19 were overwhelmingly on clinical issues and not on public health measures.

Advice by the IHR EC to WHO and Member States

The IHR Emergency Committee provided specific advice both to WHO and to Member States, which the WHO DG accepted, and which – following the declaration of a PHEIC on January 30 - were then published as temporary recommendations under the IHR. Advice has been given for different overarching areas, such as coordination and planning, essential health services or risk communication, not following a particular order. For this analysis the temporary recommendations were therefore sorted into main categories as presented in the tables below. The tables below include an overview of the main recommendations given in the respective categories following the six successive meetings of the IHR Emergency Committee since the beginning of the COVID-19 pandemic.

Leadership and Coordination

Advice to WHO	
30 Jan 20	<ul style="list-style-type: none"> • Welcomed a forthcoming WHO multidisciplinary technical mission to China
30 Apr 20	<ul style="list-style-type: none"> • Continue to lead and coordinate the global response to the COVID-19 pandemic in collaboration with countries, the United Nations (UN), and other partners; • Provide further guidance to countries about adjusting public health measures • Continue to coordinate global expert networks
1 Aug 20	<ul style="list-style-type: none"> • Continue to coordinate and mobilize global and regional multilateral organizations, partners and networks for robust political commitment and resourcing of COVID-19 pandemic preparedness and response, including for development of vaccines and therapeutics
29 Oct 20	<ul style="list-style-type: none"> • Provide States Parties with a mechanism including templates and processes to report on national progress in implementing the temporary recommendations
Advice to Member States	
23 Jan 20	<ul style="list-style-type: none"> • All countries should be prepared for containment, including active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread of 2019-nCoV infection • Countries are required to share information with WHO according to the IHR • Countries should place particular emphasis on reducing human infection, prevention of secondary transmission and international spread and contributing to the international response through multi-sectoral communication and collaboration • Countries should also follow travel advice from WHO
30 Apr 20	<ul style="list-style-type: none"> • Support WHO leadership and continue to collaborate with WHO at all levels of the organization and with other countries • Participate in global solidarity efforts to enable access to essential supplies for all
29 Oct 20	<ul style="list-style-type: none"> • Share best practices, including from intra-action reviews, with WHO; apply lessons learned from countries that are successfully re-opening their societies • Enhance and sustain political commitment and leadership for national strategies and localized response activities

Evidence-Based Response Strategies

Advice to WHO	
23 Jan 20	<ul style="list-style-type: none"> WHO should continue to provide all necessary technical and operational support to respond to this outbreak
30 Jan 20	<ul style="list-style-type: none"> WHO should continue to use its networks of technical experts to assess how best this outbreak can be contained globally
1 Aug 20	<ul style="list-style-type: none"> Provide nuanced, pragmatic guidance on criteria for appropriate COVID-19 response activities to reduce the risk of response fatigue in the context of socio-economic pressures
29 Oct 20	<ul style="list-style-type: none"> Continue to provide evidence-based guidance for COVID-19 readiness and response
15 Jan 21	<ul style="list-style-type: none"> Continue to rapidly provide and regularly update evidence-based advice; guidance; tools; and resources, including regular dissemination of resources to combat misinformation for COVID-19
Advice to Member States	
30 Apr 20	<ul style="list-style-type: none"> Strengthen preparedness for health emergencies, and build resilient health systems, incorporating lessons learned during different stages of the pandemic, and sharing experiences with other countries
30 Oct 20	<ul style="list-style-type: none"> Avoid politicization or complacency with regards to the pandemic response which negatively impact local, national, regional, and global response efforts National strategies and localized readiness and response activities should be driven by science, data, and experience and should engage and enable all sectors using a whole-of-society approach Implement a dynamic risk management approach using appropriate indicators to inform time-limited, evidence-based public health and social measures.

Research

Advice to WHO	
23 Jan 20	<ul style="list-style-type: none"> The Committee urged to support ongoing efforts through a WHO international multidisciplinary mission, including national experts
30 Apr 20	<ul style="list-style-type: none"> Work with the World Organisation for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO), and countries to identify the zoonotic source of the virus Work with partner organizations and countries to strengthen the global food supply chain, protect food workers, properly manage food markets, and mitigate possible disruptions to the food supply
1 Aug 20	<ul style="list-style-type: none"> Accelerate research into remaining SARS-CoV-2 critical unknowns, such as the animal source and potential animal reservoirs, and improve understanding of the epidemiology and severity of COVID-19, and the effectiveness of public health measures
29 Oct 20	<ul style="list-style-type: none"> Continue to convene multi-disciplinary experts to agree on consistent language for and to further explain all potential modes of transmission and virulence of SARS-CoV-2 etc.
15 Jan 21	<ul style="list-style-type: none"> Continue intersectoral collaborations to understand the origin of SARS-CoV-2, the role/impact of animals
Advice to Member States	
30 Apr 20	<ul style="list-style-type: none"> Address research gaps such as: routes of transmission, including the role of asymptomatic and pre-symptomatic infection droplet, contact, fomite and aerosol transmission; and viral shedding; and animal source and intermediate hosts

	<ul style="list-style-type: none"> Continue sharing full genome sequences to increase global understanding of virus evolution and phylogenetics and their application to public health practices.
30 Oct 20	<ul style="list-style-type: none"> Conduct research and share information on transmission, including role of aerosols; presence and potential impact of SARS-CoV-2 in animal populations; and potential sources of contamination (such as frozen products) to mitigate potential risks through preventative measures and international cooperation.

Surveillance, Alert & Contact tracing

Advice to WHO	
23 Jan 20	<ul style="list-style-type: none"> In the face of an evolving epidemiological situation and the restrictive binary nature of declaring a PHEIC or not, WHO should consider a more nuanced system, which would allow an intermediate level of alert
30 Jan 20	<ul style="list-style-type: none"> The Committee wished to re-emphasize the importance of studying the possible source and the need for enhanced surveillance in regions outside Hubei
30 Apr 20	<ul style="list-style-type: none"> Clarify the testing strategy, support countries to increase testing capacity, and aim to provide equitable access to diagnostic tests and supplies Provide clear qualitative and quantitative indicators to monitor SARS-CoV-2 transmission to inform the adjustment of public health and social measures
1 Aug 20	<ul style="list-style-type: none"> Continue to support State Parties and partners in conducting active and community-based COVID-19 surveillance
29 Oct 20	<ul style="list-style-type: none"> Encourage and support countries to understand and report on their epidemiological situation
15 Jan 21	<ul style="list-style-type: none"> Continue to actively support countries to further strengthen their SARS-CoV-2 surveillance systems
Advice to Member States	
30 Jan 20	<ul style="list-style-type: none"> All countries should be prepared for containment, including active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread of 2019-nCoV infection Countries are reminded that they are legally required to share information with WHO under the IHR
30 Apr 20	<ul style="list-style-type: none"> Work with WHO and multisectoral partners to interrupt transmission by maintaining robust surveillance systems Share with WHO all data necessary to conduct global risk assessments
1 Aug 20	<ul style="list-style-type: none"> Continue to enhance capacity for public health surveillance, testing, and contact tracing a share timely information and data with WHO on COVID-19 epidemiology and severity, response measures
30 Oct 20	<ul style="list-style-type: none"> Sustain efforts to strengthen public health surveillance systems Continue timely and consistent reporting to WHO

Risk communication & Community engagement

Advice to WHO	
30 Jan 20	<ul style="list-style-type: none"> WHO should continue to provide all necessary technical and operational support to respond to this outbreak, including with its extensive networks of partners and collaborating institutions, to implement a comprehensive risk communication strategy WHO should continue to explore the advisability of creating an intermediate level of alert between the binary possibilities of PHEIC or no PHEIC, in a way that does not require reopening negotiations on the text of the IHR (2005)

30 Apr 20	<ul style="list-style-type: none"> Continue risk communications and community engagement activities through the WHO Information Network for Epidemics (EPI-WIN) and other platforms to counter rumours and misinformation. Continue to regularly communicate clear messages, guidance, and advice about the evolution of the COVID-19 pandemic, how to reduce transmission, and save lives.
1 Aug 20	<ul style="list-style-type: none"> Continue to work with partners to counter mis/disinformation and infodemics by developing and disseminating clear, tailored messaging on the COVID-19 pandemic and its effects; encourage and support individuals and communities to follow recommended public health and social measures
29 Oct 20	<ul style="list-style-type: none"> Continue to work with partners to counter the ongoing infodemic and provide guidance on community mobilization to support effective public health and social measures.
Advice to Member States	
30 Apr 20	<ul style="list-style-type: none"> Continue to engage communities to address rumors and misinformation and keep the public informed, with a focus on vulnerable populations.
1 Aug 20	<ul style="list-style-type: none"> Strengthen community engagement, empower individuals, and build trust by addressing mis/disinformation and providing clear guidance, rationales, and resources for public health and social measures to be accepted and implemented
30 Oct 20	<ul style="list-style-type: none"> Engage and empower individuals and communities to strengthen confidence in the COVID-19 response and promote sustained adherence to public health and social measures underpinned by the principles of solidarity and human rights; monitor and address rumors and misinformation.

Diagnosics, Therapeutics & Vaccines

Advice to WHO	
30 Jan 20	<ul style="list-style-type: none"> Measures to ensure rapid development and access to potential vaccines, diagnostics, antiviral medicines and other therapeutics for low- and middle-income countries should be developed
1 Aug 20	<ul style="list-style-type: none"> Support diagnostics, safe and effective therapeutics and vaccines' rapid and transparent development (including in developing countries) and equitable access through the Access to COVID-19 Tools (ACT) Accelerator; support all countries to implement the necessary clinical trials and to prepare for the rollout of therapeutics and vaccines
29 Oct 20	<ul style="list-style-type: none"> Continue to support development of and equitable access to diagnostics, safe and effective therapeutics and vaccines, through the Access to COVID-19 Tools (ACT) Accelerator; Accelerate support to enhance countries' readiness for COVID-19 vaccine introduction by providing guidance, tools, and technical assistance for critical areas
Advice to Member States	
30 Apr 20	<ul style="list-style-type: none"> Continue to support and conduct COVID-19 research, in line with the WHO Research and Development Blueprint, and the road map for COVID-19 vaccines, diagnostics, and therapeutics.
1 Aug 20	<ul style="list-style-type: none"> Engage in the Access to COVID-19 Tools (ACT) Accelerator, participate in relevant trials, and prepare for safe and effective therapeutic and vaccine introduction.
29 Oct 20	<ul style="list-style-type: none"> Establish a national multi-disciplinary taskforce, assess progress using the COVID-19 Vaccine Introduction Readiness Assessment Tool (VIRAT), and prepare the National Deployment and Vaccination Plan A strong emphasis should be placed on communication with communities to prepare for COVID-19 vaccination.

Essential Health Services

Advice to WHO	
30 Apr 20	<ul style="list-style-type: none"> • Support countries to assess and manage the unintended consequences of public health measures implemented to control the COVID-19 pandemic, including gender-based violence and child neglect • Support countries to monitor their ability to provide and strengthen essential health services throughout a likely extended COVID-19 response • Support countries to address shortages of essential medicines and health products, personal protective equipment, and other medical supplies and to establish sustainable risk management practices to prevent future shortages
1 Aug 20	<ul style="list-style-type: none"> • Support State Parties, particularly vulnerable countries, in strengthening their essential health services and accompanying supply chains as well as preparing for and responding to concurrent outbreaks, such as seasonal influenza
29 Oct 20	<ul style="list-style-type: none"> • Work with partners to support countries in strengthening their essential health services, with a particular focus on mental health, public health prevention and control systems, and other societal impacts, as well as preparing for and responding to concurrent outbreaks, such as seasonal influenza. Special attention should continue to be provided to vulnerable settings
15 Jan 21	<ul style="list-style-type: none"> • Provide strategic insight on how State Parties can sustain the public health infrastructure, capacities, and functions developed for COVID-19 response to support strengthened health systems and universal health coverage in the long-term
Advice to Member States	
30 Apr 20	<ul style="list-style-type: none"> • Prioritize the protection of the health workforce through access to training and provision of personal protective equipment, infection prevention and control measures, improved working conditions, application of WHO recommended testing strategies • Maintain essential health services throughout a likely extended COVID-19 response
1 Aug 20	<ul style="list-style-type: none"> • Maintain essential health services with sufficient funding, supplies, and human resources; prepare health systems to cope with seasonal influenza, other concurrent disease outbreaks, and natural disasters
29 Oct 20	<ul style="list-style-type: none"> • Maintain essential health services with sufficient funding, supplies, and human resources; strengthen health systems to cope with mental health impacts of the pandemic, concurrent disease outbreaks, and other emergencies

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