Technical consultation on public health and social measures for mitigating the risk and impact of epidemic and pandemic influenza to update the 2019 WHO guidance

Report of a WHO meeting

China, Hong Kong Special Administrative Region
27–28 June 2023
Technical consultation on public health and social measures for mitigating the risk and impact of epidemic and pandemic influenza to update the 2019 WHO guidance

Report of a WHO meeting

China, Hong Kong Special Administrative Region
27–28 June 2023
Contents

Executive summary ................................................................................................................................ iv
1. Opening session .................................................................................................................................. 1
2. Overview of guidance and practices ................................................................................................. 3
3. The systematic review and the working documents ....................................................................... 5
4. Breakout group sessions .................................................................................................................... 7
5. Knowledge gaps and research needs ............................................................................................... 8
6. Closing session ................................................................................................................................... 10
References ............................................................................................................................................ 11
Annex 1. Meeting agenda ...................................................................................................................... 12
Annex 2. List of participants .................................................................................................................. 15
Annex 3. Declarations of interest .......................................................................................................... 17
Executive summary

Influenza pandemics occur at unpredictable intervals and cause considerable morbidity and mortality. In the early stages of an influenza pandemic there may be significant delays in the availability of vaccines and antiviral drugs. Public health and social measures (PHSM), formerly called non-pharmaceutical interventions (NPI), represent the only countermeasures for preventing or controlling the spread of a pandemic virus that will be readily available in all countries.

In 2019, the Global Influenza Programme of the World Health Organization (WHO) published its guidance on the use of PHSM for mitigating the risk and impact of epidemic and pandemic influenza based on the then-current scientific literature. Since that time, several PHSM have been widely used to reduce and slow transmission of SARS-CoV-2, the pathogen responsible for the COVID-19 pandemic. In light of the resulting huge increase in experience and evidence regarding the use of PHSM, and given the ever-present threat of the next influenza pandemic, a pressing need has been identified to update the 2019 WHO guidance.

This technical consultation brought together international experts, a range of global and regional partners and other stakeholders and interested entities, and WHO technical staff from headquarters and regional offices to share their expertise and experience and to discuss the most up-to-date scientific evidence identified through a systematic literature review. During a mix of plenary and breakout group sessions, meeting participants reviewed the scientific evidence and assessed the quality and strength of evidence for each PHSM. In addition, the feasibility, cost–effectiveness and ethical aspects of PHSM implementation were considered and efforts made to identify the current knowledge gaps and research needs to be addressed.
1. Opening session

Dr Ronald Lam, Director of Health, Hong Kong Special Administrative Region (SAR), China, welcomed all participants to this technical consultation and expressed his thanks to WHO for hosting and supporting this important event with the support of Hong Kong Polytechnic University. Dr Lam recalled the 2019 WHO guidance on the use of non-pharmaceutical public health measures that had been finalized just before the COVID-19 pandemic hit. Despite rapid developments in vaccine technologies, it was clear that such measures would remain vitally important in flattening the epidemiological curve of the next pandemic and in protecting the most vulnerable in society.

The variable use of what are now termed “public health and social measures” in many settings during the COVID-19 pandemic provided the health community with a lot of data and information for the updating of WHO guidance in this area. In Hong Kong SAR, China, adjusting PHSM in the face of new SARS-CoV-2 variants had proved challenging and Dr Lam expressed his thanks to the Government of China and to WHO for the support provided during the different waves of the pandemic.

Dr Lam looked forward to hearing the recommendations of meeting participants on how best to address future such health events, thanked the University of Hong Kong for its part in the current review and revision process, and looked forward to the fruitful discussions to come.

Dr Wenqing Zhang, Head, Global Influenza Programme, WHO, thanked Dr Lam for his comments and added her own welcome to all meeting participants. Dr Zhang also thanked the Department of Health and the University of Hong Kong for their support in the current undertaking. Since publication of the 2019 WHO guidance on what were then called non-pharmaceutical interventions, the COVID-19 pandemic had changed the world in many ways and the broader concept of PHSM had now been adopted. As the ever-present threat of influenza, including zoonotic influenza A(H5N1), cannot be ignored, we have to ask ourselves if we are prepared for the next pandemic, and if we can improve on our responses to influenza pandemics and other respiratory disease outbreaks.

Dr Zhang noted that a huge amount had been learned from the COVID-19 pandemic and revision of the 2019 WHO guidance was now urgently needed. As vaccines and antiviral drugs would not always be widely or immediately available during a public health emergency, there remained a crucial need for non-pharmaceutical PHSM-based approaches in countries. On behalf of WHO, Dr Zhang once again welcomed all those present and wished everyone a productive meeting.

Professor Christopher Chao, Vice President (Research and Innovation), Hong Kong Polytechnic University, expressed his pleasure at seeing so many colleagues present, and on behalf of Hong Kong Polytechnic University welcomed everyone to the current meeting. Influenza is a highly infectious contagious disease capable of causing significant levels of illness and death in vulnerable individuals and groups. The health community needs to come together at this platform and to consider how best to mitigate this impact. Professor Chao noted the distinguished group of colleagues present and expressed his own thanks to WHO for its continuing efforts to protect the most vulnerable during public health emergencies.
Dr Zhang then addressed a number of procedural issues including the declarations of interest which had been made (see Annex 3) and nominated the meeting officials. In the absence of dissent, Dr Vernon Lee, Ministry of Health, Singapore, was elected as meeting Chair and Dr Tony Waddell was elected as meeting rapporteur.

Dr Zhang then provided meeting participants with an overview of the meeting objectives which were:

- to determine the quality of evidence for each PHSM identified through systematic review;
- to discuss the direction and strength of the potential recommendations to be given and the rationale for each PHSM;
- to address feasibility, cost and ethical considerations relevant to the implementation of each PHSM;
- to identify current knowledge gaps and identify research needs to address these gaps; and
- to identify the “real-time” evidence that will be vital for adjusting PHSM during an influenza pandemic and to develop corresponding readiness mechanisms.
2. Overview of guidance and practices

Meeting participants were provided with a series of presentations during this plenary session. At the start of the session, it was noted that the COVID-19 pandemic had provided a large body of evidence in many of the areas to be discussed. It was further noted that the topic of PHSM and their implementation during an emergency had become a high-profile issue with a considerable attention globally.

In order to inform discussion, an overview was provided of the WHO guideline development process as set out in the WHO Handbook for guideline development, and of the corresponding process undertaken so far to update the 2019 WHO guidance (1).

Topics raised during preliminary discussion included the recognition that “gold standard” evidence, such as that produced during randomized clinical trials (RCTs), was not available for each PHSM due to their inherent complexity. One key message to be emphasized in the updated WHO guidance was that the implementation of PHSM would involve contextual factors that go beyond the evidence base. The example was given of the effects of different levels of coverage determining the success or failure of a particular measure, even when the measure was supported by evidence of its effectiveness.

Clarification was also sought on the grading approach that had been taken during the review of the published data. It was noted that such an approach was universally used when developing WHO guidelines and that the upcoming breakout sessions of the current meeting would provide an opportunity to highlight any issues arising from the application of this approach during the review step.

The importance of the current meeting in reviewing the strength of the available evidence, and where necessary providing clear caveats and conditions for its application in developing WHO recommendations, was again highlighted.

An overview was then provided of a multi-year WHO initiative now under way to measure the effectiveness and impact of PHSM during health emergencies, harmonize PHSM activities across WHO and develop further tools and resources required. The key strategic areas of the initiative were outlined and its key deliverables envisaged for 2023 summarized. Clarification was also given of the important terminology shift that had taken place from “non-pharmaceutical intervention” to “PHSM”. To further inform the upcoming discussions of the breakout groups a series of presentations was also given on selected regional and national perspectives and initiatives on the use of PHSM, including during the COVID-19 pandemic. Following a summary of recent work by the European Centre for Disease Prevention and Control to strengthen national PHSM capacities and emergency planning and preparedness, a series of three presentations was given to illustrate national perspectives on PHSM implementation during the COVID-19 pandemic in South Africa, Singapore and the United States. In Singapore, the robust implementation of PHSM early in the pandemic had prevented the health system from being overwhelmed and a strategic decision had been taken later in the pandemic to suspend such measures and allow case numbers to run their course. In the United States, the system of state-level governance had led to
considerable variation in the implementation and timing of measures. The lack of national-level
guidance had also contributed to a lack of consistency in the approaches taken by different states.

One recurring theme emerging during discussion of these presentations was the need for more
coordinated decision-making processes with regard to the use of PHSM during a public health
emergency. Such decisions should, to the extent possible, be based on scientific evidence but
during the COVID-19 pandemic the boundaries and responsibilities of different national and local
governmental agencies and other entities had been unclear in certain cases. Clarification was also
given that the overarching work now being undertaken aimed to ensure that infrastructure and
capacities were in place, but that the actual PHSM recommended during an emergency would be
tailored to the nature and specific threats posed by the pathogen.

A presentation was then given on human rights considerations in the development and
implementation of PHSM, and on the associated need to explicitly incorporate a gender, health
equity and human rights perspective into the work of WHO. Rather than being an abstract concept
separate from the implementation of PHSM, or an obstacle to such implementation, the recognition
and respecting of human rights was instead an integral element in determining the success of such
measures. Based on this rationale and supported by WHO’s formal mandate in this regard, the
mainstreaming of human rights and equity issues within the updated WHO guideline would be a
key requirement.
3. The systematic review and the working documents

Meeting participants were provided with a detailed summary of the systematic review process undertaken by the WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, University of Hong Kong. After identifying the potential PHSM to be considered for inclusion in the updated WHO guideline, systematic literature reviews had been conducted for each of the proposed PHSM in accordance with standard review procedures. The main outcomes considered in the review were those related to respiratory virus transmission in the community. The results of the systematic review of each of the proposed PHSM were then presented.

Meeting participants acknowledged the efforts of the review group in conducting the systematic review and the considerable amount of work that had been required to produce the working document of the current meeting. Discussion then turned to the issue of the variable evidence base for each measure. It was clear that in some cases the findings of RCTs had been available, while for some measures only observational or simulation studies had been conducted. There may therefore be a need to better present the methodology by making explicit the evidence scenario for each of the individual measures. For different measures this scenario varied, and it was suggested that some indication be given in the updated WHO guideline without attempting to present the evidence base in its entirety.

Clarification was requested of the extent to which human rights issues had been incorporated into the review process, particularly with regard to the utility of measures in protecting the most vulnerable. The view was expressed that there is currently a lack of studies focusing specifically on this aspect and that there was a need to further strengthen the incorporation of human rights and equity considerations into the final product.

Other issues raised during discussion included the inherent difficulty of evaluating the effectiveness of the individual measures in isolation, and the crucial need for contextualizing information when making decisions on the likely utility of individual measures in different settings. It was recognized that PHSM will interact with each other when implemented in tandem. Consideration may also need to be given to how best to incorporate other evidence, including non-influenza evidence, into the updated WHO guideline beyond that currently captured. Despite the clear focus on influenza, it was noted that a lot of the evidence base had been obtained for other respiratory diseases, particularly information and data obtained during the COVID-19 pandemic. Caution would be needed however when extrapolating lessons learned during the COVID-19 pandemic and other non-influenza respiratory disease outbreaks as not all of these would be applicable to influenza epidemics and pandemics due to pathogen-specific considerations.

The related issue of how the updated guideline on PHSM could be adopted to guide response efforts to other respiratory pathogens may also require consideration. In this regard, it was highlighted that in practice, the continuing shift towards integrated hazard preparedness and response approaches would likely mean that the document would be used for non-influenza emergency planning. It might therefore be beneficial to emphasize the importance of taking into account situational differences for different pathogens in the document introduction and/or section.
preamble for each PHSM. Other issues that might usefully be captured in the document included the factors determining the timing of initiation and cessation of PHSM implementation.

However, caution was also urged in attempting to capture too much complexity in the document itself as issues such as the contextualization and timing of PHSM would be the focus of subsequent companion WHO resources on PHSM implementation in countries.

In conclusion, it was recognized that updated WHO guideline in this area represents a very important and much needed global resource that will be very closely scrutinized, including by government sectors other than ministries of health, and by the private sector. The current meeting would allow for expert review and input that would be taken into account in the next iteration of the updated guidance document.
4. Breakout group sessions

During a series of breakout group sessions, meeting participants divided into three groups to consider each PHSM. Detailed discussions took place in each group. Discussion facilitators, rapporteurs and note takers led and captured the resulting discussions which were then reported on in plenary.

One recurring theme highlighted, both across the measures and across the different breakout groups, was the need to ensure coherence between the evidence base and the associated recommendation. Where direct evidence on the effectiveness of individual PHSM was lacking in the published literature, evidence from other study designs or for other diseases might usefully be taken into consideration, along with lived experiences and expert opinion.

The importance of coherence and alignment with other WHO guidelines and resources in this area was also highlighted.

With regard to the increasingly recognized need to strengthen the incorporation of the human rights and equity dimensions into all measures, consistent language should be used, and should be based upon and aligned with existing published WHO and other United Nations documents with direct relevance to these issues.

Addressing the current knowledge gaps for all measures would also be an important step in improving the currently limited understanding of specific factors such as precise transmission modes, the effectiveness of specific types of personal protective equipment and the impact of environmental measures.

In one of the groups, discussion led to the following thematic “Cs” that might usefully be considered during the document finalization steps:

- context – explaining objectives and the “why” of measures
- containment versus mitigation
- confidence alongside quality
- comparability with COVID-19
- combination of measures
- complicatedness needs to be recognized.
5. Knowledge gaps and research needs

Meeting participants were provided with an overview of current knowledge gaps for each of the proposed PHSM which were identified through the review of available evidence undertaken by the WHO Collaborating Centre for Infectious Disease Epidemiology and Control, School of Public Health, University of Hong Kong.

A recurring theme across all PHSM was the need for improved studies covering both the highly specific aspects of each measure as well as broader cross-cutting themes such as compliance with individual measures and their feasibility. In order to help guide discussion, the following two questions were posed:

1. Because of the challenges of conducting RCTs for some measures, what alternative study designs could be used to provide the better-quality evidence now needed?
2. What could be done to enable the timely monitoring and evaluation of PHSM during the next pandemic?

During discussion, the importance was emphasized of not simply measuring the number of RCTs conducted but of placing more weight on exactly how a study had been conducted, and what had been measured (and what had not). Careful consideration should also be given to assessing the extent to which other factors had been taken into account. In any setting, there will be a need to better understand and take into account broader contextual factors and determinants. There was also a need to involve social scientists in behavioural research in order to better evaluate aspects such as the impact, acceptability and feasibility of measures. In general, greater deliberation would be needed on how to structure and conduct research projects in this area, particularly as many PHSM are interdependent with resulting complexities in determining their potential individual effectiveness and impact.

The suboptimal quality of some studies conducted to date was also highlighted and this included many of the studies carried out during the COVID-19 pandemic. The use of PHSM during the COVID-19 pandemic had been unprecedented but their evaluation had been scant. In addition, the indiscriminate rush for data at the start of the pandemic may have had negative impacts on more targeted and useful investigations. Avoiding further lost research opportunities during a public health emergency such as COVID-19 would require improved and innovative approaches to both RCTs and observational studies. Attention was also drawn to the need for PHSM impact studies among vulnerable groups to allow for better evaluation of the feasibility and effectiveness of specific measures in such contexts. In general, a greater focus needed to be placed on conducting research studies among vulnerable populations.

Current WHO activities with direct relevance to these areas include the development of protocols intended to help harmonize and standardize future studies. The crucial need to engage with a broad range of stakeholders was also highlighted, including engagement with governments, along with the need to actively advocate for the benefits of research. It was stressed that such engagement and advocacy efforts needed to take place prior to the next health emergency.
There was widespread recognition of the current limitation of high-quality evidence and of the need to develop and actively promote the required research agenda, including through engagement with governments on its importance. The updated WHO guidance on PHSM should therefore include a section on the importance of the research agenda, and should identify the critical questions that need to be addressed. Potentially synergistic activities include the CONSISE serology initiative and the long-established WHO influenza research agenda.
6. Closing session

Dr Vernon Lee, Chair of the meeting, expressed his thanks to all participants and hoped for their continued involvement in this important effort. The meeting had generated extensive discussion that would contribute to the next steps in updating WHO guideline in this important area.

Themes which had emerged during the consultation included:

- the paramount importance of evidence and evidence-based approaches in any revised WHO guidance on PHSM;
- the need to acknowledge the complex interdependency of individual measures, and to understand the crucial importance of the broader context in which they are implemented;
- the pressing need to factor in human rights and equity issues that both arise from the use of PHSM while also affecting their likely impact; and
- the need to support the revised WHO guideline with subsequent implementation toolkits and other WHO resources.

Dr Wenqing Zhang, Global Influenza Programme, WHO, reminded participants that as soon as the next pandemic emerges WHO will be asked by countries for its guidance and there was therefore an urgent need for the revised and updated WHO resources currently being developed. The next steps in the updating of WHO guidance on PHSM will require very careful consideration. Specific challenges include the need to ensure consistency in the language used in the updated document, the need for clear contextualizing information when introducing each of the PHSM, and how best to capture and potentially visualize the complex interdependency of measures. In addition, such a resource for guiding influenza response activities might also, with minimal adjustment, provide the basis for responding to the emergence of other respiratory disease pathogens with pandemic potential. Efforts will also be needed to match the updated guidance with subsequent WHO implementation resources to ensure effective support to Member States.

Dr Zhang expressed her thanks to all participants for their efforts during this consultation. In addition, Dr Zhang acknowledged the support provided by the staff and students from the Hong Kong Polytechnic University, the breakout group facilitators and rapporteurs, and the meeting Chair and rapporteur.
References

# Annex 1. Meeting agenda

## Day 1: Tuesday 27 June 2023

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00–9:30</td>
<td>Opening and welcome</td>
<td>Ronald Lam, Director of Health, Hong Kong SAR, China</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wenqing Zhang, Head, Global Influenza Programme, WHO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Christopher Chao, Vice President (Research and Innovation), Hong Kong Polytechnic University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wenqing Zhang, Global Influenza Programme, WHO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vanessa Cozza, Global Influenza Programme, WHO</td>
</tr>
<tr>
<td>09:40–11:00</td>
<td>Review of the relevant guidance in the WHO handbook for guidelines development, and the PHSM guidelines development process</td>
<td>Vanessa Cozza, Global Influenza Programme, WHO</td>
</tr>
<tr>
<td></td>
<td>PHSM implementation: a European perspective</td>
<td>Jonathan Suk, European Centre for Disease Prevention and Control, Sweden</td>
</tr>
<tr>
<td></td>
<td>Country experience on implementation of PHSM</td>
<td>▪ South Africa – Sibongile Walaza, National Institute for Communicable Diseases</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Singapore – Vernon Lee, Ministry of Health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ United States of America – Carrie Reed, Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Judith Bueno de Mesquita, University of Essex, the United Kingdom</td>
</tr>
</tbody>
</table>
### Plenary 2: The systematic review and the working documents

<table>
<thead>
<tr>
<th>Time</th>
<th>Overview</th>
<th>Session minder</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30–13:00</td>
<td>Overview of the systematic review findings and the quality of evidence</td>
<td>Jessica Wong, University of Hong Kong, China, Hong Kong SAR</td>
</tr>
<tr>
<td></td>
<td>A. Personal protective measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Environmental measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Targeted response measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Community-wide response measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E. Travel-related measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introducing the working document on Public Health and Social Measures</td>
<td>Caitriona Murphy, University of Hong Kong, China, Hong Kong SAR</td>
</tr>
<tr>
<td></td>
<td>for Mitigating the Risk and Impact of Epidemic and Pandemic Influenza – an Update of the 2019 WHO Guidance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q&amp;A and discussions</td>
<td></td>
</tr>
</tbody>
</table>

### Breakout session 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00–17:20</td>
<td>Introducing the breakout session</td>
<td>Introducing the breakout session</td>
<td>Introducing the breakout session</td>
</tr>
<tr>
<td></td>
<td><strong>Group 1</strong></td>
<td><strong>Group 2</strong></td>
<td><strong>Group 3</strong></td>
</tr>
<tr>
<td></td>
<td>Facilitator: Jessica Wong, University of Hong Kong, China, Hong Kong SAR</td>
<td>Facilitator: Castriona Murphy, University of Hong Kong, China, Hong Kong SAR</td>
<td>Facilitator: Wey Wen Lim, University of Hong Kong, China, Hong Kong SAR</td>
</tr>
<tr>
<td></td>
<td>Rapporteur: Hitoshi Oshitani, Tohoku University Graduate School of Medicine, Japan</td>
<td>Rapporteur: Jonathan Suk, European Centre for Disease Prevention and Control, Sweden</td>
<td>Rapporteur: Sibongile Walaza, National Institute for Communicable Diseases, South Africa</td>
</tr>
<tr>
<td>17:20–17:30</td>
<td>Chair’s remarks</td>
<td>Chair</td>
<td>Chair</td>
</tr>
</tbody>
</table>

Chair
## Day 2: Wednesday 28 June 2023

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chair/Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00–9:10</td>
<td>Chair’s introductory remarks</td>
<td>Chair</td>
</tr>
<tr>
<td>09.10–12:30</td>
<td>Breakout session 2</td>
<td></td>
</tr>
<tr>
<td>09.10–12:30</td>
<td>Continuation of group discussions</td>
<td></td>
</tr>
<tr>
<td>13:30–15:00</td>
<td>Plenary 3: Group feedback</td>
<td>Moderator: Benjamin Cowling</td>
</tr>
<tr>
<td>13:30–15:00</td>
<td>Feedback from group discussions</td>
<td></td>
</tr>
<tr>
<td>15:30–17:00</td>
<td>Plenary 4: Knowledge gaps and research priorities</td>
<td>Moderator: John Edmunds</td>
</tr>
<tr>
<td>15:30–17:00</td>
<td>Discussion on knowledge gaps and research priorities</td>
<td></td>
</tr>
<tr>
<td>17.00–17.30</td>
<td>Closing session</td>
<td>Chair</td>
</tr>
<tr>
<td>17.00–17.30</td>
<td>Chair’s closing remarks</td>
<td>Wenqing Zhang, Global Influenza Programme, WHO</td>
</tr>
<tr>
<td></td>
<td>Wrap up and closing remarks</td>
<td></td>
</tr>
</tbody>
</table>
Annex 2. List of participants

Richelle P. Abellera, Epidemiology Bureau, Manila, Philippines
Morenike Alex-Okoh, Ministry of Health, Abuja, Nigeria
Leon Biscornet, Public Health Laboratory, Victoria, Seychelles
Judith Bueno De Mesquita, School of Law, University of Essex, Essex, the United Kingdom
Christopher Chao, Hong Kong Polytechnic University, China, Hong Kong SAR
Dongxuan Chen, University of Hong Kong, China, Hong Kong SAR
Urtnasan Chuluunbat, National Center for Communicable Diseases, Ulaanbaatar, Mongolia
Benjamin Cowling, University of Hong Kong, China, Hong Kong SAR
John Edmunds, London School of Hygiene and Tropical Medicine, London, the United Kingdom
Charbel El Bcheraoui, Robert Koch Institute, Berlin, Germany
Eric Gogstad, Centers for Disease Control and Prevention, Atlanta, GA, the USA
Ronald Lam Man Kin, Department of Health, China, Hong Kong SAR
Vernon Lee, Ministry of Health, Singapore, Singapore
Wey Wen Lim, University of Hong Kong, China, Hong Kong SAR
Caitriona Murphy, University of Hong Kong, China, Hong Kong SAR
Hitoshi Oshitani, Tohoku University Graduate School of Medicine, Sendai, Japan
Darmaa Oyungerel, National Center for Communicable Diseases, Ulaanbaatar, Mongolia
Pasi Penttinen, Gulf CDC, Riyadh, Saudi Arabia
Antso Hasina Raherinandrasana, Université d’Antananarivo, Antananarivo, Madagascar
Carrie Reed, Centers for Disease Control and Prevention, Atlanta, GA, the USA
Flavia Riccardo, Istituto Superiore di Sanità, Rome, Italy
Guiselle Guzmán Saborío, Caja Costarricense de Seguro Social, San José, Costa Rica
Jonathan Suk, European Centre for Disease Prevention and Control, Sweden
John SL Tam, Hong Kong Polytechnic University, China, Hong Kong SAR
Muhammad Tariq, National University of Sciences and Technology, Islamabad, Pakistan
Sibongile Walaza, National Institute for Communicable Diseases, Johannesburg, South Africa
Sonam Wangchuk, Ministry of Health, Thimphu, Bhutan
Jessica Wong, University of Hong Kong, China, Hong Kong SAR
Observers
David Makram Bishai, University of Hong Kong, China, Hong Kong SAR
Hui Yee Diong, Ministry of Health, Singapore, Singapore
Min Fong, University of Hong Kong, China, Hong Kong SAR
Stephanie Gao, University of Hong Kong, China, Hong Kong SAR
Karly Law Ka Yi, Department of Health, China, Hong Kong SAR
Mingwei Li, University of Hong Kong, China, Hong Kong SAR
Dawin Lo, Department of Health, China, Hong Kong SAR
Greeta Sharma, Department of Health, China, Hong Kong SAR
Eunice Shiu, University of Hong Kong, China, Hong Kong SAR
Jin-Guang Teng, Hong Kong Polytechnic University, China, Hong Kong SAR
Wing-Tak Wong, Hong Kong Polytechnic University, China, Hong Kong SAR
Hoi-kei Wong, Department of Health, China, Hong Kong SAR
Yanmy Xie, University of Hong Kong, China, Hong Kong SAR
Hualei Xin, University of Hong Kong, China, Hong Kong SAR

World Health Organization
Kim Carmela Dee Co, WP/WCO/Lao
Vanessa Cozza, HQ/WHE/EPP/GIP
Hien Doan, HQ/WHE/EPP/GIP
Ramona Ludolph, HQ/WPE/EPP/IEP
Tanja Schmidt, EU/RGO/WHE/CPI
Wenqing Zhang, HQ/WHE/EPP/GIP

Meeting rapporteur
Tony Waddell, Consultant, Consett, the United Kingdom
Annex 3. Declarations of interest

The WHO technical consultation on public health and social measures for mitigating the risk and impact of epidemic and pandemic influenza: Update of the 2019 WHO guidance was held on 27–28 June 2023 in China, Hong Kong SAR.

In accordance with WHO policy, all non-WHO participants completed the Declaration of Interests for WHO Experts form before being invited to the consultation. The interests declared were reviewed by WHO and were deemed not to present a conflict with the objectives of the consultation.

At the start of the consultation, all the interests that had been declared were disclosed to all participants.