

# Contact tracing and quarantine in the context of COVID-19

Interim guidance

6 July 2022



## Key points

- In the context of growing global population immunity from COVID-19 vaccination and past SARS-CoV-2 infection, WHO recommends that identification, contact, quarantine and follow-up should be prioritized for individuals at high risk who have been in contact with a confirmed or probable case of SARS-CoV-2 infection, rather than targeting all contacts.
- This group includes individuals who are older than 60 years, are immunocompromised or have multiple comorbidities; pregnant women and individuals living or working in high-risk settings such as healthcare, nursing homes and long-term care facilities. The rationale for prioritizing contacts at high risk for identification and follow-up is that they have higher chances of developing severe disease and will benefit the most from early diagnosis and medical support.
- Contact tracing should be conducted for all contacts during periods of time characterized by uncertainty such as the emergence of new variants of concern or as otherwise indicated by national health authorities' assessments. In these uncertain situations the contact tracing activities need to be adapted to the context and the availability of resources.
- Supported quarantine measures should be applied for (i) contacts at high risk, (ii) in high-risk settings and (iii) uncertain situations (such as the emergence of a new variant of concern).
- Wherever possible, contacts should have access to free or affordable and reliable testing, including self-tests. Additionally, public health messaging should provide clear information about COVID-19 testing options.
- All contacts who in the last 90 days have (i) completed the primary series vaccination, or (ii) have received a vaccine booster dose, or (iii) have reported a previous COVID-19 infection do not need to quarantine.
- Contacts at high risk and those living in high-risk settings, who have not completed a primary series or received a booster vaccine dose, or who have not reported a previous infection in the last 90 days, need to quarantine for 10 days. Quarantine can be shortened to 5 days if the contact tests negative on day 5 and presents no symptoms.
- Under uncertain situations (such as the emergence of a new variant of concern, or as otherwise indicated by assessments conducted by national health authorities), all contacts should quarantine for 14 days as a precautionary measure, although this period could be shortened with testing, if the characteristics of the new variant and detection methods for it are suitable.
- Digital technologies, such as contact tracing application, which require low resource engagement from public health systems, should be explored, assessed and implemented to support management of contact tracing, notification and effective public health messaging.
- National and local health authorities should use risk-based approaches to contact tracing and quarantine that include reviewing and adjusting to their local circumstances and disease epidemiology, population immunity, their health system's capacities, and risk tolerance.

## What is new

This document is a consolidated and updated guidance built on WHO's 'Contact tracing in the context of COVID-19', interim guidance, last updated in February 2021 and 'Considerations for quarantine of contacts of COVID-19 cases', interim guidance, last updated in June 2021, as well as the 'Contact tracing and quarantine in the context of the Omicron SARS-CoV-2 variant' interim guidance, published in February 2022. This guidance replaces all three WHO interim guidance documents noted above on contact tracing and quarantine in the context of COVID-19.

The current guidance is based on the most recent available evidence on SARS-CoV-2 infection. It applies to the breadth of phenotypic characteristics observed in all variants encountered up to the time of its release and considers future virus evolution.<sup>1</sup> In light of increasing immunity against severe disease and against death from SARS-CoV-2 infection due to past infection and vaccination, WHO's recommended strategy for contact tracing and quarantine has shifted from aiming to interrupt all chains of transmission to reducing COVID-19 morbidity and mortality, especially among groups at high risk. Accordingly, WHO's recommendations focus on priority groups, settings and situations for sustained management of contact tracing and quarantine activities as a risk-based approach, rather than targeting all individuals in contact with a confirmed or probable case of SARS-CoV-2 infection.

In the current situation, characterized by high levels of population immunity, predominance of Omicron, and in the absence of a new variant of concern (VOC), the quarantine period is reduced from 14 to 10 days if no testing is available. If testing is available, the quarantine can be reduced to 5 days if the contact does not present symptoms and tests negative on day 5. In the previous guidance, COVID-19 vaccination of the contacts was not considered, while now WHO recommends that contacts who in the last 90 days have either been vaccinated (completing the primary series or with a booster dose) or previously infected do not need to quarantine.

A risk-based approach is also encouraged in situations in which case numbers are overwhelming healthcare services, resources and capacities are overstretched, and the unavailability of large numbers of persons in isolation or quarantine impacts essential societal functions. Based on the above principles, updated recommendations are provided on contact tracing, testing and quarantine of contacts.

## Background

Contact tracing for COVID-19 is the process of identifying, assessing, and managing people who have been exposed to someone who has been infected with the SARS-CoV-2 virus, while quarantine is the separation of contacts from other people after exposure to a probable or confirmed case of SARS-CoV-2 infection.<sup>2</sup> Contact tracing and quarantine are public health measures to control the spread of infectious disease pathogens such as SARS-CoV-2. They allow for the interruption of infection transmission and can also help people at a higher risk of developing severe disease to more quickly identify their exposure, so that their health status can be monitored and they can seek medical care faster if they become symptomatic.<sup>2</sup>

Since the beginning of the pandemic, WHO has recommended that health authorities identify, trace, quarantine and follow up all individuals who have been in contact with a confirmed or probable case<sup>3</sup> of SARS-CoV-2 infection. This approach aimed at breaking all chains of transmission and controlling the spread of the virus. Member States have incorporated this recommendation into their pandemic response activities, and there are examples of countries that effectively controlled the spread of the virus through timely implementation of intensive contact tracing and quarantine measures. However, there have been many challenges to implementing contact tracing and quarantine, including the low number of recalled and identified contacts for each case, delay in contacting and notifying identified contacts, lack of human resources for extensive contact tracing activities during epidemic peaks, uncertain cooperation and economic difficulties of contacts subject to quarantine measures, competing public health priorities, and balancing public health objectives associated with contact tracing and quarantine with individuals' right to privacy.<sup>4,5</sup> WHO stresses the importance of considering all these aspects and other implementation barriers to put in place effective and sustainable systems for contact tracing and quarantine.

Since early 2020, a considerable work force has been trained for contact tracing and quarantine activities by countries around the world. This work force represents a valuable resource for the future management of COVID-19, and for other epidemics and pandemics in the future.

This document aims to provide guidance on sustained maintenance of contact tracing and quarantine activities for COVID-19, and to support countries in defining priorities for contact tracing and quarantine in case of any future major surge or emergence of new SARS-CoV-2 variants of concern.

## Rationale for updated contact tracing and quarantine recommendations

WHO takes a holistic, risk-based view of contact tracing and quarantine measures. At this stage of the pandemic, two and a half years after the reporting of the first COVID-19 cases and with overall global vaccine- and infection-acquired population immunity reaching at least 67%,<sup>6</sup> WHO recommends Member States to consider adjusting contact tracing activities to take a pragmatic approach in line with other national public health and social measures to lay the groundwork for the sustained management and control of COVID-19.

Focusing contact tracing and quarantine efforts to reduce morbidity and mortality, rather than stopping all chains of transmission, presents some risk of further infection transmission of SARS-CoV-2. However, the current level of population immunity (which is expected to increase over time) should mitigate the risk of severe disease and premature death.

The recommendations in this guidance document do not intentionally discriminate based on gender, ethnicity or income level. They do, however, recommend more targeted contact tracing and quarantine measures to focus protection on the populations at high risk, and WHO acknowledges that this could put at disadvantage some social groups. For these groups, the benefits of participating in contact tracing and quarantine are expected to diminish the risks of COVID-19 severe disease or premature death and outweigh the potential harms of quarantine. Nevertheless, WHO encourages Member States to logistically and financially support contacts that have difficulties in following the recommendations below.

## Intended audience

The main target audience of this updated interim guidance is public health authorities worldwide, but other users and institutions may also find it informative and useful. These include educational institutions; workplaces; border health services; organizers of group and mass gathering events; and non-government, civil society, and community-based organizations, including those working with or led by populations most affected by COVID-19, at increased risk of severe COVID-19 disease, or most affected by response measures.

## Considerations for vaccinated or previously infected contacts

Vaccines have proven to be highly effective in preventing severe COVID-19 disease, hospitalization and death in infected individuals.<sup>7,8</sup> A significantly higher proportion of severe disease outcomes, including hospitalization and intensive care unit stays, has been observed worldwide among unvaccinated or partially vaccinated individuals compared to those who were fully vaccinated. There is also some evidence that a vaccinated individual is less likely to transmit the virus on to others;<sup>9</sup> however, PCR cycle threshold (Ct) values are not consistently higher in vaccinated and boosted individuals, and similar levels of infective virus have been observed between vaccinated and unvaccinated Delta variant cases.<sup>10</sup> Vaccine effectiveness against infection transmission, although high from two weeks after inoculation, wanes over time.<sup>7</sup> With the emergence and widespread transmission of Omicron globally, waning vaccine effectiveness against infection transmission has been observed for the primary series and booster dose vaccines.<sup>11</sup> Most vaccine effectiveness studies focus mainly on seven vaccines [(BNT162b2 (Pfizer), mRNA-1273 (Moderna), AZD1222 (Astra-Zeneca), Ad26.COV2.S (Janssen), CoronaVac (Sinovac), BBIBP-CorV (Sinopharm), Sputnik V (Gamaleya Research Institute)].<sup>8</sup> There still remains some uncertainty on the vaccine effectiveness against

infection over time for the other vaccines used across the world. Nevertheless, infection rates observed during the Omicron wave suggest that current vaccines do not provide high levels of protection from infection<sup>7,12,13</sup>.

Similar to vaccine-derived immunity, infection-derived immunity has been observed to offer some protection from severe disease and death in the event of a reinfection.<sup>12–14</sup> However, observed reinfection rates<sup>12–15</sup> indicate that a past infection does not offer a persistent protective effect against reinfection, and reinfected individuals, as well as those with a breakthrough infection, may spread the virus.

For the purposes of contact tracing and quarantine and related to transmission (as an issue separate from severe disease), WHO advises that the protective effect of vaccination or past infection can be extended up to 90 days from the last vaccine dose or last infection diagnosis. After this period, a vaccinated or previously infected contact should be considered at similar risk of getting infected as an unvaccinated or not previously infected individual.

## Evidence on testing of contacts

Over time, the availability, reliability and affordability of SARS-CoV-2 diagnostic tests has improved and continues to be improved. WHO currently recommends the use of polymerase chain reaction (PCR) tests and antigen detection rapid diagnostic tests (Ag-RDT) for the detection of acute SARS-CoV-2 infection.<sup>16,17</sup> The latter can be administered by a qualified professional or performed as a self-test.<sup>17</sup> Depending on the epidemiological situation, a positive self-test result in symptomatic individuals or those with recent exposure could be used for diagnosis and to facilitate linkage to clinical care and therapeutics. For screening purposes, a negative self-test result could enable participation in an activity, such as group activities or indoor gatherings. Confirmatory testing for positive results can be considered. A negative self-test can also be used to shorten the quarantine period, as described below.

Modelling studies, based on pre-Omicron variants, have shown that contacts have higher chances of testing positive between day 1 and day 7 from exposure,<sup>18–21</sup> and this information can be used to shorten the quarantine period of contacts who show no signs or symptoms of infection. In addition to published research, pre-print data shared with WHO and the Contact Tracing and Quarantine Guideline Development Group convened by WHO, have demonstrated that most contacts who developed infection did so between the day of last contact with the source case (day 0) and day 5.<sup>22</sup> Other studies have also indicated that daily rapid testing of contacts is as effective as quarantine in preventing onward transmission.<sup>20</sup>

## Recommendations for contact tracing

The published evidence on currently known SARS-CoV-2 variants of concern has warranted only minor changes to the definition of contacts presented in the previous version of the guidance. This definition balances the practical need for a compromise between a sensitive definition that would not miss any contacts and a more specific definition that reduces the resource burden of unnecessarily extensive contact tracing and quarantine.

### Updated contact definition

A SARS-CoV-2 contact is a person who has had any one of the following exposures to a probable or a confirmed case of SARS-CoV-2 infection:

1. face-to-face contact with a probable or confirmed case within 1 metre and for at least 15 minutes, or
2. direct physical contact with a probable or confirmed case, or
3. direct care for a patient with probable or confirmed COVID-19 disease without the use of recommended personal protective equipment (PPE)<sup>23</sup> or,
4. other situations as determined by local health authorities based on local risk assessments.

Exposure must have occurred during the infectious period of the case, which is defined as follows.

- Exposure to a symptomatic case: 2 days before and 10 days after symptom onset of the case, plus 3 days without symptoms or 3 days with improving symptoms, for a minimum period of 13 days after symptoms onset.
- Exposure to an asymptomatic case: 2 days before and 10 days after the date on which the sample that led to confirmation was taken.

Currently no significant differences in SARS-CoV-2 viral load have been reported between symptomatic and asymptomatic cases<sup>24,25</sup>, and no infective viral load threshold has been established for humans.<sup>26</sup> Thus, contacts of an asymptomatic case should be managed in the same way as those of a symptomatic case.

### Contact tracing priorities

Current evidence suggests that contacts at higher risk of infection are those in close proximity settings where people spend long periods of time with a case, such as households. As seen with all SARS-CoV-2 variants to date, the secondary attack rate among household contacts were among the highest reported.<sup>27–29</sup> In other closed settings such as prisons, cruise ships, and schools, the reported secondary attack rates are also high.<sup>30–33</sup> Although children have been reported to be at lower risk of negative outcomes from COVID-19 than adults, they are still likely to become infected with SARS-CoV-2 and potentially further spread the infection. There have been reported outbreaks and clusters in workplaces (other than prisons, cruise ships and schools); but these, together with community settings, represent a lower transmission risk.<sup>34,35</sup>

In light of the epidemiological evolution of SARS-CoV-2 since the start of the pandemic, and the increasing levels of population immunity against severe disease, WHO no longer recommends the identification, tracing, quarantine and follow-up of all individuals who were in contact with a confirmed or probable case of SARS-CoV-2 infection. Priority should be given to the following groups, settings and situations:

- Priority groups are individuals at high risk of developing severe disease if infected with SARS-CoV-2 through exposure to a case. They include (but are not limited to): individuals older than 60 years, individuals with immunocompromising diseases or taking immunosuppressive medications, people with multiple co-morbidities, pregnant women, and those otherwise informed by a medical professional that they are at high risk.

Unvaccinated or partially vaccinated contacts, especially if belonging to the above groups at high risk, are more likely to experience severe disease, requiring hospitalization and/or resulting in death, when compared with vaccinated contacts.<sup>36</sup> They should, therefore, receive special attention from contact tracing activities. It is worth noting that the vaccination status or the presence of underlying conditions in a contact might not always be known to the source case or the contact tracer. It is therefore imperative that public messaging targets these individuals, making them aware of their increased risk of severe disease when exposed to a case and advising them to get vaccinated (or, if partially vaccinated, to complete the primary vaccination series and recommended booster doses). Contacts at high risk ('priority groups', as defined above), independent of their vaccination status, should remain the priority for contact tracing and quarantine to reduce COVID-19 morbidity and mortality.

- Priority settings are environments where there is a higher chance that people at high risk belonging to priority groups might stay for extended periods of time in close proximity with each other, and consequently have a higher chance of becoming infected and developing severe disease. Examples of high-priority settings are health care facilities, including nursing homes and long-term care facilities.
- Priority situations are circumstances such as the emergence of a new variant for which characteristics of immune escape and disease severity are unknown, or any other circumstances determined by public health authorities as priority.

Countries can decide to expand the list of the above priority groups, settings and situations based on their national and local assessments or needs.

### **Identifying and informing contacts**

WHO acknowledges that, with the prioritization of contacts at high risk and specific settings, contact tracing activities may scale down, and resources that were previously earmarked for contact tracing may be repurposed to meet other priorities. This may make the identification of contacts at high risk difficult. In this regard, health promotion and public messaging through different means of communication is vital. Public health authorities need to ensure that social complacency regarding COVID-19, due to increasing vaccination coverage and widespread pandemic fatigue<sup>37</sup> among the general public and health workers, does not lead to reduced vigilance among populations at high risk who can still suffer severe consequences.

Persons with a probable or confirmed case of SARS-CoV-2 infection should be encouraged to provide the names of their known contacts to relevant public health authorities and to also immediately directly inform these contacts about their diagnosis. All contacts at high risk should also be aware of their increased risk of morbidity and mortality. Since this population might be accessing healthcare services more often than the general population, public health messaging on their increased risks from COVID-19 infection should also target local healthcare centres, general practitioners and hospitals.

Unvaccinated contacts should be particularly aware of their risk, especially if they belong to a group at high risk. Public messaging should reinforce the need for all contacts to practice adequate infection prevention and control (IPC) when interacting with others and avoid contact with individuals at high risk.

In settings such as health care facilities, including nursing homes and long-term care facilities, trained staff should be available to initiate contact tracing for all contacts at high risk in the event that a case is identified.

Digital tools, such as proximity tracing applications, automated calls and messaging servers can also be used to support faster and less resource-intensive identification and notification of contacts. Once contacts are aware of their exposure, specific advice on available testing options and the application of IPC measures should be provided.

### **Monitoring contacts**

Contacts at high risk should monitor their symptoms for 14 days after last exposure to the source case and undergo testing using PCR or Ag-RDT immediately if they develop symptoms. If they test positive, they are considered a case and should undergo isolation and treatment, as needed, according to recommendations in place.<sup>38</sup> If they are unable to be tested, their symptoms or signs may qualify them to be a probable case<sup>3</sup>, in which instance they should also be isolated and treated as needed.

Public health authorities should communicate with contacts at high risk under monitoring and make sure that they have adequate information on the need for quarantine, self-monitoring of symptoms, and testing; and where possible, provide necessary support as needed during the period of quarantine.

WHO recognizes that the above recommendations might need to be adapted to the local context, health system capacity and the epidemiological situation. Population vaccination coverage and the proportion of previously infected people may vary widely between different regions of the world and even within a country. Consequently, public health authorities need to assess local levels of population immunity to be able to identify pockets of populations and settings at high risk. Seroprevalence surveys can be useful instruments for assessing population immunity.<sup>6</sup>

### **Recommendations for testing and quarantine of contacts**

All individuals who become aware of an exposure should be offered access to free or affordable and reliable testing options that allow them to know whether they have been infected, and decrease the prospect of further spreading the virus. All symptomatic contacts should be able to test, either through a facility-based PCR test or Ag-RDT, or

through Ag-RDT self-testing.<sup>16,17</sup> If contacts test positive with any of the above methods, they are to be considered a confirmed case of SARS-CoV-2 infection and undergo isolation according to recommendations in place.<sup>38</sup>

Resources permitting, WHO also recommends that asymptomatic contacts be given the opportunity to test once they are made aware of being a contact. This will allow potential cases to be more quickly identified, isolated and offered treatment. Note that tests taken in the first days of infection can produce a false-negative result. Therefore, if the test result at the time of identification as a contact is negative, a second test on day 5 after the last contact with the source case may be performed. A negative result on day 5 indicates a significantly reduced likelihood that the contact is infected and would test positive during the remainder of the monitoring period. As soon as any symptoms manifest, the contact should be tested. If there are no symptoms and the contact tests negative at day 5 or thereafter, then the contact can exit quarantine. If no test is available, they should remain in quarantine until day 10.

Although daily testing has been shown to be as effective as quarantine in preventing onward transmission, repeated testing could constitute an excessive economic burden in many countries, either for public health systems or private individuals. A single negative test on day 5 after last known contact may be considered sufficient to cease follow-up.

If, in the last 90 days, a contact at high risk or someone in a priority setting has been vaccinated (i.e., completed the primary series and/or received a booster dose) or has experienced a confirmed SARS-CoV-2 infection, this contact is not considered to be at high risk of infection or further transmission. Therefore, no quarantine period is needed. However, if this contact experiences COVID-19 symptoms within 14 days after last exposure to the source case, a PCR or Ag-RDT needs to be performed as soon as possible. While awaiting the results, this person should be quarantined.

When the case load is high, and many health workers and other essential workers are absent from work due to quarantine, health systems may be overstretched. In that context, vaccinated health workers and other essential workers who are asymptomatic contacts may have a shortened quarantine, or, if required, continue to work without quarantine. Where possible, daily Ag-RDT testing may be performed up to day 5 after exposure. Essential workers with shortened or no quarantine who need to work following an exposure must continue applying all recommended IPC precautions, including wearing either a well-fitted medical mask or a respirator at all times<sup>39</sup> and self-monitoring for symptoms for 14 days. If compatible with service delivery needs, health workers who have been in contact with a probable or confirmed COVID-19 case should not provide care or have contact with individuals at high risk.

### **Quarantine conditions**

Quarantine arrangement can be at home or in a room in the facility where the contact can be regularly monitored for symptoms. It is recommended that contacts stay in a separate room in the household or the facility during quarantine. During quarantine, adequate ventilation and IPC measures in the room(s) should be implemented and maintained. Quarantined individuals must be supported with adequate food, water, protection, hygiene, and communication provisions, including access to education, paid leave or remote work options. WHO acknowledges that this recommendation might be difficult to implement in some settings, nevertheless countries need do put in place logistical and financial support to ensure that the basic needs of people in quarantine are met. Special attention should be provided to people with disabilities, whose capacity to meet basic life needs – such as accessing income, shelter and food – may be seriously affected by quarantine.

Contacts in quarantine need to regularly monitor their health status for symptoms and receive clear instructions on what to do in case they develop symptoms. The instructions need to include referrals to call centres, healthcare centres or medical staff in case of need, as well as testing facilities or self-testing options the contacts can purchase privately. All contacts in quarantine who develop symptoms need to undergo testing. Staff supporting contacts in quarantine, either through in person visits or through call centres, need to be adequately trained to assess and manage them, or adequately refer the contacts to the needed support.

If other people enter the room of a contact in quarantine, physical contact should be avoided, and face masks should be worn by all parties<sup>39</sup>, unless contraindicated (e.g., infants). Quarantined individuals should avoid contact with people at high risk.

When implementing quarantine, WHO continues to recommend that authorities avoid family separation, weighing the welfare of the child against the potential risk of SARS-CoV-2 transmission. If paediatric contacts are quarantined in the household, this should occur in the care of an adult family member or caregiver, taking into consideration the child's safety as well as physical and mental well-being. Children should not be quarantined on their own. In the scenario that an adult needs to be quarantined apart from the child, the decision needs to be based on a comprehensive assessment of the child's best interests. If required, a non-contact healthy family member, or someone who is familiar to the child and the child's family, may provide care during the quarantine period. Breastfeeding women should be supported to safely breastfeed and share a room with their infant. Child-friendly quarantine facilities, which can host children without caregivers, must provide sufficiently trained care staff who can provide a safe, caring and stimulating environment, as well as be familiar with risks of violence, exploitation, abuse or neglect. A strict child safeguarding policy must be in place.

### Contact tracing and quarantine in the context of potential future scenarios of pandemic evolution

WHO envisages three potential planning scenarios regarding viral evolution and human immunity over the coming months as stated in the 'Strategic preparedness, readiness and response plan to end the global COVID-19 emergency in 2022' document: a 'base case', a 'best case', and a 'worst case'.<sup>1</sup>

In the 'base-case' scenario, the virus continues to evolve, its severity is significantly reduced over time due to sustained and sufficient immunity against severe disease and death, and there is decoupling between incidence of cases and severe disease, leading to progressively less severe outbreaks. This scenario resembles the current pandemic situation in most countries around the world, and the above-mentioned recommendations for contact tracing and quarantine would apply.

In the 'best-case' scenario, future variants that emerge are significantly less severe, and protection against severe disease is maintained without the need for periodic boosting or significant alterations to current vaccines. In this situation the contact tracing and quarantine measures mentioned above would likely be further curtailed for individuals and situations of low risk but would still need to be maintained for individuals at highest risk of severe disease, such as immunocompromised persons; and potentially in the highest-risk priority settings, such as in nursing homes. In this scenario, it would nevertheless be important to retain the capacity to quickly reinstate contact tracing and quarantine resources if the need were to arise (see below).

In the 'worst-case' scenario, a more virulent and highly transmissible variant emerges, against which vaccines are less effective, and/or immunity against severe disease and death wanes rapidly, especially in the groups most at high risk. In this situation contact tracing and quarantine measures would need to be preserved for all contacts and be more conservative in order to contain the new variant spread. Further, upon the initial emergence of a new variant, information as to its severity may not be immediately available. Thus, if an emerging variant is classified as a variant of concern by WHO or national authorities and until there is an accurate understanding of its risk, WHO recommends contact tracing of all contacts of confirmed and probable cases infected with the new variant; and to quarantine all contacts for 14 days to minimize its transmission. Further, until robust information about the incubation period of, and the test performance for, any new variants of concern is ascertained, quarantine should not be shortened for asymptomatic contacts using negative tests.

If, during the spread of a new variant, the number of new cases increases beyond the public health system's capacities, and the tracing for all contacts of a confirmed or probable case is not possible, the focus should be on groups of contacts at high risk as defined in this document. Additionally, the close proximity settings mentioned above should be part of focused contact tracing, as should healthcare settings, households, prisons, cruise ships and schools, which have high secondary attack rates.



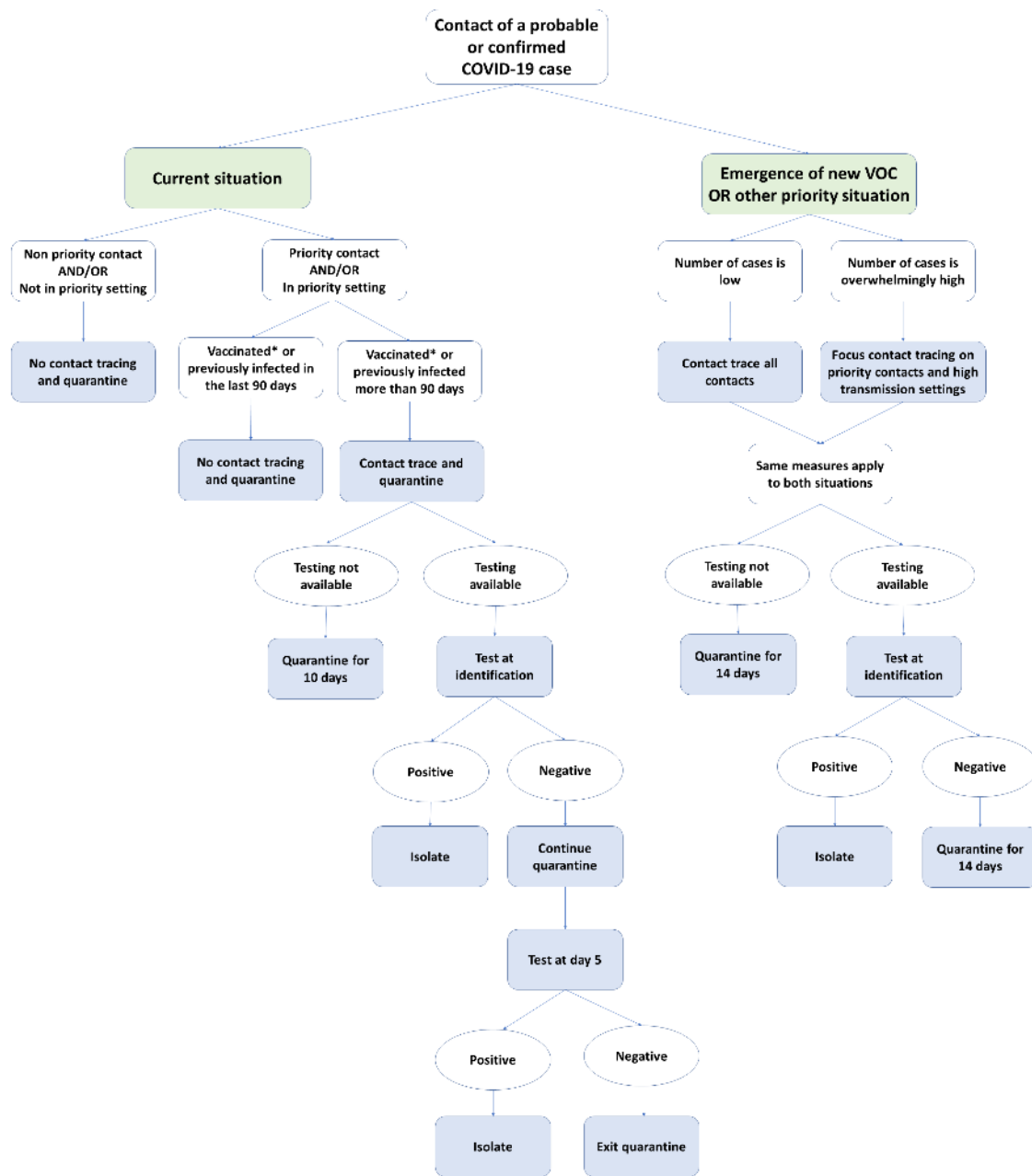
Contacts from workplaces and community settings, which have lower secondary attack rates, can be deprioritized. Nevertheless, workplaces and community settings are very diverse, and it is difficult to group them categorically into higher- or lower-risk settings. Consequently, general criteria such as close proximity, amount of time spent and ventilation conditions of the environment should be used to determine whether a setting represents a higher or lower risk for contacts. Countries can decide to expand the classification of priority settings with adequate justifications.

As above, if the caseload becomes sufficiently high to compromise healthcare and other essential service delivery, vaccinated health workers and other essential workers may be considered for shortened quarantine or to continue working with no quarantine if they are asymptomatic contacts. If reliable Ag-RDT testing is available for the new variant of concern, daily testing should be performed up to day 14 after exposure if contacts continue to work. All other precautions for health workers, as described above, continue to apply.

In addition to the three most likely scenarios described above, there is a possibility the emergence of an essentially totally new SARS-CoV-2 virus, for example emerging from an animal reservoir. This situation would effectively be a 'reset' and the total global population would be susceptible to the new virus. The contact tracing and quarantine measures to put in place would likely be similar to the 'worst-case' scenario but adapted to the epidemiological characteristics, such as the incubation period, of the novel virus.

The risk of the 'worst-case' and 'reset' scenarios highlight the importance of preserving the contact tracing workforce that countries have built over time since the beginning of the COVID-19 pandemic, as it is a valuable resource that might be needed in the future. This workforce was essential for the current pandemic and it lays the ground for preparedness plans for respiratory diseases as well as other pathogens with epidemic and pandemic potential. WHO encourages Member States to preserve it in order to be able to rapidly scale it up when needed.

**Figure 1:** Schematic presentation of the main contact tracing and quarantine recommendations in different epidemiological scenarios and for the different type of contacts.



\*Vaccinated with a complete primary series, or with a booster dose.

### Use of digital technologies for contact tracing

Since the start of the COVID-19 pandemic, countries have used innovative digital technologies to support the implementation of public health and social measures.<sup>40</sup> One of these technologies is digital proximity tracing (DPT), using smartphones or other purpose-built digital devices, which record anonymized physical proximity between individuals and issue alerts that can support contact tracing activities. However, given that digital proximity tracing is still an emerging technology, methods for assessing and monitoring its effectiveness are not yet consolidated. WHO, in collaboration with the European Centre for Disease Prevention and Control (ECDC), developed the first indicator framework to support countries in evaluating the public health effectiveness of digital proximity tracing solutions.<sup>41</sup> Additionally, WHO has provided interim guidance on ethical considerations to guide the use of these technologies for COVID-19 contact tracing, particularly the importance of respecting privacy and avoiding undue collection of personal data.<sup>42</sup>

If adequately implemented and broadly used by individuals, DPT applications can serve as an adjunct to manual contact tracing to facilitate interruption of virus transmission.<sup>43</sup> Several studies have been conducted to evaluate the performance of DPT applications,<sup>44–46</sup> but a systematic summary of this evidence is currently missing, and no major conclusions can be drawn, since the variables that influence the use and effectiveness of these application are legion.<sup>45</sup> Nevertheless, it is important to continue to explore leveraging technologies to supplement manual contact tracing activities, considering country capacities and resources, to establish sustainable public health systems that can maintain long-term COVID-19 control programs.

While many applications are focused on contact tracing, very few are dedicated to raising awareness and sharing information about the COVID-19 pandemic, public health and social measure in place or IPC methods to use for protection and during quarantine periods. WHO encourages Member States to explore, assess and implement digital technologies to support management of contact tracing, notification and effective public health messaging on COVID-19.

## International contact tracing

When a cluster or chain of SARS-CoV-2 transmission involves more than one country – including, for example, when cases are identified on conveyances, at points of entry, or in persons with a history of travel while being infectious – international contact tracing may be conducted. International contact tracing is in line with article 44 of the International Health Regulations (IHR, 2005), which requires that State Parties “undertake to collaborate with each other, to the extent possible, in the detection and assessment of, and response to, public health events”.<sup>47</sup> Nonetheless, at this stage of the COVID-19 pandemic, WHO does not recommend the international identification, contact, quarantine and follow-up of all individuals who were in contact with a confirmed or probable case of SARS-CoV-2 infection.

National authorities across countries may diverge in their assessment of needs and priorities as part of their overall national public health response to COVID-19. International contact tracing efforts need to be adapted to the epidemiological situation and local context within each country and be coherent with the overall national COVID-19 public health response strategies of involved countries.

In particular, international contact tracing may continue to be prioritized in those situations in which one or more of the countries involved in the travel journey have no cases, only imported/sporadic cases or a small number of clustered cases. In addition, it may be prioritized by countries in the context of the emergence of a new variant of concern. By contrast, in countries where community transmission is ongoing and/or where surveillance capacities are overwhelmed, international contact tracing activities may be challenging and may be of less public health value.

Where international contract tracing is conducted, national authorities may choose to give priority to contacts at high risk, as defined above. As stated earlier in this document, contact tracing may also be prioritized onboard conveyances that are considered high-risk settings, particularly those where people at high risk stay in close proximity during long periods of time and are at increased risk of exposure to SARS-COV-2 infection. When contacts are exposed onboard conveyances, collaboration between public health and other authorities at the point of entry, including transport authorities and conveyance operators, will be needed to access the necessary passenger information and to identify individuals at high risk. When contact tracing involves contiguous areas in two or more bordering countries, existing bilateral and/or multi-country agreements may facilitate international contact tracing.

International contact tracing should be rapidly coordinated in a collaborative manner through national IHR focal points (NFPs). The NFPs are accessible at all times and can receive direct support from the WHO IHR contact points, who are hosted by the six WHO Regional Offices.

Data protection must be considered throughout the contact tracing process. Whenever health information and/or personal details of an identifiable individual are exchanged between countries, these should be kept confidential in line with Article 45 of the IHR (2005), which calls for the following: “Health information collected or received by a State Party pursuant to these Regulations from another State Party or from WHO which refers to an identified or

identifiable person shall be kept confidential and processed anonymously as required by national law". The use of secure communication and encrypted and password-protected information is encouraged in these circumstances. According to Article 32 of IHR, in implementing health measures under these Regulations, States Parties shall treat travelers with respect for their dignity, human rights and fundamental freedoms and minimize any discomfort or distress associated with such measures.

## Process and methodology

For the purpose of updating the existing contact tracing and quarantine guidance, WHO formed a Contact Tracing and Quarantine Guideline Development Group (GDG) by inviting 10 external technical experts from relevant fields as subject matter specialists and two community representatives.<sup>48</sup> The GDG, together with WHO experts, assessed the needs and highlighted the gaps in the previous guidance and advised WHO to commission specific rapid literature reviews. The objective of the reviews was to compile the available evidence from the literature needed to update the contact definition, identify priority groups for follow-up and define quarantine duration and testing options as a general principle, and for vaccinated and previously infected individuals in light of current or new circulating variants. Several rapid reviews were conducted by the WHO rapid review team, and their results, together with the experience and expertise of GDG members, WHO staff and external contributors formed the basis for the recommendations in this document. Three external contributors from the United Kingdom Health Security Agency contributed to this guidance by sharing the results of a systematic rapid review of the literature on SARS-CoV-2 transmission from vaccinated individuals. They did not participate in the decision-making process for drafting of the recommendations. The Infection Prevention and Control GDG supported with consultations regarding IPC measures in quarantine and recommendations for health workers.

The rapid review team addressed a set of predefined research questions, included in Annex, by reviewing all relevant evidence available on the WHO COVID-19 Literature Database<sup>49</sup> through mid-November 2021. A specific search string was prepared for each research question, and the extracted references were screened with Rayyan<sup>50</sup> and DistillerSR<sup>51</sup> software. The articles included were critically appraised using the CASP checklist tool,<sup>52</sup> and data extraction was reported in a tabular format. The methodology and the results of the reviews were compiled and presented as a comprehensive review report to the GDG (available on request).

The Contact Tracing and Quarantine Steering Committee<sup>48</sup>, composed of WHO staff, addressed the research questions for Omicron evidence (from mid-November 2021 through the beginning of February 2022), following the same methodology described above. The CASP evaluation of Omicron evidence was not performed due to resource constraints. A summary of the review results is available on request.

All results were extensively discussed and revised through in-depth consultation with GDG members and WHO steering committee members during weekly meetings and via emails. When the evidence was scarce or inconclusive, the expert opinion of GDG members and other WHO technical staff, different from the steering committee members, helped inform the recommendations which were formulated by the GDG. All decisions taken by GDG members were discussed in online meetings. Most of the recommendations were formulated by consensus of all GDG members; where consensus was not reached, agreements were made by a simple majority vote.

Most of the available evidence on contact tracing and quarantine activities – given the diverse settings and modalities in which they were performed and the inconsistent testing and social and public health measures in place during different periods of the pandemic in different countries – is of observational nature and not easily generalizable.

## Plans for disseminating and updating

WHO will work closely with implementing partners to assist Member States to adapt this interim guidance to their national context. WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update.

## Contributors

WHO gratefully acknowledges the contributions of many individuals to the development of this guidance.

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## Declaration of interests

Declarations of interest were collected for all GDG members at the beginning of the guidance update process and renewed at the beginning of every meeting. The WHO steering committee reviewed all declarations and found no conflict of interest sufficient to preclude any GDG member from participating fully in the development of the guideline.

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## Annex

List of research questioned addressed by the rapid review team:

1. What is the incubation period in persons infected with SARS-CoV-2 Variants of Concern (VoC)?
2. What is the evidence on COVID-19 transmission in people infected with SARS-CoV-2 VoC? [type (if available) exposure, proximity, distance, contact, duration, setting]?
3. What is the definition of a contact of a confirmed or probable case infected with SARS-CoV-2 variants of concern?
4. What is the evidence that setting-based exposures can be used to classify contacts of varying risks (higher vs lower risk)?
5. What is the secondary attack rate for SARS-COV-2 for symptomatic and asymptomatic cases?
6. What is the risk of reinfection with SARS-CoV-2 (or VOC) and the evidence of onward transmission by reinfected individuals?
7. What is the evidence of waning immunity from vaccination or previous infection?
8. What is the evidence of benefits for backward contact tracing?
9. What is the evidence of testing contacts in order to shorten the quarantine period?