PERC

Partnership for Evidence-Based Response to COVID-19

Updated August 2022

COVID-19 Tiered Public Health and Social Measures Framework for Africa

Introduction

Tiered public health and social measures (PHSM) systems are a core component of effective COVID-19 preparedness, response and risk communication. These systems use indicators of disease spread to determine the appropriate level of PHSMs at a given time and in a given place, informing targeted interventions that are appropriate for different levels of disease transmission. These systems empower the public to stay safe by keeping people informed about the risk of COVID-19 in their area. If designed and implemented effectively, a tiered PHSM system can help national decision-makers reduce SARS-CoV-2 transmission and save lives while avoiding the implementation of PHSMs that are unnecessarily harsh or disruptive socially and/or economically. Finding this balance is crucial in the ongoing fight against COVID-19.

As of July 2022, few African Union (AU) Member States have implemented tiered PHSM or alert-level systems for COVID-19 at the national level to guide PHSM implementation (Appendix C); these efforts do not address regional or continental level situational awareness. The Africa Centres for Disease Control and Prevention (Africa CDC) along with other PERC partners have developed a continent-level dashboard to provide this situational awareness.

This document describes the continent-level PHSM dashboard and explains how this framework can be adapted to a national COVID-19 tiered PHSM system.

Proposed tiered PHSM system

The PERC PHSM Tiers in Africa Dashboard uses a five-tiered COVID-19 PHSM system. This number of tiers allows for adequate targeting of PHSMs based on disease transmission levels while avoiding overly complex messaging. To determine the PHSM tier of each Member State, the PHSM dashboard uses two core indicators that illustrate the burden of COVID-19 and one core indicator of COVID-19 vaccination coverage (Table 1). The overall PHSM tier for each Member State is set by the higher of the three core indicators. In addition, though it is not preset on the continental dashboard, **we recommend that AU Member States include a fourth core indicator that measures the impact of COVID-19 on the health system.**

The thresholds for the COVID-19 burden indicators presented below were determined by reviewing data for all Member States from the start of the pandemic through March 2021. We attempted to set thresholds that could be applied to all Member States, such that Member States would be at Tier 0-1 when experiencing low levels of transmission and be at Tier 4 when experiencing high levels of transmission, but before hospital capacity is overwhelmed. However, due to differences in testing strategies and capacities between Member States, no single set of thresholds performed optimally for all Member States.

ABOUT PERC

The Partnership for Evidence-Based Response to COVID-19 (PERC) is a public-private partnership that supports evidence-based measures to reduce the impact of COVID-19 on African Union Member States. PERC member organizations are: Africa Centres for Disease Control and Prevention; Resolve to Save Lives; the World Health Organization; the UK Public Health Rapid Support Team; and the World Economic Forum. Ipsos and Novetta Mission Analytics bring market research expertise and years of data analytic support to the partnership.

A complimentary document developed by PERC provides additional details on how a Member State can use data to set its own indicator thresholds. Once thresholds have been set, Member States should assess the performance of their thresholds over time, as testing capacity and factors contributing to disease spread (such as new variants) continue to change.

The first core indicator, **daily case incidence**, is a measure of COVID-19 spread within a community. This indicator's validity is dependent on a country's ability to test and diagnose individuals with COVID-19. In settings where the population has inadequate access to testing, most infected individuals may go undiagnosed; therefore, this indicator may dramatically underestimate the true infection prevalence, resulting in a low case-to-infection ratio. The performance of this indicator may be sub-optimal in countries with low testing rates per capita, where self-testing predominates, or where the results of rapid antigen tests are frequently unreported. Although there is no specific testing target because testing volume should vary at different stages of the pandemic, for the week of 16-22 May 2022, the median testing rate across Member States was 714 tests/1M/week. If a Member State has a much higher or lower testing rate, consider adjusting indicator thresholds.

Table 1: COVID-19 PHSM Tiers and Thresholds

	Indicator thresholds for each tier				
Core Indicators	**Tier 0** No Restrictions	**Tier 1** Standard Precautions	**Tier 2** Low Alert	**Tier 3** Moderate Alert	**Tier 4** High Alert
Daily case incidence *(new cases per 1M people per day, 7-day average)*	‹5		5- ‹20	20 - ‹80	≥80
Test positivity rate *(last 14 days)*[1, 2]	‹3%		3% - ‹5%	5% - ‹12%	≥12%
A health system indicator available: *The percentage of hospital beds occupied by COVID-19 patients*[3]	N/A		N/A	N/A	≥20%
COVID-19 vaccination coverage rate *(% of total population fully vaccinated)*[4]	≥70%	‹70%	N/A	N/A	N/A

We use **test positivity** as a second core indicator because the accuracy of daily case incidence as an indicator of infection burden can vary depending on the epidemic situation. For example, when COVID-19 testing capacity is overwhelmed by a surge of cases, case counts are more likely to significantly underestimate the true number of infections. In times when testing capacity is stretched, testing strategies may shift to prioritize only symptomatic or hospitalized individuals. This may cause an increasing proportion of infections to go undiagnosed, especially mild and asymptomatic infections.

We use **COVID-19 vaccination coverage** as a third core indicator to inform the lowest achievable Tier. Given that the ultimate goal is to ensure that the majority if not all of the population in Africa is protected from severe COVID-19 outcomes, it is recommended that at a minimum each AU Member State reach a 70% or higher rate of vaccination coverage of the entire population prior to implementing the most lenient PHSM — Tier 0. As estimates of immune protection related to natural exposure are more difficult to obtain in a timely manner, seroprevalence is not included as a core indicator but can contribute to contextualisation if survey results are recent. The effect of new variants on both vaccine-induced and natural immunity must also be taken into account.

1 This includes both antigen and PCR tests as described by the WHO case definition and Africa CDC guidelines.

2 We presented this indicator as percent positivity, to be consistent with WHO guidance. If a Member State prefers, it can present an equivalent indicator using the test-to-case ratio with the following thresholds: ›33.3, 33.3 to ›20, 20 to ›8.3, and ≤8.3.

3 This indicator is not included in the PHSM Tiers Dashboard because the data is not readily available in a timely manner for most Member States.

4 https://au.int/en/pressreleases/20211029/africa-needs-vaccinate-70-its-population-end-2022-have-chance-controlling

While the PHSM tier dashboard includes only three core indicators, if the data are available, **we strongly recommend that countries add a fourth core indicator that measures the impact of COVID-19 transmission on health facilities**. WHO AFRO has proposed three possible indicators[5] with thresholds that countries may adopt and provides additional information on the development of these indicators and thresholds (Table 2). The exact indicator and thresholds may vary based on data available for the Member State, and it is at the discretion of each Member State whether to use a hospital capacity indicator to trigger all PHSM tiers or only the highest tiers. The main objective is for this indicator to trigger Tier 4 approximately 4-6 weeks before hospitals would become overwhelmed, which would allow time for Tier 4 PHSMs to "bend the curve" and prevent a scenario where patient care is compromised by an overwhelmed health care system.

Table 2: WHO AFRO's proposed indicators for monitoring the impact of COVID-19 transmission on health facilities

Indicators		Low	Medium	High	Critical
1	New COVID-19 hospitalizations per 100,000 population (14-day total)	‹10	10 - ‹20	20 - ‹30	≥30
2	Percentage of functional inpatient beds occupied by COVID-19 patients (7-day average)	‹15%	15% - ‹25%	25% - ‹35%	≥35%
3	Percentage of functional ICU beds occupied by COVID-19 patients (7-day average)	‹10%	10% - ‹15%	15% - ‹25%	≥25%

The quality of data on daily case incidence, test positivity and hospital capacity vary across Member States. Considering their specific context, data quality and data availability, Member States may choose to include other core indicators in their tiered PHSM system. For example, SARS-CoV-2 wastewater surveillance could be a better proxy for burden if nationally representative samples are collected and tested on a routine and timely basis[6]. Additionally, WHO recommends that countries incorporate SARS-CoV-2 testing into existing respiratory surveillance like sentinel influenza surveillance (e.g., influenza-like illness (ILI) and severe acute respiratory infections (SARI))[7], where thresholds can be developed to trigger changes in PHSM tiers.

Linking core indicators to PHSM guidance

In this framework, changes in PHSM tier, whether up or down, are determined by data. The prompt to change from one tier to another is a core indicator crossing a pre-specified threshold. Each PHSM tier should link to clear guidance on which activities are permitted and restricted at that tier and which PHSMs should be adopted. A simple, clear infographic is the ideal way to communicate this information to the public, accompanied by a complete list of PHSMs implemented at each tier (Appendix A). After developing these communications materials, a communication strategy should be developed, including media and community engagement, to support the initial release of the tiered PHSM system as well as notify the public about changes in PHSM tiers throughout implementation.

The recommendations at each tier should be based on existing scientific evidence around which activities increase risk of COVID-19 spread, and which PHSMs decrease risk (Appendix B). Our framework includes an example of how PHSMs can be assigned at each tier; this guidance can be adapted as appropriate by each Member State. Member States may also decide to implement different PHSMs in different settings. For example, rural and urban areas may implement different restrictions at the same tier if their primary venues for COVID-19 transmission vary.

5 https://apps.who.int/iris/handle/10665/356907

6 Africa CDC: https://africacdc.org/download/enhanced-covid-19-surveillance-at-the-community-level-in-africa/

7 WHO: https://www.who.int/publications/i/item/WHO-2019-nCoV-Integrated_sentinel_surveillance-2022.1

Transitioning between PSHM tiers

In this dashboard, the overall PHSM tier for each Member State is determined by the highest of the three core indicators: case incidence, test positivity and vaccination coverage. However, when implemented at the country level, the ultimate decision to change tiers should be made by a multi-sectoral advisory group. When an indicator crosses a pre-specified threshold, this group should meet and review the disease situation, including the presence of variants of concern, mortality rates per capita, weekly trends in incidence rates, weekly trends in death rates, and health system capacities such as available oxygen supply. Additionally, the advisory group should go beyond health indicators and assess the economic, political and social context, considering societal elements that may be affected by a PHSM tier change. Member States may define a set of secondary indicators that provide information about the outbreak situation, such as health care system, health care worker infections, disease control capacity, economic impact and social harm to inform this decision. The advisory group can agree to change PHSM tiers or to defer the change and provide a revised set of conditions for when a change should occur. Decisions should be made with local community input.

To avoid confusing the public and to allow sufficient time for PHSMs to impact SARS-CoV-2 transmission, PHSM tier changes should not occur more than once every two weeks, though Member States may be forced to increase tiers more frequently during a rapid surge in cases or if hospital capacity becomes overwhelmed. When decreasing tiers, ideally changes are made even less frequently, to avoid a possible resurgence of cases, though detrimental secondary impacts of PHSMs must be taken into account. In some cases, ascending more than one tier may be necessary (although threshold differences between tiers should be broad enough to make this uncommon). For example, if a Member State is at “Tier 2” but hospitals experience a sudden large increase in COVID-19 cases, ascension to “Tier 4” may be necessary.

PHSM implementation at the subnational level

The dashboard assigns a single PHSM tier to each Member State, providing an overall estimate of the current outbreak severity in each country and indicating the types of PHSMs that may be appropriate. However, for Member States choosing to adopt their own national tiered PHSM systems, assigning tiers at the subnational level may be more appropriate, depending on the size and population of the country. Assigning PHSM tiers at the subnational level may permit more precise targeting of PHSMs to the areas facing high levels of SARS-CoV-2 transmission. However, overly granular implementation should be avoided where testing numbers are low, as this can lead to unstable and inaccurate estimates of COVID-19 spread. Evaluating the performance of the tiered PHSM system using historical data can inform decisions around the appropriate level of geographic granularity for a specific setting.

Conclusion

A national tiered PHSM framework developed and implemented using the best practices described in this document can help keep communities healthy and safe while minimizing social and economic disruption. A tiered PHSM system can allow economically and socially important activities to continue while the epidemic is under control, resorting to stronger measures only when necessary. PHSM measures should be evidence-based, geographically targeted, protective of the health care system and supportive of the most vulnerable populations. If designed well and implemented consistently, a PHSM framework can empower officials to communicate effectively with constituents, guide communities through a cohesive response strategy, build public trust and encourage community support of necessary preventive measures. This will limit both the economic and health damage of COVID-19.

Appendix A: Example PHSM Recommendations by Tier

This is an example of sector-specific modifications that could be introduced at each PHSM tier. Modifications should be aligned with country-specific contexts. Preventive measures that apply to all contexts — universal mask-wearing in public settings, maintaining physical distances of at least one metre in public areas, frequent hand-washing and good environmental ventilation — are not included in the table. These measures should be applied to all sectors in Tiers 1-4, **but requirements can be lifted when a country achieves Tier 0.**

Activity or Sector	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4
School: Early childhood and Primary[8]	**All in-person** In Tier 0, masking and one metre physical distance not required		**All in-person** Students at desks to extent possible; recess in cohorts[9]	**All in-person** Reduced capacity to maintain 2 metres between students with students at desks; cohorting of students at all times	**Staggered[10] or partially remote[11] if possible** Reduced capacity to maintain 2 metres between students with students at desks; cohorting of students at all times
School: Secondary[8]	**All in-person** In Tier 0, masking and one metre physical distance not required		**All in-person** If possible, maintain 2 metres between students with students at desks, meals in classrooms, cohorting of students at all times	**Staggered or partially remote, if possible** Reduced capacity to allow 2 metres between students with students at desks; cohorting of students	**Staggered or partially remote, if possible** Reduced capacity so 2 metres between students with students at desks; cohorting of students
Higher Ed	**All in-person** In Tier 0, masking and one metre physical distance not required		**All in-person** Maintain 2 metres between students in classrooms and public areas	**Staggered or partially remote, if possible** Maintain 2 metres between students in classrooms; capacity limit in public and recreational areas	**Full remote or consider full-time on campus (i.e., no leaving campus), if possible** Maintain 2 metres between students in classroom

8 See Appendix B for the primary and secondary school recommendation rationale

9 Cohort and cohorting: a cohort is a small group within which people interact. "Cohorting" in the school setting refers to the practice of forming and maintaining small groups of students (and possibly teachers) throughout the entire school day and over time. If there is a case of COVID-19 in a school and students have been in cohorts, the number of people who may be exposed will be limited, it will be easy to identify all exposed individuals quickly and school-wide disruptions will be minimized.

10 Stagger: the practice of arranging a schedule so that not all individuals are present at once. In the school setting, staggered classroom schedules may be adopted when students are cohorted and there is not enough space to have all cohorts present as well as safely separated from each other. In such a case, some cohorts might attend school in the morning and some in the afternoon. Staggering may also be practiced outside the classroom; for example, cohorts may be asked to arrive and depart from school on different schedules to reduce crowding around the school.

11 Remote: learning by distance. Requires access to distance learning technology and tools. Remote education may be used in conjunction with staggering to allow full-time education without all students physically present at school.

Activity or Sector	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4
Premises where alcohol consumed	**Open** In Tier 0, masking and one metre physical distance not required		**Indoor:** Limit capacity and seated only **Outdoor:** Minimum 2 metres between parties indoor/outdoor	**Indoor:** Closed **Outdoor:** Open with limited capacity, seated only, minimum 2 metres between parties AND early closure	**Closed** (curbside/pick-up/take-away available)
Restaurants - without liquor sales	**Open** In Tier 0, masking and one metre physical distance not required		**Indoor:** Limit capacity Minimum 2 metres between parties indoor/outdoor	**Indoor:** Closed **Outdoor:** Open with limited capacity, seated only, AND minimum 2 metres between parties	**Closed** (curbside/pick-up/take-away available)
Indoor workplaces *(offices, factories)*	**Open** In Tier 0, masking and one metre physical distance not required		**Work remotely where possible** Limit capacity as necessary to maintain minimum 2 metres between people; minimize movement within workplace	**Work remotely where possible, no in-person meetings** Limit capacity to maintain minimum 2 metres between people; minimize movement within workplace	**Remote or closed except essential staff**
Outdoor workplaces *(farms, construction)*	**Open** In Tier 0, masking and one metre physical distance not required		**Limit capacity as necessary to maintain minimum 1 metre between people**	**Limit capacity as necessary to maintain minimum 1 metre between people**	**Only essential open** Limit capacity as necessary to maintain minimum 2 metres between people
Indoor retail *(including grocery stores)*	**Open** In Tier 0, masking and one metre physical distance not required		**Limit capacity as necessary to maintain minimum 2 metres between people**	**Open for certain hours, specifically open only for vulnerable populations** Limit capacity of large indoor venues (i.e., malls) to 50% and maintain minimum 2 metres between people	**Closed except essential** (curbside/pick-up/take-away available for all) **Capacity for essential** Maximum 20% AND minimum 2 metres physical distancing

Activity or Sector	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4
Outdoor market	**Open** In Tier 0, masking and one metre physical distance not required		**Limit capacity as necessary to maintain minimum 1 metre between people**	**Limit capacity as necessary to maintain minimum 2 metres between people**	**Limit capacity as necessary to maintain minimum 2 metres between people; unidirectional foot traffic**
Places of Worship, Weddings, Funerals	**Open** In Tier 0, masking and one metre physical distance not required		**Maintain 2 metres distancing between households indoors; outdoors preferred** Masks obligatory if singing indoors	**No indoor services** Limit capacity outdoors AND minimum 2 metres between households; no singing	**Remote or virtual if possible; if not, outdoor services only; no singing**
Gyms/ Fitness	**Open** In Tier 1, two metre physical distancing while exercising In Tier 0, masking and one metre physical distance not required		**Limited capacity AND at least 3 metres distancing while exercising** Masks must be worn; no indoor group classes; locker rooms closed	**Indoor:** Closed **Outdoor:** Open with least 3 metres distancing. Masks must be worn; no group classes	**Closed**
Events *(concerts, conferences, exhibitions, elections)*	**Open** In Tier 0, masking and one metre physical distance not required		**Indoor venues:** Maintain 2 metres distancing between households **Outdoor venues:** Limited capacity, masks obligatory	**Indoor venues:** All closed **Outdoor venues:** Limited capacity with 2 metres distancing between households Masks obligatory	**Closed**
Cultural institutions *(museums, libraries, zoos, gardens)*	**Open** In Tier 0, masking and one metre physical distance not required		**Limited capacity outdoor** **Indoor allowed** if 2 metres distancing is possible and masks are obligatory	**Indoor:** Closed **Outdoor:** Limited capacity if 2 metres distancing is possible, and masks are obligatory	**Closed**

Activity or Sector	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4
Sports and recreation *(includes players and spectators)*	**Open** In Tier 0, masking and one metre physical distance not required		**Limited capacity indoor AND 2 metres between spectator parties** Spectators to wear masks **Contact sports *(football, wrestling, rugby):*** professional and amateur *(non-recreational)* athletes only **Recreational teams:** Non-contact only, outdoor only; teams limited to 10 people; no travel	**Individual outdoor exercise allowed** Group sports open only to professional athletes; closed to spectators; limited travel, if possible	**Individual outdoor exercise only**
Personal care *(salon, spa, barber, nails, massage)*	**Open** In Tier 0, masking and one metre physical distance not required		**Limited capacity AND 2 metres between patrons** Masks must be worn	**Indoor closed unless 2 metres between patron and service provider possible**	**Closed**
Private social gatherings	**Open** In Tier 0, masking and one metre physical distance not required		**Maximum 50 people AND 2 metres distancing between households; outdoors preferred**	**Outdoor only** Maximum 2 households AND 2 metres distancing between households	**Own household only**
Public transport	**Open** In Tier 0, masking and one metre physical distance not required		**Mask required for all passengers and drivers; vehicles max 70% capacity**	**Mask required for all passengers and drivers** **Motorcycles:** 1 passenger only **Other vehicles:** Middle seats empty, max 70% capacity for short trips and max 50% capacity for long-distance trips **Private car:** 2 passengers or 1 household max; windows open when possible	**Mask required for all passengers and drivers** **Motorcycles:** 1 passenger only **Other vehicles:** Middle seats empty and max 50% capacity for all trips **Private car:** 1 household max; windows open when possible

Appendix B: Evidence base for recommendations

Any activity involving close contact between persons can increase risk for transmission of SARS-CoV-2, the virus that causes COVID-19. This risk can be decreased through a variety of public health and social measures (PHSMs) that individuals, establishments and communities may adopt. PHSMs include protective measures that individuals can observe such as mask-wearing, physical distancing and hand-washing, as well as environmental controls such as improved indoor ventilation.

Some PHSMs may be thought of as universal, and some PHSMs are more critical during specific activities, but all can play a role in reducing the burden of COVID-19. For example, the risk of transmission on public transportation can be reduced by limiting non-essential travel, maintaining physical distancing in queues and on vehicles, wearing masks especially when distancing cannot be maintained, and washing hands after contact with high-touch surfaces. Risks associated with private social gatherings can be mitigated by reducing the number of people involved, socializing outdoors, maintaining physical distance and wearing masks. The risk of widespread transmission and of many people developing severe disease and requiring hospitalization — which could overwhelm health care systems — can be mitigated across settings through vaccination.

The following is an overview of PHSMs that can be used to mitigate risk and the scientific evidence supporting their application to reduce morbidity and mortality from COVID-19. This should serve as a foundation for decisions around risk mitigation during various activities and in various settings during the COVID-19 pandemic. While each PHSM can reduce the spread of COVID-19, these measures are most effective when 'layered' or practiced in combination with each other.

One factor that impacts COVID-19 risk across all activities is the prevalence of the disease in the community. Where COVID-19 is highly prevalent, temporary suspension of some social or economic activities may be prudent to reduce disease spread.

Masks

COVID-19 is spread predominantly when uninfected people inhale respiratory droplets generated when infected people cough, sneeze, sing, talk or breathe. The correct use of non-medical face masks in the community to prevent transmission of SARS-CoV-2 is recommended by regional and global public health authorities. Studies have shown that cloth masks — especially those made of multiple layers of material — can efficiently filter droplets of many sizes including aerosolized particles. For masks to be maximally effective, they should fit the face of the user well. Efficiently filtering, well fit masks can be made at home.

There is some evidence that respirators — including N95 and KN95 respirators — are the most effective in reducing transmission of SARS-CoV-2. The type of mask that should be worn depends on a person's level of risk and also on the supply of different mask types. It is recommended that non-medical masks be worn in the community and that medical masks be reserved for health care workers and those providing care to COVID-19 patients at home. Respirators should be reserved for health care workers in specific situations.

There is evidence from a wide variety of community settings, including from rural low-income communities, that widespread community masking can reduce the spread of COVID-19. Widespread community masking, when all individuals are asked to wear masks, combines two approaches to reducing the spread of COVID-19: personal protection for the mask- wearer and "source control," where the emission of virus-laden droplets from those who may or may not be aware of their infection is blocked. The objective of source control, and the fact that people with asymptomatic and presymptomatic SARS-CoV-2 infections may contribute significantly to transmission, provides the theoretical basis for widespread community mask use. Studies have shown that people with COVID-19 who wear masks before they develop symptoms are less likely to transmit infection to close contacts. Studies show that consistent masking can effectively protect mask wearers from infection, both in community and congregate living environments.

Mask use is most important indoors, especially in poorly ventilated areas, and when physical distancing cannot be maintained. This includes within households in which a household member has been diagnosed with COVID-19, has symptoms of COVID-19 or has been exposed to someone with COVID-19. In these situations, all household members should consistently wear masks when near each other.

Physical distancing

Physical distancing can decrease the spread of COVID-19. Contacts of people with COVID-19 are at risk of infection in large part because they may be exposed to virus-laden respiratory droplets, and physical distancing can decrease this risk. A systematic review and meta-analysis found that physical distancing of at least one metre is associated with a 70% reduction in SARS-CoV-2 infections, and that risk of infection decreased over longer distances. An analysis of data from over 140 countries or regions found that implementation of physical distancing was associated with a significant reduction in the incidence of COVID-19. Like other PHSMs, physical distancing should be routinely practiced in part because of the risk of transmission from pre-symptomatic and asymptomatic people who do not know that they are infected.

Physical distancing is particularly important indoors, especially where ventilation is limited, if many people are present, or when masks are not consistently worn. Living with someone who has been diagnosed with COVID-19 is a significant risk factor for infection, and physical distancing is recommended to prevent transmission.

Hand hygiene

Public health authorities recommend frequent hand hygiene in the community to stop the spread of COVID-19. There is a wealth of evidence that hand hygiene can reduce the spread of infectious diseases including those caused by respiratory viruses. In addition, there are data that suggest that SARS-CoV-2 can survive for prolonged periods on human skin. For those who are infected with SARS-CoV-2, including those who are pre-symptomatic or asymptomatic, hands may be contaminated with the virus. For those who are susceptible to infection, hands may be contaminated by touching infected people or contaminated objects, and the virus can then be transferred to the eyes, nose or mouth. This body of evidence makes a compelling argument for the simple practice of hand hygiene which can be practiced effectively by washing hands thoroughly with soap and water or using an alcohol-based hand rub.

Ventilation and outdoor environments

COVID-19 is predominately spread when infected people breathe out respiratory droplets that contain the SARS-CoV-2 virus and susceptible people inhale these droplets. Ensuring good environmental ventilation is WHO as an important strategy to reduce SARS-CoV-2 transmission. Multiple studies have demonstrated evidence of increased transmission of respiratory viruses, including SARS-CoV-2, indoors. Ventilation has been shown to decrease the concentration of SARS-CoV-2 in indoor air samples. Enhanced ventilation may be particularly important in crowded indoor spaces, when masks are not worn, or when activities that may generate more respiratory particles are performed (e.g., singing, exercising or speaking loudly). Crowded indoor environments with limited ventilation may be more conducive to superspreader events. Ventilation in indoor environments may be improved through implementation of engineered ventilation systems or the proper use of natural ventilation. Opening doors and windows, and the proper placement and use of fans, can effectively increase ventilation.

Moving activities outdoors when possible can also minimize exposure to exhaled respiratory droplets. A systematic review of outdoor transmission of SARS-CoV-2 and other respiratory viruses found that, globally, a much smaller proportion of reported COVID-19 cases could be linked to outdoor transmission than to indoor transmission. A review of evidence on SARS-CoV-2 transmission linked to outdoor environments found few examples of outdoor transmission among approximately 25,000 cases, and when outdoor transmission did occur, it was often associated with extended duration and close proximity of contact and possible exposure to indoor environments.

Vaccines

In areas of high COVID-19 vaccine coverage, there have been massive reductions in serious disease, hospitalization and death. Unfortunately, globally, COVID-19 vaccine access is highly inequitable and depends largely on a country's wealth. Inequities in vaccine access have had the greatest effect on African countries. Low COVID-19 vaccination coverage increases the risk of future surges of disease and death, as well as the risk that new SARS CoV-2 variants will emerge.

WHO recommends fully vaccinating at least 70% of the global population. The immediate goals of this vaccination strategy are to minimize deaths, severe disease and overall disease burden; curtail the health system impact; fully resume socio-economic activity; and reduce the risk of new variants. A technical and feasibility assessment conducted by the WHO's Strategic Advisory Group of Experts on Immunization concluded that vaccination of all adults will provide substantial

and important health benefits, is feasible to achieve in all countries, is grounded in evidence, and has the potential to strengthen primary health-care systems and other immunization activities. However, many African countries are far from achieving this coverage goal. Africa CDC recommends that Member States continue to expand COVID-19 vaccination in line with global targets, prioritizing vaccination of those at highest risk of exposure or severe disease (the elderly, those with comorbidities and health care workers).

Transmission of SARS-CoV-2 associated with primary and secondary schools

This section provides an evidence base to support the sector-specific modifications suggested for primary and secondary school settings in Appendix A. The modifications suggested for primary and secondary schools — as opposed to other settings — strive to keep those settings physically open, with only minimal reductions in capacity as necessary to maintain physical distancing, when in the highest risk tier. This is because the closure of schools and related programs can detrimentally affect the education as well as the general health and well-being of children. And there is a wealth of evidence which suggests that in-person learning can be conducted safely in primary and secondary schools, even during periods of increased community transmission, when appropriate PHSMs are in place.

Children can be infected with SARS-CoV-2 and can transmit the infection to others. However, children are at much lower risk of severe COVID-19 and COVID-19-related death than older age groups. In addition, children do not appear to transmit SARS-CoV-2 as efficiently as adolescents or adults. Studies have shown that in-person education does not necessarily increase the spread of COVID-19 in communities. A summary of epidemiologic data from Europe that when school-associated outbreaks occur they typically include few cases; that the risk of transmission from children — especially primary school-aged children — within school settings is low; and that, the school-associated outbreaks that have occurred have been associated with lack of PHSMs in the school setting. Evidence suggests that school-attending children may be less likely to acquire COVID-19 within the school than outside the school, including in their home environments, and a number of outbreaks have been linked to extra-curricular activities such as overnight camps, high-contact extra-curricular sports and social events.

In terms of the risk to school staff, evidence suggests that transmission in schools is more likely amongst adults than children. This illustrates the importance of PHSMs that protect adults in schools; however, this is not unique to school settings, as teachers may not be at increased risk of COVID-19 relative to adults working other jobs. Ultimately, even when there is extensive transmission of SARS-CoV-2 in the community, it may be safe for children, staff and the community to keep schools open as long as appropriate safety measures are in place.