

COVID-19 Infection Prevention and Control

Living guideline
Mask use in community settings
22 December 2021



Preparedness
IPC
Response Readiness

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

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WHO reference number: WHO/2019-nCoV/IPC_masks/2021.1

1. Executive Summary

Info Box

Version 1.0 Infection Prevention and Control in the context of coronavirus disease (COVID-19): Living Guideline

This first edition of the Infection Prevention and Control in the context of coronavirus disease (COVID-19): Living Guideline provides the most up to date technical guidance on mask use in community settings in the context of COVID-19. This living guideline incorporates the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) processes (see Methodology section) with existing (previously published) technical guidance in MAGICapp to allow users to easily navigate infection prevention and control (IPC) guidelines in the dynamic situation of COVID-19. This edition takes into consideration the evolving epidemiological situation, including the emergence of the VoC Omicron. Further information on Omicron VoC can be found in the following technical document Enhancing Readiness for Omicron (B.1.1.529): Technical Brief and Priority Actions for the Member States, issued by WHO on 17 December 2021 [1].

This document is a living guideline, where updated or new statements will be added as new evidence emerges that will be reviewed through the GRADE process. Thus, the guideline is written, disseminated, and updated in MAGICapp. Its user-friendly format and structure allow for easy navigation while accommodating for the dynamic nature of the COVID-19 public health emergency and associated evidence and recommendations. MAGICapp allows highlighting of new and updated statements while keeping existing statements and supporting evidence within the guideline. The statements are marked with different labels and colour coding to reflect the different consolidation approaches of existing guidance, updates, and new statements.

In this edition, new information includes updated mask recommendations for the general public, a statement on policies for appropriate adherence to a comprehensive package of preventive measures to reduce severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission, a statement on the type of mask to be used by higher-risk individuals, and implementation considerations for the type and minimum essential parameters of masks used in community settings.

The previously published technical guidance documents incorporated in Version 1.0 are as follows:

1. [Mask use in the context of COVID-19 - December 2020](#); and
2. [Advice on the use of masks for children in the context of COVID-19 - August 2020](#);

The World Health Organization (WHO) recommends the use of masks as part of a comprehensive package of prevention and control measures to limit the spread of SARS-CoV-2, the virus that causes COVID-19. Even when used correctly, a mask alone is insufficient to provide adequate protection or source control. Other public health and social measures include testing, isolation, contact tracing, quarantine, adequate ventilation in indoor settings, a physical distancing of at least 1 metre, hand hygiene, and respiratory etiquette. Together, these measures are critical to prevent human-to-human transmission of SARS-CoV-2. This document guides decision-makers, public health and IPC professionals, child health professionals and non-medical mask manufacturers.

1.1 Abbreviations

aOR	adjusted odds ratio
COVID-19	coronavirus disease 2019
CI	Confidence Interval
EtD	Evidence to Decision
GDG	Guideline Development Group
GRADE	Grading of Recommendations, Assessment, Development and Evaluations
ILI	Influenza-like illness
IPA	International Paediatric Association
IPC	infection prevention and control

NIOSH	National Institute for Occupational Safety and Health
OR	odds ratio
PPE	personal protective equipment
SARS-CoV	severe acute respiratory syndrome coronavirus
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
UNICEF	United Nations Children's Fund
UK	United Kingdom
USA	United States of America
WHO	World Health Organization
VoC	Variant of Concern

1.2 Definitions

Definitions

Health workers are all people primarily engaged in actions with the primary intent of enhancing health. Examples are nursing and midwifery professionals, doctors, cleaners, other staff who work in health facilities, social workers and community health workers.

Medical masks are defined as surgical or procedure masks that are flat or pleated, and they are affixed to the head with straps around the ears, head, or both. Their performance characteristics are tested according to a set of standardized test methods (ASTM F2100, EN 14683, or equivalent) that aim to balance high filtration, adequate breathability and, optionally, fluid penetration resistance [5][121].

2. Methodology

Methodology for developing the statements

Statements included in this document are based on published WHO guidelines (in particular, the WHO Guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care) and ongoing evaluations of all available scientific evidence by WHO COVID-19 IPC Guidance Development Group (GDG) (see Acknowledgements). This evidence is evaluated through expedited systematic reviews and expert consensus-building through regular GDG consultations facilitated by a methodologist. When further clarity or consensus is necessary, meetings are followed up by a voting process by the GDG members. Recommendations are based on an assessment of the balance of benefits to harms as well as certainty in these assessments. This process also considers, as much as possible, potential resource implications, values and preferences, feasibility, equity and ethics. An external review panel of experts reviews draft guidance documents before publication.

Methodology for developing this living guideline

As described in the executive summary, given the dynamic situation of the COVID-19 pandemic, this first edition of this living guideline combines existing guidance formulated through expert review of evidence, the GRADE evidence-to-decision (EtD) framework, and standards for trustworthy guidelines. For recommendations following the GRADE EtD framework, a GDG comprised of individuals with broad expertise spanning multiple specialties across all WHO regions (see Acknowledgements) was convened over multiple meetings where GDG members reached agreement (through consensus or vote with supermajority) on the statements.

Managing Conflicts of Interest

After analyzing the Declaration of Interest forms and conducting the required internet search, WHO concluded no member had financial or commercial interests related to COVID-19 and masks. Methods are aligned with [WHO Handbook for guideline development](#).

Readership cues for approaches used to develop statements

Given the consolidation process, the statements are marked with different labels and colour codes to reflect these two approaches. The green checkmarks reflect statements that were developed using the GRADE EtD framework. Purple checkmarks refer to statements that have not gone through the GRADE EtD framework process but are informed by evidence review and are the product of expert consensus. The grey bar refers to implementation considerations which support statements through practical advice, and are the product of expert consensus.



The GREEN checkmark symbol denotes a statement in favour of an intervention that was developed using the GRADE EtD framework



The PURPLE checkmark symbol denotes a statement in favour of an intervention that has not undergone the GRADE EtD framework process



The RED X denotes a statement that is advised against as an intervention

Implementation
consideration

The GREY bar denotes a statement advised as an implementation consideration supporting the practical implementation of a statement

GRADE EtD Framework

GRADE rates scientific evidence to develop evidence-based guidelines. Each recommendation is assigned a strength of recommendation and quality of evidence.

Strength of recommendation	Certainty of Evidence			
Strong*	High	Moderate	Low	Very low
Conditional**	High	Moderate	Low	Very low

* Recommended in most circumstances

** Alternatives may be appropriate for some patients and settings dependent on conditions or circumstances

GRADE evidence profiles contain an assessment of the quality of the evidence and a summary of findings for each critical outcome and each key question. The GDG uses these summaries as the basis for discussions and formulation of recommendations.

Domain	Favours strong recommendations	Favours conditional recommendations
Balance of benefits and harms	Benefits highly outweigh harms	Benefits and harms more closely balanced
Quality of evidence	Higher certainty	Lower certainty
Values/preferences regarding outcomes	Benefits to harms assessment not impacted by variability in values/preferences	Variability in values/preferences would impact benefits to harms assessment
Acceptability	Highly acceptable	Low or variable acceptability
Costs/resources	Cost savings/cost-effective	Costly/cost-ineffective
Feasibility	Feasible in intended settings	Unfeasible or feasibility varies in intended settings
Equity	Increase equity	Decrease equity or effects on equity variable

Good practice statements and implementation considerations

Good practice statements indicate actions that should be implemented, in most circumstances, when the certainty surrounding the effect estimates is high, but the supportive evidence is indirect. Benefits are based on multiple bodies of indirect evidence, often challenging to review systematically. Good practice statements are generally reserved for considerations with widespread consensus and when the intervention is widely accepted. Implementation considerations are critical elements that facilitate the appropriate use of formal statements.

Timeline

An external living systematic review has been commissioned to continuously monitor emerging evidence on the use of masks in the context of the COVID-19 public health emergency of international concern. The emerging evidence will trigger continuous updates as the need is identified.

3. Advice, statements and recommendations

3.1 General mask advice

Info Box

Mask management

For any type of mask, appropriate use, storage, cleaning or disposal are essential to ensure that they are as effective as possible and to avoid any increased risk of transmission. Adherence to correct mask management practices varies, reinforcing the need for appropriate messaging [115]. WHO provides the following guidance on the correct use of masks:

- Wash hands thoroughly before putting on the mask.
- Inspect the mask for tears or holes, and do not use a damaged mask.
- Place the mask carefully, ensuring it covers the mouth and nose, adjust to the nose bridge and tie it securely to minimize any gaps between the face and the mask. If using ear loops, ensure these do not cross over as this widens the gap between the face and the mask.
- Avoid touching the mask while wearing it. If the mask is accidentally touched, wash hands thoroughly.
- Remove the mask using the appropriate technique. Do not touch the front of the mask; rather, untie it from behind.
- Replace the mask as soon as it becomes damp with a new, clean and dry mask.
- Either discard the mask or place it in a clean plastic resealable bag where it is kept until it can be washed and cleaned. Do not store the mask around the arm or wrist or pull it down to rest around the chin or neck.
- Wash hands immediately after discarding a mask.
- Do not reuse single-use masks.
- Discard single-use masks after each use and properly dispose of them immediately upon removal.
- Do not remove the mask to speak.
- Do not share your mask with others.
- Wash fabric masks in soap or detergent and preferably hot water (at least 60° Centigrade/140° Fahrenheit) at least once a day. If it is not possible to wash the masks in hot water, then wash the mask in soap/detergent and room-temperature water, followed by boiling the mask for 1 minute.
- A mask should be changed to a clean mask at least once daily.

Extracted from the guidance titled "Mask use in the context of COVID-19", published 1 December 2020.



Exhalation valves on respirators and non-medical masks are discouraged as they do not allow for adequate source control from the wearer. Exhalation valves permit bypass of the filtration layers when the wearer exhales, potentially allowing pass-through of infectious particles.

Extracted from the guidance titled "Mask use in the context of COVID-19", published 1 December 2020.

3.2 Mask use in community settings

In settings where there is community or cluster transmission of SARS-CoV-2

Strong recommendation for , Moderate certainty evidence

Updated



In settings where there is community or cluster transmission of SARS-CoV-2, irrespective of vaccination status or history of prior infection, wearing a well-fitting mask* that covers the nose and mouth is recommended for the general public when interacting with individuals who are not members of their household:

- in indoor settings where ventilation is known to be poor or cannot be assessed, or the ventilation system is not properly maintained, regardless of whether physical distancing of at least 1 metre can be maintained¹;
- in indoor settings that have adequate ventilation if physical distancing of at least 1 metre cannot be maintained*; or
- in outdoor settings where physical distancing of at least 1 metre cannot be maintained*.

*Mask types include:

- reusable, non-medical masks that comply with the [ASTM F3502](#) standard or [CEN Working Agreement 17553](#), or a non-medical mask meeting WHO essential parameters (see practical info for more information).;
- disposable medical masks, complying with medical mask standards EN 14683 Type I, ASTM F2100 Level 1, YY/T 0969, YY 0469 (or equivalent) if the availability of medical masks meeting minimum performance criteria for health workers has been assured**;
- if the above options are not available, other types of well-fitting non-medical masks including homemade multilayered masks*** are an acceptable option (according to local policies).

¹Physical distance should be increased beyond 1 metre whenever feasible.

Updated 22 December 2021.

Practical Info

For information on assessing and improving indoor ventilation, please see WHO's Roadmap to improve and ensure good indoor ventilation in the context of COVID-19.

Practical considerations for policy-makers:

The potential advantages of mask use by healthy people in the general public include:

- reduced spread of potentially infectious aerosols or droplets from exhaled breath, including from infected people before they develop symptoms [15];
- encouraging concurrent transmission prevention behaviours such as washing hands and not touching the eyes, nose and mouth [16][17][18]; and
- preventing transmission of other respiratory illnesses such as tuberculosis and influenza and reducing the burden of these diseases during the pandemic [19].

The potential disadvantages of mask use by healthy people in the general public include:

- headache and/or breathing difficulties, depending on the type of mask used [12];
- development of facial skin lesions, irritant dermatitis or worsening acne when used frequently for long hours [13][20];
- difficulty with communicating clearly, especially for persons who are deaf or have poor hearing or use lip reading [21][22];
- poor compliance with mask-wearing, in particular by young children [24][25][26][27];
- waste management issues; improper mask disposal leading to increased litter in public places and environmental hazards [28]; and
- further disadvantages for, or difficulty wearing masks by, certain members of the population, especially: children;

developmentally challenged people; those with mental illness or cognitive impairment; those with asthma, chronic respiratory or breathing problems; those who have had facial trauma or recent oral maxillofacial surgery; and those living in hot and humid environments [12][25].

Evidence To Decision

Benefits and harms

Substantial net benefits of the recommended alternative

The utilization of masks in community settings is likely associated with a decreased risk of SARS-CoV-2 infections compared with no mask-wearing. SARS-CoV-2 B.1.617.2 (Delta) variant has been reported to have increased transmissibility [29][30][31][33][32]; most GDG members, therefore, agreed that, in the context of the Delta variant, the benefits of mask-wearing in the community setting outweigh potential harms. Ecological studies have identified an association with decreased number of confirmed cases of COVID-19 and policies requiring the use of masks [34][35][36]. A cluster randomized controlled trial evaluating mask promotion (as an indirect public health intervention) found that in a country with low mask use, mask promotion increased mask use and decreased symptomatic SARS-CoV-2 seroprevalence [37]. Conversely, another randomized controlled trial found no statistical significance associated with surgical mask use and a reduced risk of SARS-CoV-2 [38]. The study provided an imprecise estimate for mask utilization versus no utilization; however, the study was not designed to evaluate the effectiveness of mask use for source control.

Many GDG members note that, even though the certainty of the evidence is moderate, there is a substantial need for WHO to produce cohesive and robust recommendations, as the net benefits of mask use by the general public outweigh the potential harms.

Certainty of the Evidence

Moderate

Balance of desirable and undesirable outcomes.

Preference and values

No substantial variability expected

Discussions with stakeholders and IPC GDG members have indicated a general preference to favour mask use in community settings. Many GDG members note that, in the context of the Delta variant and other variants of concern, masking is a vital SARS-CoV-2 mitigation measure. Members expressed a need to document a clear opinion on the use of masks in community settings, given the impact of local and national values and preferences on IPC policies. Given the availability of masks, community masking is likely feasible.

Resources and other considerations

No important issues with the recommended alternative

Many GDG members noted the global supply chain for mask manufacturing has improved and would not pose a severe obstacle to community masking. The cost of both medical masks and non-medical (fabric) masks are relatively low, and do not pose a substantial barrier for low- and middle-income countries.

Gaps in knowledge and research needs

Investigations on the utilization of masks in the community setting are ongoing; however, published work has identified the need for continued research. Well conducted observational studies and/or randomized controlled trials exploring the use of masks versus no masks in various settings (e.g. indoor, outdoor, ventilation status, etc.) would further clarify outstanding inquiries concerning mask use in community settings. In addition, research investigating the use of masks (including type of mask and transmission scenarios) in the context of the Delta variant would provide powerful evidence for future recommendations. However, GDG members discussed the challenges associated with obtaining compelling evidence from a randomized controlled trial on behavioural interventions. Furthermore, with the availability of a SARS-CoV-2 inoculation, further research will be needed to reinforce the impact of vaccination on mask utilization in community settings.

Justification

GDG members were asked to evaluate the strength of the proposed recommendation (strong recommendation versus conditional recommendation). Based on the available evidence, the GRADE process and the Evidence to Decision framework, the IPC GDG agreed on a strong recommendation. The opinion of the GDG was solidified via an online survey, in which 82.1% (23/28) of GDG members voted for a strong recommendation and 17.9% (5/28) voted for a conditional recommendation.

Good practice statement

New



In settings where there is community or cluster transmission of SARS-CoV-2, policies should be developed, strengthened and implemented to encourage appropriate adherence to a comprehensive package of preventive measures to reduce transmission (ventilation, physical distance, hand hygiene, and respiratory etiquette) including in particular, mask adherence by the general public.

Updated 22 December 2021.

Justification

GDG members were initially asked if WHO should develop a statement on the importance of mask-wearing and/or interventions to improve adherence to mask-wearing guidance; however, many members thought it was essential to consider the “bundle” of public health social measures that pertain to the general public. The above good practice statement was determined by an online vote, where 27 GDG members responded, with 55.6% (15) voting for the statement as mentioned above, while the remaining 44.4% (12) voted for slightly different wording for the good practice statement.

In all transmission scenarios of SARS-CoV-2

Updated

Info Box

Implementation consideration

In areas with known or suspected sporadic transmission, or no documented transmission, WHO advise that decision-makers should apply a risk-based approach focusing on the following criteria when considering the use of masks for the general public:

- purpose of mask use;
- risk of exposure to SARS-CoV-2;
- vulnerability of the mask wearer/population;
- setting in which the population lives;
- feasibility;
- type of mask;
- vaccination coverage; and
- circulating variants of concern.

Updated 22 December 2021.

Justification

GDG members noted the importance of including vaccination coverage and circulating variants of concern to the implementation

considerations given the availability of vaccination and the current landscape of SARS-CoV-2 transmission.



In any transmission scenario, persons with any symptoms suggestive of COVID-19 should wear a medical mask and additionally:

- self-isolate and seek medical advice as soon as they start to feel unwell with potential symptoms of COVID-19 (even if symptoms are mild);
- follow instructions on how to put on, take off and dispose of medical masks and wash hands thoroughly [39];
- follow all additional measures, in particular, respiratory hygiene, frequent hand washing and maintaining a physical distance of at least 1 metre from other persons [75].
- If a medical mask is not available for individuals with suspected or confirmed COVID-19, a fabric mask with fit, filtration and breathability assessed to meet WHO's essential parameters for non-medical masks should be worn by patients as a source control measure, pending access to a medical mask. The use of a non-medical mask can minimize the projection of respiratory particles from the user [40][41]



Asymptomatic persons who test positive for SARS-CoV-2 should wear a medical mask when with others for a period of 10 days after testing positive.

Extracted from the guidance titled "Mask use in the context of COVID-19", published 1 December 2020.

Evidence To Decision

Certainty of the Evidence

Evidence on the protective effect of mask use in community settings

At present, there is only limited and inconsistent scientific evidence to support the effectiveness of masking healthy people in the community to prevent infection with respiratory viruses, including SARS-CoV-2 [6]. A large randomized community-based trial in which 4862 healthy participants were divided into a group wearing medical/surgical masks and a control group found no difference in infection with SARS-CoV-2 [42]. A recent systematic review found nine trials (of which eight were cluster-randomized controlled trials in which clusters of people, versus individuals, were randomized) comparing medical/surgical masks versus no masks to prevent the spread of viral respiratory illness. Two trials involved healthcare workers and seven had community-based participants. The review concluded that wearing a mask may make little or no difference to the prevention of ILI (RR: 0.99; 95% CI: 0.82–1.18) or laboratory-confirmed influenza (LCI) (RR: 0.91; 95% CI: 0.66–1.26) [11]; the certainty of the evidence was low for ILI, moderate for LCI.

By contrast, a small retrospective cohort study from Beijing found that mask use by entire families before the first family member developed COVID-19 symptoms was 79% effective in reducing transmission (odds ratio (OR): 0.21; CI 0.06–0.79) [43]. A case-control study from Thailand found that wearing a medical or non-medical mask all the time during contact with a COVID-19 patient was associated with a 77% lower risk of infection (adjusted odds ratio (aOR) 0.23; 95% CI 0.09–0.60) [44]. Several small observational studies with epidemiological data have reported an association between mask use by an infected person and the prevention of onwards transmission of SARS-CoV-2 infection in public settings [2][45][46][47].

A number of studies, some peer-reviewed but most published as pre-prints, reported a decline in the number of COVID-19 cases associated with face mask use by the public, using country- or region-level data. [48][49][50][51][52] [53][54][55][56][57][58][59][60][61][62][63][64][65][66][67][68][69]. One study reported an association between community mask-wearing policy adoption and increased movement (less time at home, increased visits to commercial

locations) [23]. These studies differed in setting, data sources and statistical methods, and have important limitations to consider [70], notably the lack of information about actual exposure risk among individuals, adherence to mask-wearing and the enforcement of other preventive measures [71][72].

Studies of influenza, ILI and human coronaviruses (not including COVID-19) provide evidence that the use of a medical mask can prevent the spread of infectious droplets from an asymptomatic infected person to someone else and potential contamination of the environment by these droplets [6]. There is limited evidence that wearing a medical mask may be beneficial for preventing transmission between healthy individuals sharing households with a sick person or among attendees of mass gatherings [11][73][74][75][76][77]. A meta-analysis of observational studies on infections due to beta coronaviruses, with the intrinsic biases of observational data, showed that the use of either disposable medical masks or reusable 12–16-layer cotton masks were associated with the protection of healthy individuals within households and among contacts of cases. This could be considered to be indirect evidence for the use of masks (medical or other) by healthy individuals in the wider community; however, these studies suggest that such individuals would need to be in close proximity to an infected person in a household or at a mass gathering where physical distancing cannot be achieved to become infected with the virus. Results from cluster randomized controlled trials on the use of masks among young adults living in university residences in the United States of America indicate that face masks may reduce the rate of influenza-like illness but showed no impact on the risk of laboratory-confirmed influenza [78][79].

Mask use for those with a higher risk of severe complications from COVID-19

Good practice statement

Updated



Individuals/people with a higher risk* of severe complications from COVID-19 should wear a medical mask where physical distancing of at least 1 metre cannot be maintained.

* High-risk populations are defined as: *people aged ≥ 60 years; or people with underlying comorbidities, such as cardiovascular disease or diabetes mellitus, chronic lung disease, cancer, cerebrovascular disease, immunosuppression, obesity or asthma.*

Updated 22 December 2021.

Justification

The decision to formalize the above statement as a good practice statement was reached through online voting. Thirty-one members responded; 19 (61.3%) voted to endorse the aforementioned statement as a good practice statement, and the remaining 12 (38.7%) members suggested that the statement should be considered an implementation consideration. Many GDG members noted that those at high risk of sequelae should use reputedly manufactured masks, as there are discrepancies in the effective filtration, fit and breathability of non-medical masks, without quality control testing. GDG members thoroughly discussed advocating the use of medical masks for vulnerable populations, as they are intended for disposal after single use reducing both the risk of self-contamination and the eventual breakdown of effective filtration efficiency inherent with masks that are washed for reuse. GDG members indicated apprehension towards the statement, given concerns of excessive waste and environmental implications.



Persons with suspected COVID-19 or mild COVID-19 symptoms should wear a medical mask as much as possible, especially when there is no alternative to being in the same room with other people.



Caregivers of or those sharing living space with people with suspected COVID-19 or with mild COVID-19 symptoms should wear a medical mask when in the same room as the affected person.

Extracted from the guidance titled "Mask use in the context of COVID-19", published 1 December 2020.

Practical Info

Persons who cannot tolerate a medical mask should rigorously apply respiratory hygiene (i.e., cover mouth and nose with a disposable paper tissue when coughing or sneezing and dispose of it immediately after use; or use respiratory etiquette via coughing or sneezing into a bent elbow covering the mouth and nose, and then wash hands thoroughly).

Updated

Table 1. Mask use in community settings depending on transmission scenario, setting, target population, purpose and type

Transmission scenario	Situations/settings (where)	Target population (who)	Mask type (which one)
In settings where there is known or suspected community or cluster transmission of SARS-CoV-2, irrespective of vaccination status	Indoor settings where ventilation is known to be poor or cannot be assessed or the ventilation system is not adequately maintained regardless of whether physical distancing of at least 1 metre can be maintained	The general population in public settings such as shops, shared workplaces, schools, churches, restaurants, gyms, etc. or in enclosed settings such as transportation	Non-medical mask
	Indoor settings that have adequate ventilation** if physical distancing of at least 1 metre cannot be maintained		
	Outdoor settings where physical distancing of at least 1 metre cannot be maintained	Individuals/people with a higher risk of severe complications from COVID-19	
	Settings where physical distancing of at least 1 metre cannot be maintained, and the individual is of increased risk of severe complications	Individuals/people with a higher risk of severe complications from COVID-19	
Known or suspected sporadic transmission or no documented SARS-CoV-2 transmission	Risk-based approach	General Population	Depends on purpose
Any transmission scenario	Any setting in the community	Anyone with suspected or confirmed COVID-19,	Medical mask

		<p>regardless of whether they have symptoms or not.</p> <p>OR</p> <p>Anyone awaiting viral test results when in the presence of others</p>	
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3.2.1 Mask use during physical activity

Mask use during physical activity



WHO advises that people should not wear masks during vigorous-intensity physical activity [80] because masks may reduce the ability to breathe comfortably. The most important preventive measure is to maintain physical distancing of at least 1 metre and to ensure good ventilation when exercising.

Extracted from the guidance titled "Mask use in the context of COVID-19", published 1 December 2020.

Practical Info

When community or cluster transmission of SARS-CoV-2 is experienced in local context, particular attention should be paid to ensuring physical distancing of at least 1 metre between persons outside of their households and frequent cleaning and disinfection of any public environment in which exercise is performed, especially high-touch surfaces. As well, if the activity takes place indoors, adequate ventilation (e.g. 10 litres of air exchange per second, per person occupying an indoor space) should be ensured at all times through natural ventilation or a properly functioning and maintained ventilation system [81]. If all the above measures cannot be ensured, consider temporary closure of public indoor exercise facilities (e.g. gyms).

Should people wear masks while exercising during the COVID-19 pandemic?

Wearing a mask during **vigorous** physical activity may reduce the ability to breathe comfortably, and wet or damp masks lose their effectiveness.

To be safer, exercise outside, and maintain physical distance of at least one metre from others.

at least 1 metre

World Health Organization

How do I exercise indoors during the COVID-19 pandemic?

It's safer to exercise alone, but if you exercise in a public indoor space:

- Go to uncrowded gyms with good ventilation
- Keep at least 1 metre distance from others - the farther the better
- Frequently clean your hands
- As always, clean and disinfect frequently touched surfaces and equipment

Wearing a mask during **vigorous** physical activity may reduce the ability to breathe comfortably, and wet or damp masks lose their effectiveness. Always follow the facility guidelines.

World Health Organization

Evidence To Decision

Benefits and harms

There are limited studies on the benefits and harms of wearing medical masks, respirators and non-medical masks while exercising. Several studies have demonstrated statistically significant deleterious effects on various cardiopulmonary physiologic parameters during mild to moderate exercise in healthy subjects and in those with underlying respiratory diseases [82][83][84][85][86][87][88]. The most significant impacts have been consistently associated with the use of respirators and in people with underlying obstructive airway pulmonary diseases such as asthma and chronic obstructive pulmonary disease (COPD), especially when the condition is moderate to severe [84]. Facial microclimate changes with increased temperature, humidity and perceptions of dyspnoea were also reported in some studies on the use of masks during exercise [82][89]. A recent review found negligible evidence of any negative effects of mask use during exercise but noted concern for individuals with severe cardiopulmonary disease [90].

3.2.2 Type of mask used by the general public

Info Box

Implementation consideration

The following mask types are acceptable options for use by the general public:

- reusable non-medical masks that comply with standards*;
- disposable medical masks, if the availability of medical masks meeting minimum performance criteria for health workers has been assured**;
- if the above options are not available, other types of well-fitting non-medical masks*** are an acceptable option (according to local policies).

-
- *Complying with the ASTM F3502 standard or CEN Working Agreement 17553, or a non-medical mask meeting WHO essential parameters (see practical info for more information).
 - **Complying with medical mask standards EN 14683 Type I, ASTM F2100 Level 1, YY/T 0969, YY 0469 (or equivalent).
 - ***Including homemade multi-layered masks (see more info for more information).

Updated 22 December 2021.

Practical Info

Table 2. Essential parameters (minimum and preferred thresholds) for manufactured non-medical mask

Essential Parameters	Minimum threshold	Preferred threshold
1. Filtration*		
1.1 Filtration efficiency	70% at 3 µm	>50% at 0.3 µm, without compromising breathability
1.2. Challenge particle	<i>Solid:</i> sodium chloride (NaCl), Talcum powder, Holi powder, dolomite, Polystyrene Latex spheres <i>Liquid:</i> DEHS Di-Ethyl-Hexyl-Sebacat, paraffin oil	Solid: sodium chloride (NaCl), Polystyrene Latex spheres
1.3. Particle size	Choose either size: 3 µm, 1 µm, or smaller	0.3 µm
2. Breathability		
2.1. Breathing resistance**	≤60 Pa/cm ²	<i>Adult:</i> ≤ 40 Pa/cm ² <i>Children:</i> ≤ 20 Pa/cm ²
2.2 Exhalation valves	Not recommended	N/A
3. Fit		

3.1. Coverage	Full coverage of nose and mouth, consistent, snug perimeter fit at the nose bridge, cheeks, chin and lateral sides of the face; adequate surface area to minimize breathing resistance and minimize side leakage	Same as current requirements
3.2 Face seal	Not currently required	Seal as good as FFR (respirator) Fit factor of 100 for N95 Maximum Total Inward Leakage of 25% (FFP1 requirement) OR Leakage ratio of ≥ 5
3.2. Sizing	Adult and child	Should cover from nose bridge to below the chin and cheeks on either side of the mouth Sizing for adults and children (6-9, 10-12, >12)
3.3 Strap strength		> 44.5 N

* Smaller particles may result in lower filtration.

** High resistance can cause bypass of the filtration layers of the mask. Unfiltered air will leak out the sides or around the nose on the path of least resistance.

Table 3. Additional (optional) parameters for manufactured non-medical masks

Additional parameters	Minimum thresholds
If reusable, the number of wash cycles	5 cycles
Disposal	Reusable If biodegradable (CFC-BIO), according to UNI EN 13432, UNI EN 14995
Antimicrobial (bacteria, virus, fungus) performance	ISO 18184 (virus) ISO 20743 (bacteria) ISO 13629 (fungus) AATCC TM100 (bacteria)
Chemical safety	Comply with REACH regulation, including inhalation safety

Standards organizations' performance criteria

Manufacturers producing masks with consistent standardized performance can adhere to published, freely available guidance from several organizations including those from, ASTM International, the French Standardization Association (AFNOR Group), The European Committee for Standardization (CEN), Swiss National COVID-19 Task Force, the American Association of Textile Chemists and Colorists (AATCC), the South Korean Ministry of Food and Drug Safety (MFDS), the Italian Standardization Body

(UNI) and the Government of Bangladesh.

Additional performance criteria:

- The non-medical mask, including all components and packaging, must be non-hazardous, non-toxic and child-friendly (no exposed sharp edges, protruding hardware or rough materials).
- Factory-made non-medical masks must be made using a process that is certified to a quality management system (e.g., ISO 9001).
- Social accountability standards (e.g., SAI SA8000) for multiple aspects of fair labour practices, health and safety of the workforce and adherence to UNICEF's Children's Rights and Business Principles are strongly encouraged.

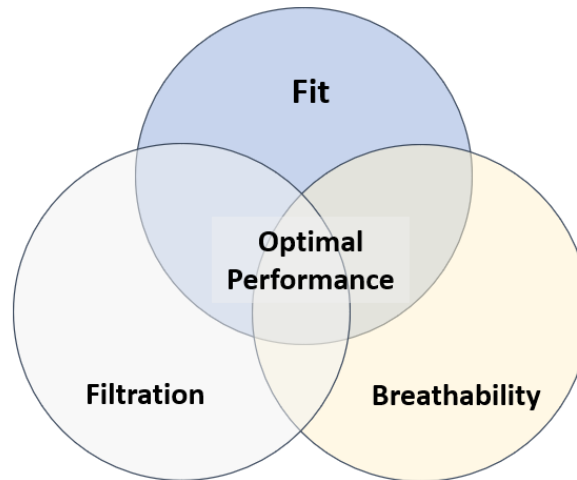


Figure 1. Illustration of the three essential parameters of filtration, breathability and fit.

Filtration and breathability

Filtration depends on the filtration efficiency (in %), the type of challenge particle (oils, solids, droplets containing bacteria) and the particle size (see Table 2). Depending on the fabrics used, filtration and breathability can complement or work against each other. Filtration is dependent on the tightness of the weave, fibre or thread diameter. Non-woven materials used for disposable masks are manufactured using processes to create polymer fibres that are thinner than natural fibres such as cotton, and that are held together by partial melting. Breathability is the difference in pressure across the mask and is typically reported in millibars (mbar) or Pascals (Pa), or normalized to the cm^2 in mbar/cm^2 or Pa/cm^2 . Non-medical fabric masks consisting of two layers of polypropylene spunbond and two layers of cotton have been shown to meet the minimum requirements for droplet filtration and breathability of the CEN CWA 17553 guidance. It is preferable not to select elastic material to make masks as the mask material may be stretched over the face, resulting in increased pore size and lower filtration through reuse. Additionally, elastic fabrics are sensitive to washing at high temperatures and may therefore degrade over time.

Coating the fabric with compounds such as wax may increase the barrier and render the mask fluid-resistant; however, such coatings may inadvertently block the pores completely and make the mask difficult to breathe through. In addition to decreased breathability, unfiltered air may more likely escape from the sides of the mask on exhalation. The coating is therefore not recommended.

Fit: shape and sizing

Fit is the third essential parameter, and takes into consideration coverage, seal, sizing and strap strength. Fit of masks is currently not defined by any standard except for the anthropometric considerations of facial dimensions (ISO/TS 16976-2) or simplified to height mask (South Korean standard for KF-AD). Ideally, the mask should not have contact with the lips, unless hydrophobic fabrics are used in at least one layer of the mask [116]. Leaks where unfiltered air moves in and out of the mask may be attributed to the size and shape of the mask [14].

Optional parameters for consideration

If reusable:

- the biodegradability;
- antimicrobial performance (where applicable); and
- chemical safety (see Practical Info section).

Non-medical masks intended to be reusable should include instructions for washing and, must be washed a minimum of five cycles, implying initial performance is maintained after each wash cycle. Advanced fabrics may be biodegradable or compostable at the end of service life, according to a recognized standard process (e.g. UNI EN 13432, UNI EN 14995 and UNI/PdR 79).

Manufacturers sometimes claim their non-medical masks have antimicrobial performance. Antimicrobial performance may be the result of coatings or additives to the fabric fibres. Treated fabrics must not come into direct contact with mucous membranes; the innermost fabric should not be treated with antimicrobial additives, only the outermost layer. In addition, antimicrobial fabric standards (e.g. ISO 18184, ISO 20743, AATCC TM100, AATCC 100) are generally slow-acting. The inhibition on microbial growth may not take full effect until after a contact time of 2–24 hours, depending on the standard. The standards have generally been used for athletic apparel and to substantiate claims of odour control performance. These standards are not appropriate for non-medical cloth masks and may provide a false sense of protection from infectious agents. If claims are made, manufacturers should specify the standard that supports antimicrobial performance, the challenge organism and the contact time.

Volatile additives are discouraged as these may pose a health risk when inhaled repeatedly during wear.

Certification according to organizations including OEKO-TEX (Europe) or SEK (Japan), and additives complying with REACH (Europe) or the United States Environmental Protection Agency (EPA), indicate that textile additives are safe and added at safe levels.

Justification

GDG members agreed with the notion of standardizing recommendations for the utilization and specifications of masks for the general public. Many GDG members expressed concern of being overly prescriptive while the current state of evidence on the quality and effectiveness of non-medical masks continues to evolve as this may limit the social enterprise of homemade mask production, a standard practice in many WHO member state countries. However, GDG members agreed with laboratory evidence confirming that non-medical masks without standardized quality control processes can have large variabilities in their key parameters (see *Practical info section for information on essential parameters for non-medical masks*). Members also conveyed the importance of specifying the use of well-fitting masks, as the fit is an essential parameter for effective source control and protection. In addition, GDG members spoke of the potential harms associated with limited resources and lack of personnel to test the essential parameters of masks in various low-income settings, along with expressing concerns regarding waste disposal.

Adaptation

Homemade non-medical masks made from household fabrics (e.g. cotton, cotton blends and polyesters) should ideally have a three-layer structure, with each layer providing a function (see Figure 1) [91].

1. an innermost layer (that will be in contact with the face) of a hydrophilic material (e.g. cotton or cotton blends of terry cloth towel, quilting cotton and flannel) that is non-irritating against the skin and can contain droplets [116];
2. a middle hydrophobic layer of synthetic breathable non-woven material (spunbond polypropylene, polyester and polyaramid), which may enhance filtration, prevent permeation of droplets or retain droplets [116][92]; and
3. an outermost layer made of hydrophobic material (e.g. spunbond polypropylene, polyester or their blends), which may limit external contamination from penetrating through the layers to the wearer's nose and mouth and maintains and prevents water accumulation from blocking the pores of the fabric [116].

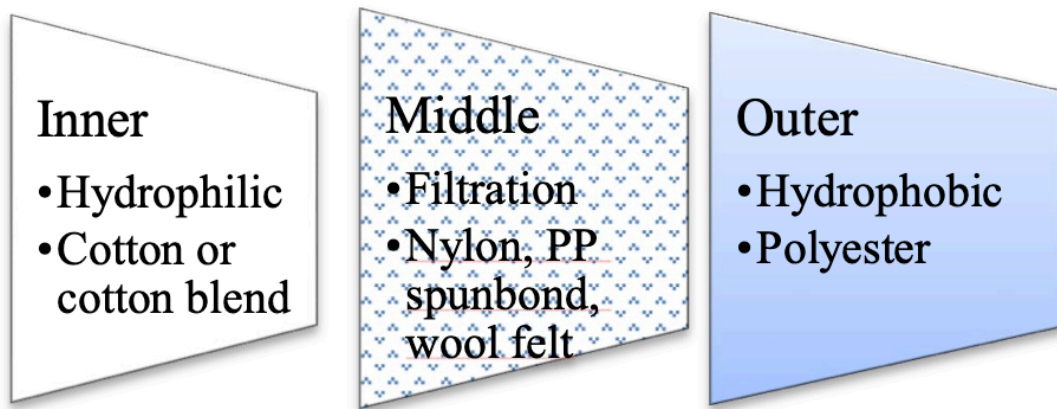


Figure 1. Non-medical mask construction using breathable fabrics such as cotton, cotton blends, polyesters, nylon and polypropylene spunbond that are breathable may impart adequate filtration performance when layered. Single- or double-layer combinations of advanced materials may be used if they meet performance requirements [9]



Although a minimum of three layers is recommended for non-medical masks for the most common fabric used, single, double or other layered combinations of advanced materials may be used if they meet performance requirements.

Assumptions regarding homemade masks are that individual makers only have access to common household fabrics and do not have access to test equipment to confirm target performance (filtration and breathability). Figure 1 illustrates a multi-layer mask construction with examples of fabric options. Very porous materials, such as gauze, even with multiple layers, may provide very low filtration efficiency [122]. Fabrics with higher thread count offer improved filtration performance [125]. Coffee filters, vacuum bags and materials not meant for clothing should be avoided, as they may contain injurious content when breathed in. Microporous films such as Gore-Tex are not recommended [123].



At present, face shields are considered to provide a level of eye protection only, and should not be considered as an equivalent to masks with respect to respiratory protection and/or source control. Current laboratory testing standards only assess face shields for their ability to provide eye protection from chemical splashes [93].

Extracted from the guidance titled "Mask use in the context of COVID-19", published 1 December 2020.

Practical Info

In the context of non-availability or difficulties wearing a non-medical mask (e.g. on people with cognitive, respiratory or hearing impairments), face shields may be considered as an alternative, noting that they are inferior to masks with respect to respiratory particle transmission and prevention. If face shields are to be used, ensure proper design to cover the sides of the face and below the chin.

3.3 Mask use by children

In review



WHO and UNICEF advise decision-makers to apply the following criteria for use of masks in children when developing national policies, in countries or areas where there is known or suspected community transmission of SARS-CoV-2 and in settings where physical distancing cannot be achieved.

Based on the expert opinion gathered through online meetings and consultative processes, **children aged up to five years should not wear masks for source control** [94].

Extracted from the guidance titled "Advice on the use of masks for children in the community in the context of COVID-19", published 21 August 2020.

Practical Info

In some countries, guidance and policies recommend a different and lower age cut-off for mask use [95][96][97][98]. It is recognized that children may reach developmental milestones at different ages, and that children five years of age and under may have the dexterity needed to manage a mask. Based on the do-no-harm approach, if the lower age cut-off of two or three years of age is to be used for recommending mask wearing by children, appropriate and consistent supervision, including direct line of sight supervision by a competent adult and compliance, need to be ensured, especially if mask wearing is expected for an extended period of time. This is both to ensure correct use of the mask and to prevent any potential harm associated with mask wearing to the child.

Other IPC, public health and social measures should be prioritized to minimize the risk of SARS-CoV-2 transmission for children five years of age and under, specifically: maintaining physical distance of at least 1 metre where feasible, educating children to wash hands thoroughly and limiting the size of school classes. It is also noted that there may be other specific considerations, such as the presence of vulnerable people or other local medical and public health advice that should be considered when determining whether children five years of age and under need to wear a mask.

Justification

WHO and UNICEF advise decision-makers to apply the following criteria for the use of masks by children when developing national policies, in countries or areas where there is known or suspected community transmission* of SARS-CoV-2, and in settings where

physical distancing cannot be achieved

This advice is motivated by a do-no-harm approach and considers:

- childhood developmental milestones** [198];
- compliance challenges; and
- autonomy required to use a mask properly.

The experts (following the process described in Methodology section) recognized that the evidence supporting the choice of the age cut-off is limited (see Background section relating to transmission of COVID-19 in children), and they reached this decision mainly by consensus. The rationale included consideration of the fact that, by the age of five years, children usually achieve significant developmental milestones, including the manual dexterity and fine motor coordination movements needed to appropriately use a mask with minimal assistance.

* Defined by WHO as “experiencing larger outbreaks of local transmission defined through an assessment of factors including, but not limited to: large numbers of cases not linkable to transmission chains; large numbers of cases from sentinel surveillance; and/or multiple unrelated clusters in several areas of the country/territory/area”, available from <https://www.who.int/publications-detail/global-surveillance-for-covid-19-caused-by-human-infection-with-covid-19-virus-interim-guidance>

** Example of childhood developmental milestones as defined by CDC are available from: https://www.cdc.gov/ncbddd/actearly/pdf/checklists/Checklists-with-Tips_Reader_508.pdf

In review



WHO and UNICEF advise decision-makers to apply the following criteria for use of masks in children when developing national policies, in countries or areas where there is known or suspected community transmission of SARS-CoV-2 and in settings where physical distancing cannot be achieved.

For children between six and 11 years of age, a risk-based approach should be applied to the decision to use a mask. This approach should take into consideration:

- the intensity of transmission in the area where the child is and updated data/available evidence on the risk of infection and transmission in this age group;
- the social and cultural environment such as beliefs, customs, behaviour or social norms that influence the community and population’s social interactions, especially with and among children;
- the child’s capacity to comply with the appropriate use of masks and availability of appropriate adult supervision;
- the potential impact of mask wearing on learning and psychosocial development; and
- additional specific considerations and adaptation for specific settings such as households with elderly relatives, schools, during sport activities, or for children with disabilities or underlying diseases.

Extracted from the guidance titled “Advice on the use of masks for children in the community in the context of COVID-19”, published 21 August 2020.

Practical Info

Implementation considerations

Local epidemiology and contextual issues, such as intensity of transmission, ability to physically distance or implement appropriate ventilation measures in indoor settings, age mixing and contact with other vulnerable individuals should be considered when adopting advice for wearing masks among different age groups, in addition to the potential harms and adverse effects of mask wearing.

Age-appropriate communication aimed at improving understanding of the purpose of mask wearing, as well as safe and appropriate

mask wearing and maintenance of masks, should be provided by parents/guardians, teachers, educators, and trusted community members through role-modelling. Materials, messages and mechanisms for communications on masks for children should remain flexible and adaptive, and be systematically reviewed and updated based on changes in evidence, and on community needs and questions [99][100]. Children should also be listened to regarding their perceptions and any concerns about wearing a mask. Adapted communication should be available for different social, cultural and linguistic settings, with feedback mechanisms in place for responding to children's questions and expectations.

Specific education and communication messages should be developed to ensure that the use of masks does not result in a false sense of security or disregard for other public health measures by children. It is important to emphasize that the use of masks is one tool and that children should also adhere to physical distancing, hand washing and respiratory etiquette. Parents, family members, teachers and educators have a critical role in ensuring that these messages are consistently conveyed to children.

Strategies for assisting children, especially in younger age groups, to manage the wearing of masks safely and effectively should be included in the implementation of this advice. This may include processes for the safe storage of used masks for reuse by the same child after eating or exercising, storing soiled masks (e.g. in dedicated bags or containers) before they can be laundered, and storage and supply of additional clean masks if a child's mask becomes soiled, wet or lost.

Masks should be made accessible and free of charge to children living in households or geographic areas with social vulnerabilities and limited resources, to ensure equitable access for all children. Consideration should also be made for the provision of masks for the journey to and from school.

The design of face masks for children should take into consideration the overall quality of the fabric, suitable breathability and comfort [4], and child-friendliness (appropriate size, colours, design, etc.) to help improve their acceptance of and use by children. Specific attention needs to be given to the care of masks and the need for masks to be changed when they become wet or soiled. Specific measures will need to be in place for children under 12 years who are in a situation where they are asked to wear masks.

The age cut-off for wearing a mask should be adapted to social or school settings to avoid stigmatizing and alienating children in mixed-age groups where individuals may be on opposite sides of a recommended age cut-off. For example, in situations where older children for whom masks are advised are in the same class as younger children who fall below the age cut-off for wearing masks, the older learners might be exempt from wearing masks.

Monitoring and evaluation of the impact of the use of masks by children

If authorities decide to recommend mask wearing for children, key information should be collected on a regular basis to accompany and monitor the intervention. Monitoring and evaluation should be established at the onset, and include: indicators that measure the impact on the child's health, including mental health; reduction in transmission of SARS-CoV-2; motivators and barriers to mask wearing; secondary impacts on a child's development learning; attendance in school; the ability to express him/herself or access school; and impact on children with developmental delays, health conditions, disabilities or other vulnerabilities.

Data should be used to inform strategies on: communication; training and support to teachers, educators and parents; engagement activities for children; and the distribution of materials that empower children to use masks appropriately.

Analysis should include sex, age and physical, social and economic stratification to ensure that the policy implementation contributes to reducing health and social inequities.

WHO and UNICEF will continue to closely monitor the emerging evidence on this topic and the situation for any changes that may affect this interim guidance. Should any factors change, WHO and UNICEF will issue a further update. Otherwise, this interim guidance document will expire six months after the date of publication.

Evidence To Decision

Benefits and harms

Available evidence on the use of masks by children for COVID-19 and other respiratory diseases

Evidence on the benefits and harms of children wearing masks to mitigate transmission of COVID-19 and other coronaviruses is

limited. However, some studies have evaluated the effectiveness of mask use in children for influenza and other respiratory viruses [26][27][124][101]. A study of mask wearing during seasonal influenza outbreaks in Japan noted that the use of masks was more effective in higher school grades (grades 4-6, or children aged 9-12 years) than lower grades (grades 1-3, or children aged 6-9 years) [27]. One study, conducted under laboratory conditions and using non-betacoronaviruses, suggested that children between five and 11 years old were significantly less protected by mask wearing compared with adults, possibly related to the inferior fit of the mask [117]. Other studies found evidence of some protective effect for influenza for both source control [26] and protection in children [27], although overall compliance with consistent mask wearing, especially among children under the age of 15, was poor.

Some studies, including studies conducted in the context of influenza and air pollution, found the use and acceptability of mask wearing to be highly variable among children, initially ranging from very low to acceptable levels and decreasing over time [26][124][76][25][102][103]. One study was carried out among primary school children during COVID-19 and reported 51.6% compliance [124].

Several studies found that factors such as warmth, irritation, breathing difficulties, discomfort, distraction, low social acceptability and poor mask fit were reported by children when using masks [25][26][76][102]. So far, the effectiveness and impact of masks for children during play and physical activity have not been studied; however, a study in adults found that N95 respirator and surgical masks reduced cardiopulmonary capacity during heavy exertion [82].

Main conclusions

According to the limited available evidence, young children may have lower susceptibility to infection compared with adults [113][120]; however, the available data suggest that this may vary with age among children [114][6][3][8][118][119]. Data from seroepidemiology and transmission studies suggest that older children (e.g. teenagers) may play a more active role in transmission than younger children [113][120][114][6][3][8][118][119].

The benefits of wearing masks in children for COVID-19 control should be weighed against any potential harms associated with wearing masks, including feasibility and discomfort, as well as social and communication concerns. Factors to consider also include age groups, sociocultural and contextual considerations, and the availability of adult supervision and other resources to prevent transmission.

There is a need for data from high quality prospective studies in different settings on the role of children and adolescents in transmission of SARS-CoV-2 [112], on ways to improve acceptance and compliance of mask use, and on the effectiveness of masks use by children. These studies must be prioritized and include prospective studies of transmission within educational settings and households stratified by age groups (ideally <2, 2-4, 5-11 and > 12 years) and with different prevalence and transmission patterns. Particular emphasis must be placed on studies in schools in low- and middle-income settings.

In review



Advice on mask use in children and adolescents 12 years or older should follow the WHO guidance for mask use in adults and/or the national mask guidelines for adults.

Extracted from the guidance titled "Advice on the use of masks for children in the community in the context of COVID-19", published 21 August 2020.

Practical Info

Even where national guidelines apply, additional specific considerations (see below) and adaptations for special settings such as schools, during sport, or for children with disabilities or with underlying diseases will need to be specified.

Mask use for children at high children with severe cognitive or respiratory impairments, developmental disorders or disabilities, and immunocompromised children and paediatric patients with cystic fibrosis

In review



Children with severe cognitive or respiratory impairments who have difficulties tolerating a mask **should, under no circumstances, be required to wear a mask.**



Children with developmental disorders or disabilities may face additional barriers, limitations and risks, and should therefore be given **alternative options to mask wearing**, such as face shields.



The use of a medical mask for immunocompromised children or for paediatric patients with cystic fibrosis or certain other diseases (e.g. cancer) is **usually recommended** but should be assessed in consultation with the child's medical provider [10][106].

For children of any age with developmental disorders, disabilities or other specific health conditions that might interfere with mask-wearing, the use of masks should not be mandatory and should be assessed on a case by case basis by the child's educator and/or medical provider.

Extracted from the guidance titled "Advice on the use of masks for children in the community in the context of COVID-19", published 21 August 2020.

Practical Info

Other IPC, public health and social measures should be prioritized to minimize the risk of SARS-CoV-2 transmission for children five years of age and under, specifically: maintaining a physical distance of at least 1 metre where feasible, educating children to perform frequent hand hygiene and limiting the size of school classes. It is also noted that there may be other specific considerations, such as the presence of vulnerable persons or other local medical and public health advice that should be considered when determining if children five years of age and under need to wear a mask. Policies on masks should be adapted for children with disabilities based on social, cultural and environmental considerations.

Some children with disabilities require close physical contact with therapists, educators or social workers. In this context, it is critical that all care providers adopt key IPC measures, including wearing masks, and that settings are adapted to strengthen IPC.

The wearing of masks by children with hearing loss or auditory problems may present learning barriers and further challenges, exacerbated by the need to adhere to the recommended physical distancing [104]. These children may miss learning opportunities because of the degraded speech signal stemming from mask-wearing, the elimination of lipreading and speaker expressions, and the requirement for physical distancing. Adapted masks to allow lip-reading (e.g. clear masks) or the use of face shields (see below) may be explored as an alternative to fabric masks [105].

See section on alternatives to fabric masks for children for additional details.

Face shields as an alternative to fabric masks for children

In review



WHO and UNICEF advise that when physical distancing cannot be maintained, and in situations where it is not practical to wear a mask (e.g. among children with hearing loss or other disabilities, or health conditions that limit compliance with wearing fabric or medical masks and consequently their utility), **face shields may be used while taking the following considerations into account:**

- The face shield is an incomplete physical barrier and does not provide the filtration layers of a mask.
- The face shield should cover the entire face, be wrapped around the sides of the face and extend to below the chin [107].
- Reusable face shields must be properly cleaned (with soap or a detergent and water), disinfected (with 70–90% alcohol) and stored correctly after each use [97]. Face shields that can withstand the use of disinfectants without damaging their optical properties should be selected.
- Maintaining a physical distance of at least 1 m (3.33 feet) should be maintained where feasible, with the ongoing promotion of frequent hand hygiene and respiratory etiquette.
- Caution should be taken to avoid injury when children don, wear and doff face shields.

Extracted from the guidance titled “Advice on the use of masks for children in the community in the context of COVID-19”, published 21 August 2020.

Justification

Face shields

Face shields are designed to be used [18] to provide protection from splashes of biological fluid (particularly respiratory secretions), chemical agents and debris [14][7] into the eyes. In the context of protection from SARS-CoV-2 transmission through respiratory droplets, they are used by health workers as personal protective equipment (PPE) for eye protection in combination with a medical mask or a respirator [8]. In the context of COVID-19 in community settings, some children may not be able to wear a mask for a variety of reasons (e.g. health issues, fear of mask), and face shields may be considered as an alternative to masks as respiratory droplet protection or as source control, based on availability, improved feasibility and better tolerability [107][108]. Some countries, such as Australia [109], recommend face shields as an alternative to a mask. Other countries, such as Singapore [110], advise that both a mask and a shield can be worn together but acknowledge that children with special needs may need to be exempt from wearing either.

WHO and UNICEF have reviewed the current available evidence on the use of face shields for respiratory droplet protection and/or source control in the context of the COVID-19 pandemic. While a face shield may confer partial protection [18] of the facial area against respiratory droplets with the added benefit of ease of use, the effectiveness of face shields for source control has not yet been adequately studied. Infectious particles as aerosols may be exhaled or inhaled from the open gaps between the visor and the face [18], which is a disadvantage inherent to its design [14]. Other design disadvantages include glaring, fogging, optical imperfection and being bulkier than goggles and safety glasses [93]. There are many emerging face shield designs that attempt to overcome these limitations, but current laboratory testing standards only assess face shields for their ability to provide eye protection from chemical splashes [93][111]. Further research and laboratory challenge standards are urgently needed to investigate the effectiveness of face shields for respiratory protection and/or source control. At present, face shields are considered to provide a level of eye protection only. They should not be considered equivalent to masks concerning respiratory protection and/or source control.

Considerations for schools

In review



To facilitate the operationalization of this guidance in **school settings (as per national standards)**, it is advised that the **age categories be adapted to the national/local education level structure**.

Extracted from the guidance titled “Advice on the use of masks for children in the community in the context of COVID-19”, published 21 August 2020.

Justification

The use of masks by children and adolescents in schools should only be considered as one part of a comprehensive strategy to limit the spread of COVID-19. The following guidance documents can be used to inform policy-making and programming either for a comprehensive school safety strategy when reopening or for operations in the context of COVID-19:

- WHO considerations for school-related public health measures in the context of COVID-19
- WB/WFP/UNESCO/UNICEF framework for school reopening
- WHO/UNICEF/IFRC Interim Guidance for COVID-19 Prevention and Control in Schools

As part of the comprehensive school safety strategy for reopening, the views of teachers and educators on the perception of risks and the time burden required to ensure adherence to COVID-19 policies in schools and classrooms – including the use of masks by children – should be considered. Situations where wearing a mask can significantly interfere with the learning process, or have a negative impact on critical school activities such as physical education, meal programs, play time, sports and learning, require special consideration.

If the wearing of fabric masks is recommended in schools, specific instructions and supplies should be provided for the safe storage, handling and availability of fabric masks (see above). A sufficient supply of appropriate masks should be ensured for all school children. Basic water, sanitation and hygiene requirements should be met in the school building so that comprehensive IPC measures, linked to specific age-appropriate educational activities, can be implemented.

If medical or disposable masks are used in specific situations, a system for waste management including the disposal of used masks will need to be established to reduce the risk of contaminated masks being disposed of in classrooms and playgrounds.

No child should be denied access to education because of mask wearing or the lack of a mask due to low resources or availability.

4. Acknowledgements

This document was developed in consultation with the following:

The WHO Health Emergencies Programme (WHE) COVID-19 IPC Guideline Development Group (in alphabetical order):

Jameela Alsalman, Ministry of Health, Bahrain; Anucha Apisarnthanarak, Thammasat University Hospital, Thailand; Baba Aye, Public Services International, France; Roger Chou, Oregon Health Science University, USA; May Chu, Colorado School of Public Health, USA; John Conly, Alberta Health Services, Canada; Barry Cookson, University College London, United Kingdom; Nizam Damani, Southern Health and Social Care Trust, United Kingdom; Dale Fisher, National University Hospital, Singapore; Joost Hopman, Radboud University Medical Center, The Netherlands; Mushtuq Husain, Institute of Epidemiology, Disease Control and Research, Bangladesh; Kushlani Jayatilleke, Sri Jayewardenapura General Hospital, Sri Lanka; Seto Wing Jong, School of Public Health, China, Hong Kong SAR; Souha Kanj, American University of Beirut Medical Center, Lebanon; Daniele Lantagne, Tufts University, USA; Fernanda Lessa, Centers for Disease Control and Prevention, USA; Anna Levin, University of São Paulo, Brazil; Ling Moi Lin, Singapore Health Services, Singapore; Caline Mattar, World Health Professions Alliance, USA; Mary-Louise McLaws, University of New South Wales, Australia; Geeta Mehta, Journal of Patient Safety and Infection Control, India; Shaheen Mehtar, Infection Control Africa Network, South Africa; Ziad Memish, Ministry of Health, Saudi Arabia; Babacar Ndoye, Infection Control Africa Network, Senegal; Fernando Otaiza, Ministry of Health, Chile; Maria Clara Padoveze, School of Nursing, University of São Paulo, Brazil; Diamantis Plachouras, European Centre for Disease Prevention and Control, Sweden; Mathias Pletz, Jena University, Germany; Marina Salvadori, Public Health Agency of Canada, Canada; Mitchell Schwaber, Ministry of Health, Israel; Nandini Shetty, Public Health England, United Kingdom; Mark Sobsey, University of North Carolina, USA; Paul Ananth Tambyah, National University Hospital, Singapore; Andreas Voss, Canisius Wilhelmina Ziekenhuis, The Netherlands; Walter Zingg, University of Geneva Hospitals, Switzerland.

The WHO Technical Advisory Group of Experts on Personal Protective Equipment (TAG PPE) (Masks in Context of COVID-19 - Essential Parameters of Non-Medical Masks)

The TAG PPE was convened by WHO's Medical Devices and In-vitro Diagnostics Department in 2020 as a joint expert group among individual and industry experts on materials engineering, procurement, and human factors to achieve consensus on minimum international standards supported for the technical specifications of personal protective equipment used in the context of COVID-19, as well as the essential parameters of non-medical masks contained within this guideline:

Faisal Al Shehri, Saudi Food and Drug Authority, Saudi Arabia; Razan Asally, Saudi Food and Drug Authority, Saudi Arabia; Ayse Ayzit Kilinc, Istanbul University-Cerrahpasa, Turkey; Kelly Catlin, Clinton Health Access Initiative, USA; Patricia Ching, University of Hong Kong, China, Hong Kong SAR; Mark Croes, Centexbel, Spring Gombe, United Nations Technology Bank; Emilio Hornsey, UK Public Health Rapid Support Team, UK; Selcen Kilinc-Balci, Centers for Disease Control and Prevention, USA; Melissa Leavitt, Clinton Health Access Initiative, USA; John McGhie, International Medical Corps; Claudio Meirovich, Meirovich Consulting; Mike Paddock, United Nations Development Program, USA; Trish Perl, University of Texas Southwestern Medical Center, USA; Alain Prat, Global Fund; Ana Maria Rule, Johns Hopkins Bloomberg School of Public Health, USA; Jitendar Sharma, Andhra Pradesh MedTech Zone, India; Alison Syrett, SIGMA; Reiner Voelksen, Voelksen Regulatory Affairs; Nasri Yussuf, IPC, Kenya.

External IPC peer review group (Masks in Context of COVID-19):

Paul Hunter, University of East Anglia, UK; Direk Limmathurotsakul, Mahidol University, Thailand; Mark Loeb, Department of Pathology and Molecular Medicine, McMaster University, Canada; Kalisavar Marimuthu, National Centre for Infectious Diseases, Singapore Yong Loo Lin School of Medicine, National University of Singapore, Singapore; Nandi Siegfried, South African Medical Research Council, South Africa.

UNICEF observers (Masks in Context of COVID-19):

Nagwa Hasanin; Raoul Kamadjeu; Sarah Karmin; Jerome Pfaffmann.

Experts from UNICEF (Engaged in Steering Committee for Masks in children):

Maya Aarii, Gregory Built, Simone Carter, Carlos Navarro Colorado, Anne Detjen, Nada Elattar, Maria Agnese Giordano, Gagan Gupta, Nagwa Hasanin, Linda Jones, Raoul Kamadjeu, Sarah Karmin, Asma Maladwala, Ana Nieto, Luwei Pearson, Jerome Pfaffmann.

External reviewers (Masks in children):

Angela Dramowski, Stellenbosch University, South Africa; Susanna Esposito, World Association for Infectious Diseases and Immunological Disorders and University of Parma, Italy; Alfredo Tagarro, Universidad Europea de Madrid, Spain.

Reviewers from IPA (Masks in children):

Zulfiqar A. Bhutta, Centre for Global Child Health, Hospital for Sick Children, Canada; Mortada El-Shabrawi, Cairo University, Egypt; Margaret Fisher, Department of Pediatrics, Monmouth Medical Center, USA; Jonathan Klein, University of Illinois at Chicago, IPA Executive Committee and Focal Point for WHO Collaboration, USA; Berthold Koletzko, Ludwig-Maximilians-Universität München, Germany; Jane E. Lucas, International Health and Child Development IPA Strategic Advisory Group on Early Child Development, USA; Mohamad Mikati, Division of Pediatric Neurology and Developmental Medicine, Duke University Medical Center, USA; Aman Pulungan, University of Indonesia, Indonesian Pediatric Society and Asia Pacific Pediatric Association, Indonesia; Susan M. Sawyer, International Association for Adolescent Health and University of Melbourne, Australia; Russell M. Viner, Faculty of Population Health Sciences, University College London and Royal College of Pediatrics and Child Health, UK.

WHO Secretariat:

Benedetta Allegranzi, April Baller, Giorgio Cometto, Ana Paula Coutinho Rehse, Luca Fontana, Nathan Ford, Rebeca Grant, Tom Grein, Hannah Hamilton, Ivan Ivanov, Landry Kabego, Catherine Kane, Pierre Claver Kariyo, Ying Ling Lin, Abdi Mahamud, Madison Moon, Paul Rogers, Nahoko Shindo, Alice Simniceanu, Aparna Singh Shah, Howard Sobel, Valeska Stempluk, Maha Talaat Ismail, Joao Paulo Toledo, Anthony Twywan, Maria Van Kerkhove, Adriana Velazquez, Vicky Willet, Bassim Zayed.

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