COVID-19

CONTACT TRACING IN THE CONTEXT OF COVID-19 IN THE REGION OF THE AMERICAS

Complement to the WHO Interim Guidance on Contact Tracing

March 2021

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Declaration of conflict of interests

The Pan American Health Organization staff who prepared this publication declare that they have no conflict of interests.

Summary of added topics included in this publication

The topics in this document complement the interim guidance published by the World Health Organization (WHO) on 1 February 2021, titled "Contact tracing in the context of COVID-19".[1] The structure of that document has been followed here.

Section 1. Building a contact tracing team

Added topics
• Tools, methodology, and examples for calculating and estimating the workforce • Obstacles to calculating and estimating the workforce

Section 2. Engaging communities

Added topic
• Expanding on key principles for engaging communities in contact tracing activities

Section 3. Adjusting contact tracing to epidemiological scenarios

Added topics
• Detailed explanation of different epidemiological scenarios • Detailed explanation and subclassifications of community transmission • Indicators for evaluating community transmission • Evaluating levels of community transmission • Examples and types of community transmission

Section 4. Steps for contact tracing

Added topics
• Reviewing exposure periods • Reviewing periods of investigation into the source of infection • Expanding on how to share information with contacts • Reviewing quarantine periods and quarantine compliance mechanisms • Process for monitoring of contacts in quarantine • Reviewing suggestions for collecting specimens from contacts

Section 5. Data processes and analysis

Added topics
• Explanation of key performance indicators (KPIs) for contact tracing programs • Explanation and suggestions on the use of KPIs in decision-making • Options for intensified contact tracing

[1] World Health Organization. Contact tracing in the context of COVID-19: Interim guidance, 1 February 2021. Geneva: WHO; 2021. Available at: https://www.who.int/publications/i/item/contact-tracing-in-the-context-of-covid-19

Introduction

This document complements the interim guidance published by the World Health Organization on 1 February 2021, titled *Contact tracing in the context of COVID-19.*[2] It presents findings from a meeting held with contact tracing experts representing different countries in the Region. The information and recommendations included here reflect evidence available at the date of publication provided by countries of the Region. This publication will be updated as new evidence becomes available.

Purpose

The publication provides operational considerations, with specific examples and mechanisms, in areas related to contact tracing in the Region of the Americas, particularly the following:

- Epidemiological scenarios
- Duration of quarantine and testing
- Calculating the workforce
- Quarantine compliance mechanisms
- Community engagement
- Key performance indicators (KPIs) for contact tracing programs in the COVID-19 context
- Backward (retrospective) tracing

Target audience

This document is aimed at national health authorities, public health professionals, and other officials involved in developing and implementing policies and standard operating procedures on contact tracing operations in the Americas.

Methodology

An online panel was held with experts from different countries of the Region on 11 and 12 March 2021, to formulate recommendations for contact tracing and its regional implementation. Panelists discussed points of interest from the WHO interim guidance published in February 2021, and the areas in which more information was needed. Annex 1 below features a report on the points analyzed during this expert meeting.

[2] Ibid.

1. Building a contact tracing team

1.1. Calculating and estimating the workforce

Calculation of the workforce necessary for performing the activities related to contact tracing varies from country to country, depending on a number of factors:

- Administrative structure of the country: coordination of contact tracing activities in each administrative area
- Availability of logistical resources (e.g., budget and trained contact tracers)
- Availability of technological resources
- Daily number of new cases and epidemiological scenario
- Number of contacts identified per each positive case
- Dynamics of the pandemic and workload
- Cultural and sociopolitical framework
- Contact tracing strategies (e.g., self-reporting, calls, and visits)

1.2. Tools for calculating and estimating the workforce

Based on the factors mentioned in topic 1.1, three steps can facilitate calculation of the necessary contact tracing workforce.

Step 1. Answer key questions before calculating the contact tracing workforce

Before making any calculations related to estimating the necessary workforce for contact tracing, it is important to analyze the following subjects with officials at the Ministry of Health or the health authority that coordinates contact tracing activities, based on the key questions set forth below (table 1).

Table 1. Key questions to calculate the contact tracing workforce

1. How many contacts (on average) does the program plan to trace nationally?	Will depend on the daily number of new cases, number of contacts identified per positive case, and agreed definition of "contact"
2. How often will these contacts be traced?	Daily, weekly, or other agreed frequency
3. How will the contact tracing be disaggregated at each administrative level?	Regional, provincial, municipal, and community levels, among others
4. How many contact tracing teams will be needed at each administrative level?	Will depend on the daily number of new cases, and number of contacts identified per positive case
5. How many contact tracers will be needed on each team?	Will depend on the availability of resources and working hours
6. How many contacts will each contact tracer follow?	Will depend on the availability of resources and working hours

As shown in table 1, the answers to questions 5 and 6 depend on the performance of the tracing team. Teams are more efficient when the same tracer takes charge of the case and the declared contacts, communicating with both groups when the majority of infections occur within families or workplace groups. In the case of the determination of contacts from the households themselves, a team's performance will depend on the isolation of these contacts and access to the community, with visits of approximately one hour in well-defined areas by teams that know the contacts. Contact tracing with non-family members (e.g., in the event of super-spreader events and closed or semi-closed groups) and with people who visit the area should also be considered, since their access to information and communication with the contact are different.

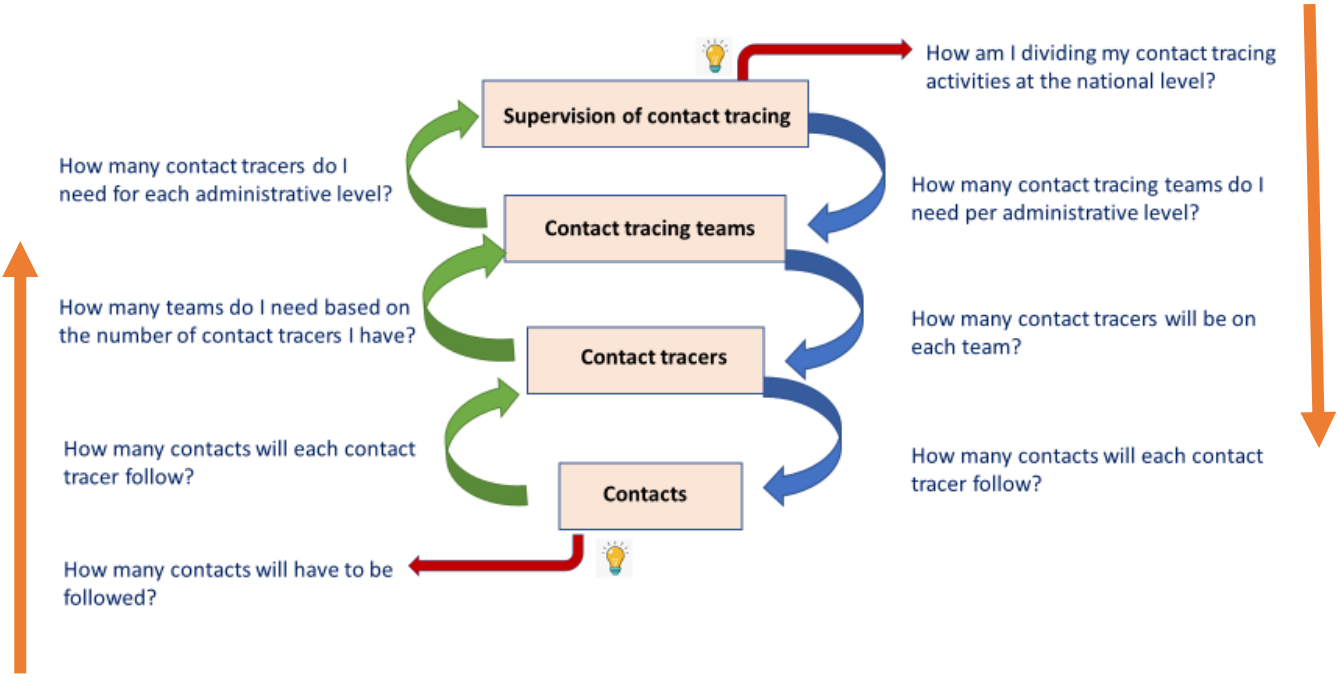
There should be a clear agreement on the responses to these questions, to structure and better organize the flow of contact tracing activities.

Step 2. Understand the flow of contact tracing activities

There are different levels in workforce calculation, depending on how the flow of contact tracing activities is structured nationally. It is important to draw up a flow chart that explains how these activities will be coordinated. The questions analyzed in step 1 will be useful for this. Figure 1 shows an example of how a flow chart for a contact tracing program can be structured at the national level, according to two different approaches: 1) considering how contact tracing activities are organized nationally as the starting point for the calculation; and 2) using the number of contacts to follow as the starting point for the calculation.

Figure 1. Approaches to the flow of activities and relevant questions for calculating the contact tracing workforce

Approach 1. Organization of contact tracing activities at the national level



Approach 2. Number of contacts to follow

The participation of local epidemiologists, as well as of cultural facilitators and people from the community, will be helpful in the logistics of creating these flow charts. In parallel, partnerships with community leaders, local authorities, and nongovernmental organizations will be also of great assistance in the cultural context. National officials, centralized committees, Ministries of Health and of Labor, and health planning officials will be in charge of reviewing local workforce requirements.

Step 3. Calculate the necessary workforce with the available methodology

Once an agreement has been reached on steps 1 and 2, calculating the workforce will be simpler. This can be done electronically or manually. In the former case, a number of tools are available on the Internet:

- COVIDTracer and the COVIDTracer Advanced tools, developed by the Centers for Disease Control and Prevention of the United States of America, available at: COVIDTracer and COVIDTracer Advanced
- Health Workforce Estimator (HWFE) tool of the WHO Regional Office for Europe, available at: https://www.euro.who.int/en/health-topics/Health-systems/pages/strengthening-the-health-system-response-to-covid-19/surge-planning-tools/health-workforce-estimator-hwfe
- Johns Hopkins Bloomberg School of Public Health's Contact Tracing Evaluation and Strategic Support Application (ConTESSA), available at: ConTESSA (shinyapps.io).
- Contact Tracing Staffing Calculator from the Resolve to Save Lives initiative, available at: Contact tracing staffing calculator | Prevent Epidemics

Manual calculation of the workforce can be carried out using the following method and formulas:

Method and relevant formulas

1 case = x contacts
1 contact tracer = y number of new cases daily = z contacts
1 contact tracer = z contacts

Example:

Country X is structured administratively as: country→ region→ province→ municipality.

It has been agreed with the Ministry of Health that contact tracing teams will be formed at the **municipal** level, with one contact tracing team per municipality.

Based on the consensus reached in steps 1 and 2, and using the formulas presented above, the following assumptions are made:

1 case = 5 contacts
1 contact tracer = 2 new cases daily = 10 contacts
1 contact tracer = 10 contacts

If municipality Y has approximately 100 cases:

1 case = 5 contacts
100 cases = 500 contacts

1 contact tracer = 2 new cases daily
100 new cases daily/2 cases per tracer = 50 tracers

Conclusion: Approximately **50** contact tracers will be needed to trace **500** contacts.

If country X has 20 municipalities, it will need:

- 20 contact tracing teams (1 team per municipality × 20 municipalities)
- 1000 contact tracers (50 tracers per team × 20 teams)
- To trace 10 000 contacts (1000 tracers × 10 contacts per tracer)

1.3. Challenges in calculating and estimating the workforce

Despite the different digital tools and methodological structures available to calculate the workforce, there are still many factors that can affect the numbers resulting from these calculations. Some of the obstacles reported were:

- Development of the epidemiological situation

- Number of contacts traced per case
- Availability of staff able to devote most of its work day to contact tracing
- Limited economic resources
- Digital tools that are inappropriate or too complex for the situation in the country
- Lack of methodological standardization at the national level
- A workforce that is being shifted from contact tracing to vaccination campaigns

These obstacles can be mitigated if: 1) there is clear communication between public health authorities and those coordinating contact tracing, from the very beginning of the pandemic; and 2) the appropriate steps for calculating the workforce are carried out according to the epidemiological scenario in each country.

2. Engaging communities

2.1. Key principles

Close and consistent engagement with communities is critical for successful contact tracing. Section 4 of the WHO interim guidance describes 11 key principles to be considered in community engagement. These include broad sensitization and community involvement in planning, selection of contact tracers, contact tracing methodologies, and channels of communication

In addition to these points, the following recommendations from the Region should be implemented:

- **Obtain the acceptance and approval of community leaders.** Engage early with local leaders to obtain their approval for any contact tracing activities to be carried out in the community. The approval of these community leaders will assist in gaining the confidence and respect of the community.
- **Support with basic resources.** In many communities, there is a lack of personal protective equipment, and the availability of basic products has become limited due to the pandemic. Offer communities practical incentives such as masks, hand disinfectant, food, or household items.
- **Improve risk communication.** Ensure that the community understands the purpose of contact tracing, and avoid any stigma associated with the different activities by presenting information sessions and disseminating educational material via social networks and signage, in which the purpose of contact tracing is explained to the community, providing guidelines to mitigate the risk of infection. Make sure that all contact tracing staff entering these communities is trained in the risk communication strategy.
- **Use formal entities, including neighborhood associations and patients associations.** These pre-existing associations, including local residents and people who have recovered from the illness, should be leveraged to disseminate information and unite the community.
- **Ensure the safety of contact tracers when they enter communities.** Not all communities are welcoming and open to working with people from the outside, especially those who view the contact tracing team as bringing in disease and stigmatization. Ensure that, in such communities, the contact tracers are accompanied by a group of trained security officers, in case of civil disturbances.
- **Lack of Internet access.** Not all communities where contact tracing is carried out have Internet access. If possible, it is advisable to equip contact tracers with Internet-accessible portable devices. If this is not an option, provide the tracers with sufficient materials (e.g., printed forms, paper, and ball-point pens) to compile all the data.
- **Include translators and community facilitators on the team.** The communities where contact tracing activities are planned do not necessarily all speak the same language. Rather than hiring outside translators, members of the community should be identified who can act as translators. This will also show a commitment to involving the community in all activities.

2.2. Access mechanisms

In their interactions with communities, contact tracing teams should seek to engage territorial and social organizations, and primary care organizations. It is important to involve community leaders from the beginning of the planning process, establishing a clear channel of communication. Education, awareness-raising, and training are essential for gaining access to communities, especially those in remote areas, and indigenous groups.

3. Adjusting contact tracing to epidemiological scenarios

3.1. Epidemiological scenarios

The Pan American Health Organization classifies the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) into four epidemiological scenarios (table 2). The fourth epidemiological scenario (community transmission) continues to be a challenge for the countries of the Region, and needs greater and more detailed attention.

Table 2. Epidemiological scenarios for contact tracing, according to SARS-CoV-2 transmission patterns

Epidemiological scenario	Description
No cases	A well-trained contact tracing workforce should be identified and ready to deploy and scale up (i.e., have the required tools) to respond to first cases.
Sporadic cases	Exhaustive contact tracing and case investigation for all cases is essential for rapidly halting transmission. Backward contact tracing may be an option.
Case clusters	Contact tracing is essential to reducing transmission within clusters and to identifying events that led to high levels of virus transmission. Public health and social measures can then be implemented to reduce the occurrence of such events.
Community transmission	Contact tracing remains an important activity in high-incidence scenarios where capacity to trace and follow up all contacts may be at the breaking point. Contact tracing activities should be specifically targeted, not abandoned. It is possible to prioritize tracing of higher risk exposure contacts (detailed in section 3.2) based on capacity. Annex 1 presents the elements to consider for prioritization and decision-making support in this context.

Source: Adapted from Contact tracing in the context of COVID-19: Interim guidance, 1 February 2021. Geneva: WHO; 2021. Available at: https://www.who.int/publications/i/item/contact-tracing-in-the-context-of-covid-19

3.2. Community transmission

Community transmission is subdivided into four classifications, summarized in table 3. Topic 3.2.3 presents examples and types of community transmission.

Table 3. Subclassifications of community transmission based on the incidence rate of cases and the level of risk for the general population in the context of the COVID-19 pandemic

Indicator	Definition
Community transmission – level 1 (CT1)	**Low incidence** of locally acquired, widely dispersed cases detected in the past 14 days, with many of the cases not linked to specific clusters; transmission may be concentrated in certain population sub-groups. Low risk of infection for the general population.
Community transmission – level 2 (CT2)	**Moderate incidence** of locally acquired, widely dispersed cases detected in the past 14 days. Moderate risk of infection for the general population.
Community transmission – level 3 (CT3)	**High incidence** of locally acquired, widely dispersed cases in the past 14 days; transmission widespread and not concentrated in population sub-groups.

	High risk of infection for the general population.
Community transmission – level 4 (CT4)	**Very high incidence** of locally acquired, widely dispersed cases in the past 14 days. Very high risk of infection for the general population.

3.2.1. *Indicators to evaluate community transmission*

Table 4 presents four suggested KPIs to classify community transmission.

Table 4. Epidemiological indicators and proposed figures for classifying community transmission levels in the context of the COVID-19 pandemic

Domain	**Indicator**	**Description**	**Limitations**	**Level of community transmission**			
				CT1	**CT2**	**CT3**	**CT4**
Hospitalization rate	New COVID-19 hospitalizations per 100 000 population per week, averaged over a two-week period	A subset of all incident cases requiring hospitalization; thus, an indirect indicator of incidence, unlikely to be subject to surveillance policy changes/differences	Delayed measure of incidence. May be influenced by hospitalization capacity and policy decisions; e.g., if mild cases are hospitalized for isolation	<5	5-<10	10-<30	≥30
Mortality	Number of COVID-19 attributed deaths per 100 000 population per week, averaged over a two-week period	A subset of all fatal incident cases; thus, an indirect indicator of incidence, minimally influenced by surveillance policy if testing is comprehensive	Delayed measure of incidence. Small populations and small geographical regions can be sensitive to minor fluctuations (e.g., one versus two deaths). Population with higher risk for COVID-19	<1	1-<2	2-<5	≥5
Case incidence	New confirmed cases per 100 000 population per week, averaged over a two-week period	Direct indicator of incidence	Heavily influenced by surveillance system performance, testing policy and laboratory capacity. Small populations and small geographical regions can be sensitive to minor fluctuations in case counts, particularly due to batch reporting	<10	20-<50	50-<150	≥150
Testing	Test positivity proportion from sentinel sites, averaged over a	Not influenced by surveillance capacity or strategy; minimally influenced	May not be representative of the general population if there are only limited	<2%	2%-<5%	5%-<20%	≥20%

	two-week period	by testing strategy or capacity	sentinel sites. May miss mild or atypical cases if testing criteria require influenza-like presentation				

CT: community transmission. COVID-19: Coronavirus-2019, the disease caused by the novel coronavirus

These four indicators are based on data that should be compiled systematically during the pandemic. The relative importance of each indicator will vary with the local context (e.g., validation of the data collected for each indicator), and the limitations described should be taken into account to interpret each indicator. Indicators should be measured at the lowest administrative level possible to provide evidence for specific public health interventions. If there are difficulties in accessing this information at the lowest administrative level, it is recommended to add data from the most complete administrative level available or to establish support parameters for the administrative levels.

To classify transmission at a higher administrative level, a separate analysis should be conducted using indicators for that administrative level, instead of trying to add lower-level subclassifications of transmission.

These indicators should be used together with other available epidemiological information, either systematically or through special studies (e.g., studies conducted by universities) or model estimates. Non-epidemiological data and other considerations should also be included, for evidence-based strategic and operational decisions.

These indicators should be evaluated every 15 days, based on the definition of epidemiological week used in the country.

3.2.2. *Evaluation of the community transmission level*

The ranges for the four indicators (table 4) were developed through a review of the existing data and may be used for the subclassification of transmission at subnational levels. These ranges are approximate and may require adjustments according to local contexts, based on the performance (for example, sensitivity and representativeness) of the local surveillance system and the testing strategy, and should be reviewed periodically. Caution must be exercised when interpreting changes in indicators that occur in the context of changes in the surveillance system (e.g., an increase in the testing rate, or a change in the population under surveillance). Some indicators (such as general incidence) may be higher in the presence of very large clusters (such as super-spreader outbreaks) than during community transmission.

It is useful to monitor the testing rate as a measure of surveillance coverage; a recommended minimum rate is at least one test per 1000 inhabitants per week. Tests should not be limited to specific populations (for example, only those in urban areas with good access to testing). The denominator data should be available at the level of disaggregation being evaluated (e.g., district or province). Some authorities may opt to monitor these indicators in people at higher risk of severe disease and death.

Once all of the available indicators are calculated, if the levels for each indicator are different, then a qualitative review should be conducted to determine the final classification of transmission. If data are not available for all indicators (or if they are untrustworthy), then more emphasis should be placed on the indicators considered most reliable in the local context.

In places where the values of the indicators are not reliable but the system is stable, trends can be used for an alternative evaluation. An example would be a situation in which the testing rate is very low and many cases are likely being missed, but the testing strategy has not been modified. Another example would be a situation in which it is not indicated whether tests are being carried out in higher risk groups.

Annex 2 presents other indicators that can provide additional evidence to help classify the transmission level. However, these indicators may not be easily available at the lowest administrative level. Consequently, they are considered secondary to the four KPIs listed in table 4. Furthermore, it is possible that they do not reflect directly the transmission or the strength of SARS-CoV-2 infection, or they may be more difficult to interpret and compare than those listed in table 4. Ranges are not presented for these secondary indicators due to the lack of available data, high local variability, or both.

As a last resort, when values are not available for an indicator, other options can be used: 1) subjective evaluation, but this should be carried out over several weeks to avoid the influence of transitory or anecdotal observations; and 2) excess deaths, if there is not a robust mortality information system.

3.2.3. *Examples and types of community transmission*

Examples of community transmission were reported in different countries of the Region. Table 5 summarizes different settings and examples of community transmission, organizing them into 14 categories. The list is specific to community transmission, and excludes households and close contacts.

Table 5. Categories and examples of settings for community transmission of COVID-19

Category	**Settings and examples**
Recreational facilities	Cinemas and theaters, casinos, discotheques, clubs, bars, ice skating rinks, bingo halls, museums, concert halls, parks, stadiums, and hair salons
Events	Weddings, funerals, social gatherings, house parties, break rooms, local festivals, and sporting events
Community living	Shelters, hotels, motels, university residences, and collective dwellings (low-income housing, such as *cités* and *conventillos*)
Educational institutions	Schools (kindergarten, primary, and secondary), universities, summer camps, and vocational education centers
Food service establishments	Restaurants, bars, cafeterias, markets, and fairs
Long-term care establishments	Nursing homes, retirement homes, and care homes for children and adolescents
Health services establishments	Hospitals, public and private clinics, community health centers, testing centers, health residences, and specialized centers
Places of worship	Churches, synagogues, and mosques
Workplaces	Offices, meeting rooms, construction sites, factories, and agricultural workplaces
Means of transportation	Buses, taxis, trains, subways, airplanes, ships, and cruise liners
Penitentiary institutions	Prisons
Undetected imported cases	Refugee and migrant populations
Sporting establishments	Clubs, gyms, and swimming pools
Establishments of the armed forces and security services	Police and military posts

4. Steps for contact tracing

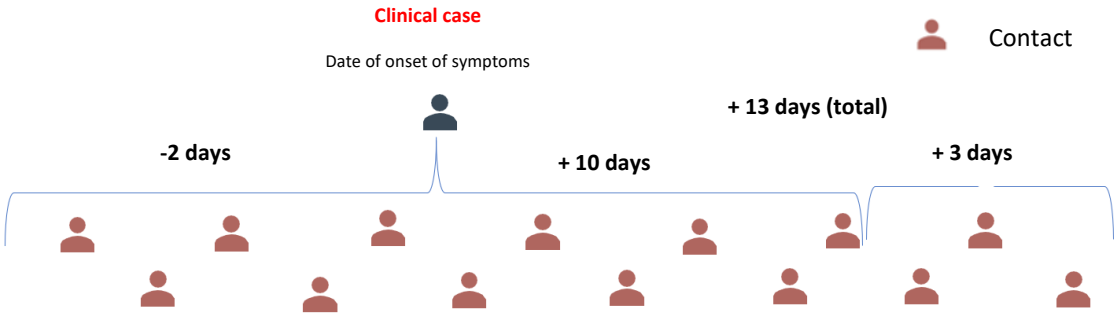
4.1. Exposure periods

Contact tracing starts once a case of COVID-19 is confirmed. The definition of "contact" can be found in the WHO interim guidance on contact tracing.[3]

The exposure must have occurred during the infectious period of the case; the following definitions are recommended for exposure periods.

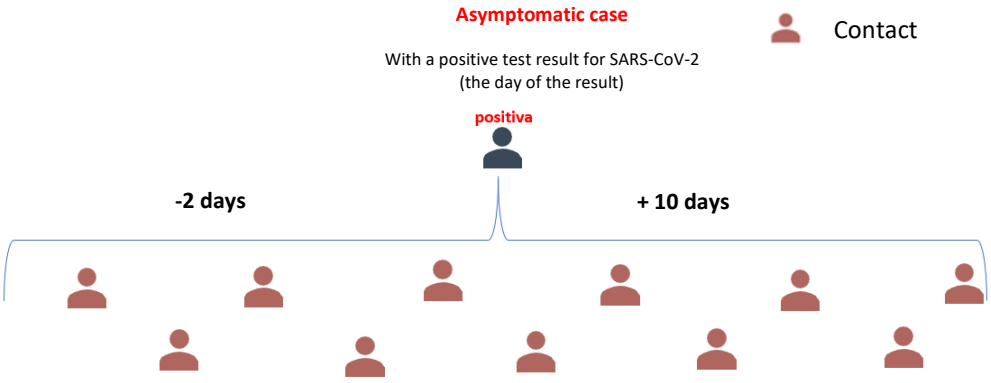
Exposure to a symptomatic case: two days before and 10 days after the onset of COVID-19 symptoms, plus at least another three days without symptoms (in particular, fever or respiratory symptoms), during a minimum total of 13 days after onset of symptoms (figure 2).

Figure 2. Periods of exposure for clinical cases in the context of the COVID-19 pandemic



Exposure to an asymptomatic case: two days before and 10 days after the date on which the specimen was taken that confirmed the diagnosis. These contacts should be treated just like a symptomatic case (figure 3).

Figure 3. Periods of exposure for asymptomatic cases in the context of the COVID-19 pandemic



SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.

[3] Ibid.

4.2. Investigating the source of infection

The WHO publication that serves as the basis for this technical document[4] recommends conducting an investigation into the source of infection beginning from up to 14 days before the onset of symptoms in the index case (or diagnosis of an asymptomatic case).

However, investigation on the source of infection can focus on the period beginning seven days before symptom onset (or diagnosis, in an asymptomatic case).

Although other, different periods (in days) have been reported in the Region, the two investigation periods mentioned in this section are recommended.

4.3. Notifying contacts

The information that should be shared with contacts is detailed in the WHO interim guidance for contact tracing. However, it is important to explain the different methods of notifying contacts. The scenarios presented below will vary from one country to another, and will depend a great deal on the strategies and internal processes for storing private data and communicating information.

- **The case is in charge of notifying the contact.** In places where stigma and data privacy are considered very important factors, cases may be asked to directly notify the people with whom they have been in contact.
- **The health system notifies the company where the contact works.** If a case was reported in a workplace, the health system may directly notify the company of the exposure, allowing the company to follow its internal communication guidelines, as long as they are aligned with the health authority's own policy.
- **The investigation team calls the contact or makes an in-person visit.** After investigating the case and identifying all those exposed, the investigation team calls the contacts or visits them in their homes.

4.4. Quarantine and quarantine compliance mechanisms

4.4.1. *Definition of quarantine and isolation*

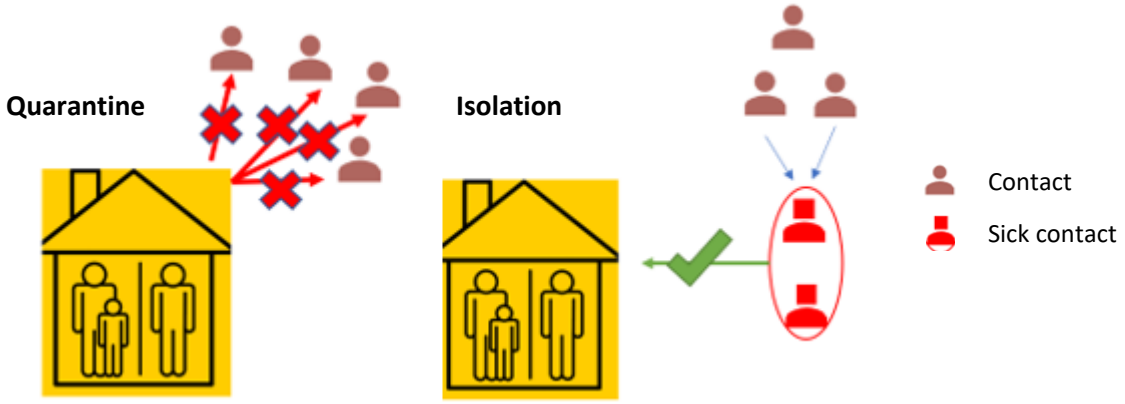
It is important to be aware of the difference between "quarantine" and "isolation", since this will facilitate contact tracing (figure 4).

Quarantine: Separates people who have had close contact with someone with COVID-19, to determine whether they develop symptoms or test positively for SARS-CoV-2. Quarantine also reduces transmission risk, if it is later discovered that a quarantined person has COVID-19.

Isolation: Separates people who are sick or have presented symptoms, so that they do not infect others.

[4] Ibid.

Figure 4. Difference between the definitions of quarantine and isolation in the context of the COVID-19 pandemic



4.4.2. *Quarantine periods*

To diminish transmission risk, WHO recommends maintaining quarantine for 14 days after last contact with a confirmed case. Quarantine periods may be classified as follows:

- Shortened quarantine: 10-day quarantine for contacts who have not presented symptoms; confirmation test not necessary.
- Full quarantine: 14-day quarantine, regardless of whether the contact presented symptoms; confirmation test not necessary.

4.4.3. *Quarantine compliance mechanisms*

Quarantine compliance is essential to reducing transmission of the virus, but there are major obstacles when asking people to comply. Those receiving an order to enter quarantine may resist following government directives, because limits on their movements disrupt their daily lives. Different mechanisms are recommended to ensure quarantine compliance, which will be different in each country.

- **Educate the public about the infection and quarantine protocol.** A lack of clear instructions on how to live in quarantine can lead some of those affected to invent their own rules. Educational materials about the virus and the quarantine strategy should be provided to the public (using such channels as television, radio, social media, and health care providers). If the population understands what quarantine is, what its goals are, and what can be expected from it, adherence to the protocol will be significantly greater.
- **Leverage existing social standards.** Social standards can play a major role in quarantine compliance. For example, peer pressure can be useful for achieving adherence to quarantine. The country's existing social norms should be leveraged to promote community members' compliance with the quarantine period. For example, if the head of household has a favorable opinion about quarantine, then the rest of the family probably will, as well, and will adhere to the protocol. It is also important to recognize the importance of the collective commitment to protecting the community, and the measures that are adopted in these situations.
- **Strengthen penalties and compliance with the law.** Many places have used strict laws to guarantee quarantine compliance, including high fines, imprisonment, and other penalties. Laws should be enacted and enforced that clearly establish the definition of "quarantine" (volunteer or compulsory) and the penalties for failure to comply. It is important to clearly define the meaning of the term "voluntary quarantine", to avoid leaving adherence to the measure at the discretion of the population.
- **Create legal protections for workplace safety and income replacement.** The need to work and the fear of income loss have been reasons for not respecting quarantine protocols. The necessary legislation should be

enacted to provide legal protection in the area of workplace safety and to guarantee income levels affected by quarantine. Furthermore, doubts must be dispelled to clarify channels for redress in managing legal protection regarding workplace safety.

- **Communicate the benefits of quarantine.** People who benefit from quarantine are more likely to be compliant. It is useful to establish constant communication with the public (weekly or monthly) to show how quarantine compliance has led to a reduction in disease transmission. Perception of the possibility of avoiding others during the quarantine period has also been associated with compliance.
- **Promote perception of risk regarding the outbreak of disease.** People who perceive a disease outbreak as more dangerous (in terms of transmission of the disease and it severity) are more likely to comply with quarantine. Official means of communication should be used to disseminate information about the risks related to the disease (including symptoms, modes and places of transmission, and the evolution and severity of the outbreak).
- **Address practical issues related to quarantine.** The reasons why people do not comply with quarantine include trips to buy food and supplies, seeking medical care, or factors related to their household situation. Ensure that people in quarantine have access to basic supplies (for example, provide a daily food basket and essential supplies), and set up a medical hotline exclusively for those in quarantine who need urgent care. For those people who cannot comply with quarantine orders at home, temporary collective housing can be provided (examples include government buildings and other available installations, which should be as similar as possible to household conditions) where food and shelter can be provided to those who must go into quarantine.

  Here is a summary of the suggested quarantine compliance mechanisms in the context of the COVID-19 pandemic:

  - Provide a simple and timely justification for quarantine.
  - Deliver clear information on the quarantine protocol.
  - Point out the benefit of quarantine for public health (in particular, for high-risk groups) and emphasize its importance.
  - Make sure to provide sufficient food supplies and medical, social, and logistical support.
  - Resolve doubts and support contacts in this complex situation.

It is important to mention here that contact tracers must be trained in ethical considerations, such as data confidentiality, and in reassuring their contacts that the data collected are confidential and will not be disseminated.

4.5. Quarantine follow-up and contact tracing

Once the cases are identified and the investigation teams have traced all of the individuals who have been in contact with these cases, the next step is to monitor the development of symptoms. The WHO publication that serves as a basis for this document has recommended daily follow-up with contacts during 14 days; however, these guidelines have been modified due to limited resources, the number of cases identified, the stigma regarding contact tracing, and the disruption in household dynamics, as described in table 6.

Table 6. Suggested strategies for the frequency, duration, and means of communication used for contact follow-up in the context of the COVID-19 pandemic

Frequency of contact	Duration of follow-up	Means of communication	Recommendations
Daily	14 days	• Telephone calls • Home visits • Both	If possible, given the country's epidemiological situation: • Daily home visits for 14 days If impossible due to the country's epidemiological situation: • Days 1, 3, 5, 7, 9, 11, and 13: home visits • Days 2, 4, 6, 8, 10, 12, and 14: telephone calls
Daily	10 days[a]	• Telephone calls • Home visits • Both	If possible, given the country's epidemiological situation: • Daily home visits for 10 days, and monitoring the four remaining days If impossible due to the country's epidemiological situation: • Days 1, 3, 5, 7, and 9: home visits • Days 2, 4, 6, 8, and 10: telephone calls
Days 1, 6, 8, and 14	14 days	• Telephone calls and home visits	Monitor contacts on days 6, 8, and 14, **including at least one home visit** This strategy is recommended at the peak of a wave
Days 1, 6, 8, and 10	10 days[a]	• Telephone calls and home visits	Monitor contacts on days 6, 8, and 10, **including at least one home visit** This strategy is recommended at the peak of a wave

[a] Although the follow-up period is 10 days, monitoring continues until day 14.

The monitoring phase ends once the quarantine period is finished, or if the contact presents COVID-19 symptoms and is confirmed as a positive case.

4.6. Collecting specimens from contacts

The presence of symptoms continues to be the indicator for collecting specimens from contacts. In countries where specimens are collected from contacts who present symptoms or develop them during follow-up, this should be done as soon as possible. In other countries, taking specimens from contacts is neither compulsory nor necessary, since contacts who present COVID-19 symptoms become probable cases, so testing is not carried out.

There are cases in which the procedure is that on the seventh day after the last contact with a confirmed case, all of the case's asymptomatic contacts fill out an epidemiological form and specimens are taken by nasal or oropharyngeal swab to screen for viral antigens using a polymerase chain reaction (PCR) test.

5. Data preparation and analysis

5.1. Key performance indicators for contact tracing programs

The WHO publication on which this document is based[5] mentions seven KPIs for contact tracing programs. In the Region of the Americas, prioritization of data collection is recommended for the three indicators presented in table 7.

Table 7. Priority KPIs for data collection to evaluate the performance of contact tracing programs in the context of the COVID-19 pandemic

Indicator	Necessary variables	Formula
% of new cases arising from known contacts	• Number of new cases who were contacts • Total new cases	Number of new cases who were contacts _____ *X 100* Total new cases
% of contacts provided with information on quarantine within 48 hours of confirmation of the index case	• Number of contacts who received information within the 48 hours • Total number of contacts who received information	Number of contacts who received information within 48 hours _____ *X 100* Total number of contacts who received information
% of contacts breaking quarantine	• Number of contacts who agree to comply with quarantine • Total number of contacts	Number of contacts who agree to comply with quarantine _____ *X 100* Total number of contacts

The indicators presented in table 7 can be calculated for each administrative level at which data are compiled; they can also be calculated at the national level. Weekly evaluations of the information compiled about these indicators are recommended, to ensure that the contact tracing program is working efficiently.

5.2. Using the indicators for decision-making

Once calculated, the performance indicators can be presented in documents or tables to be shared internally; ideally, they should be uploaded to an open-access platform. These indicators can also be included in situation reports or executive summaries, to assist health authorities in evaluating the program's progress.

At the local level, some institutions have platforms for contact tracing registry and follow-up and carry out their own calculation of indicators, which should be reported periodically to authorities at higher levels.

The figures from these indicators can be used to take corrective action, to evaluate the effectiveness of non-pharmacological measures, and to make planning decisions regarding confinement measures and other non-health areas.

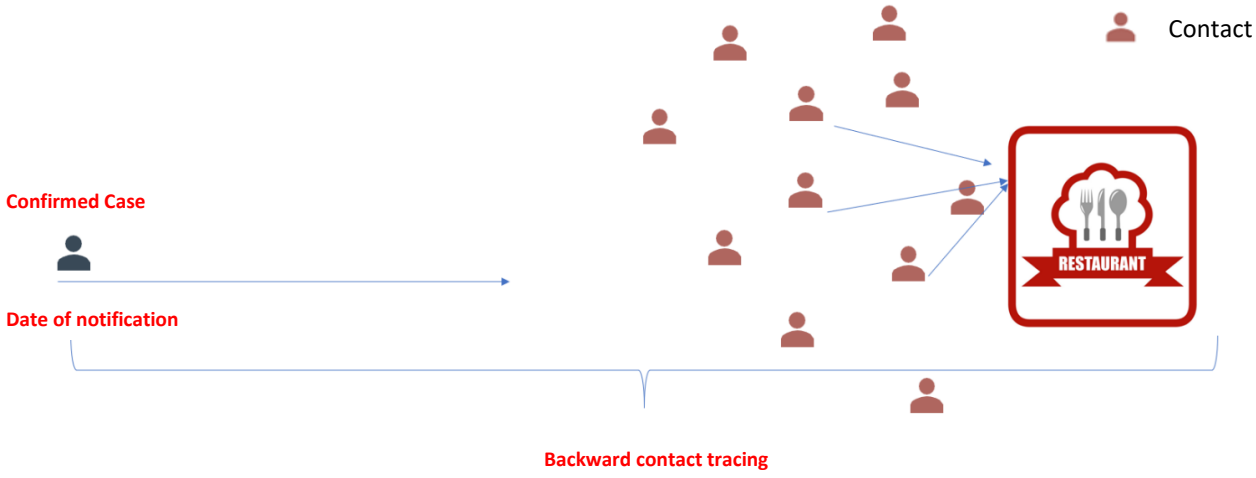
[5] Ibid.

6. Options for intensified contact tracing

6.1. Backward (retrospective) contact tracing

Backward (retrospective) contact tracing is the process of identifying the source of infection of a case under investigation, in order to detect more cases and contacts. This is in contrast to the usual form of prospective contact tracing, which focuses on detecting cases exposed recently (also in the past), who are then instructed to quarantine, to halt transmission. The underlying idea of backward contact tracing is that a relatively small proportion of cases can trigger a massive outbreak of the virus (figure 5).

Figure 5. Backward contact tracing in the context of the COVID-19 pandemic



If the public health authorities can locate the source of infection of a case currently under investigation, it is then possible to detect other cases. This process is especially useful when investigating community transmission.

A secondary benefit of these investigations is that they can also provide information on the circumstances and settings that are relevant to the pandemic's spread.

Public health authorities are advised to ask cases under investigation whether they attended any events one or two weeks before developing symptoms—especially if such events occurred in settings where they could enter into contact with an infected person, which could involve a risk high of transmission.[6]

[6] European Centre for Disease Prevention and Control. Contact tracing: Public health management of persons, including healthcare workers, who have had contact with COVID-19 cases in the European Union, third update, 18 November 2020. Solna: ECDC; 2020. Available at: https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-contact-tracing-public-health-management-third-update.pdf

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World Health Organization. Contact tracing in the context of COVID-19: Interim guidance, 1 February 2021. Geneva, WHO; 2021. Available at: https://www.who.int/publications/i/item/contact-tracing-in-the-context-of-covid-19

World Health Organization. Global surveillance for COVID-19 caused by human infection with COVID-19 virus: Interim guidance, 20 March 2020. Geneva, WHO; 2020. Available at: https://apps.who.int/iris/bitstream/handle/10665/331506/WHO-2019-nCoV-SurveillanceGuidance-2020.6-eng.pdf

World Health Organization. Laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases: Interim guidance, 19 March 2020. Geneva, WHO; 2020. Available at: https://www.who.int/publications/i/item/10665-331501

World Health Organization. Protocol to investigate non-seasonal influenza and other emerging acute respiratory diseases. Geneva, WHO; 2018. Available at: https://apps.who.int/iris/handle/10665/275657

Annex 1. Community transmission: Elements to consider when prioritizing and supporting decision-making in this context

Decisions to introduce, adapt, or improve public health and social measures (PHSMs), or to expand the capacity of the health system, should be based on an analysis of the transmission level, the health system's response capacity, and other contextual factors.

Based on an evaluation of all these factors, a situational level should be assigned to a geographical area in order to determine whether and how PHSMs should be adjusted (table A1). The evaluation should be strengthened by studying quantitative and qualitative information from multiple sources, which should be cross-checked to provide additional verification of the situational level evaluated. The resulting situational levels should be considered merely indicative, because they may not represent a good fit for the response required in a specific context. For example, in a small island developing State with limited capacity, strict measures may be justified with a relatively low transmission level.

Indicators should be monitored regularly (for example, every 15 days) and the situational level should be evaluated accordingly in order to determine the suitability and impact of the measures taken and to anticipate future changes.

Table A1. Evaluation matrix to determine the situational level, using indicators of transmission level and response capacity to guide adjustments to public health and social measures

	Response capacity		
Transmission level	Appropriate	Moderate	Limited
No cases	0	0	1
Imported and sporadic cases	0	1	1
Case clusters	1	1	2
CT1	1	2	2
CT2	2	2	3
CT3	2	3	3
CT4	3	3	4

CT: community transmission.

In table A2 the considerations are shown for the implementation of PHSM, by situational level.

Table A2. Considerations regarding the implementation of PHSM for each situational level

Situational level	**Considerations for the implementation of PHSM, by situational level**
Situational level 0: No known transmission of SARS-CoV-2 in the preceding 28 days. The health system and public health authorities are ready to respond, but there should be no restrictions on daily activities.	Surveillance should ensure that any new case can be detected and managed as early as possible, but there should be no restrictions on daily activities. Authorities may consider implementing the following measures: • Continue strengthening emergency preparedness and response, ensuring adequate stocks of medicines and medical equipment, and sufficient staff to deal with the anticipated increased workload. • Promote basic individual precautionary measures: hand hygiene, cough etiquette,[a] staying at home and wearing a mask if unwell, and voluntary physical distancing. • Implement robust surveillance to make sure any suspected cases/clusters are detected and managed early. Ensure implementation of such PHSM as contact tracing and appropriate isolation and quarantine of cases and contacts, to reduce transmission. • Travel outside the area should be permitted as per national policy; attention should be

Situational level	Considerations for the implementation of PHSM, by situational level
	given to the risk of travelers coming in from areas with a higher incidence of the disease introducing the virus. • Provide clear information to the public on what to do if unwell and whom to contact for advice, testing, and/or treatment.
Situational level 1: Basic measures are in place to prevent transmission; or if cases are already present, the epidemic is being controlled through effective measures around the cases or clusters of cases, with limited and transient localized disruption to social and economic life.	Specific measures should be adopted around cases and clusters of cases, strengthening individual measures, with limited and localized disruption to social and economic activities. In addition to emergency preparedness and response and surveillance measures, individual precautionary measures, and risk communication, authorities may consider implementing the following measures: • Emphasize case and cluster detection, investigation, and contact tracing. • Individuals should apply precautionary measures and behaviors such as hand hygiene, cough etiquette, staying home if unwell, wearing a mask where appropriate, and physical distancing. • Promote avoidance of the "3 Cs": closed spaces, crowded places, and close-contact settings. • Daily activities and services, such as educational settings, businesses, and leisure/tourism can remain open with safety measures in place to limit the risk of spread. • Measures should be in place to protect the most vulnerable, particularly to ensure appropriate measures for those in long-term care and other residential facilities.
Situational level 2: Low community incidence or a risk of community transmission beyond clusters. Additional measures may be required to control transmission; however, disruptions to social and economic activities can still be limited.	Measures should be implemented to limit the number of social encounters in the community, while ensuring that services can remain open, with safety measures in place. A wider range of measures may be required to control transmission. In addition to measures on emergency preparedness, response, and surveillance, individual precautionary measures, and risk communication, authorities may consider implementing the following measures: • Education settings remain open, with infection prevention and control measures in place • Businesses remain open, with safety measures in place, and teleworking encouraged to the utmost. • Individuals should apply individual precautionary measures and behaviors such as hand hygiene, cough etiquette, staying home if unwell, wearing a mask where appropriate, physical distancing and avoiding the "3 Cs". • Limit the size of social and other mass gatherings. • Stronger measures may be necessary to protect the most clinically vulnerable, with strict personal protection measures, heightened surveillance, and management of visits in long-term care and other residential facilities.
Situational level 3: Community transmission with limited additional capacity to respond and a risk of health services becoming overwhelmed. A larger combination of measures may need to be put in place to limit transmission, manage cases, and ensure epidemic control.	All PHSM should be strengthened at this level, to avoid greater restrictions on movement and the other related measures implemented at level 4. All individuals should reduce their social contacts, and some activities may need to close while allowing for essential services, particularly schools, to remain open. In addition to measures on emergency preparedness, response, and surveillance, individual precautionary measures, and risk communication, authorities may consider implementing the following measures: • Closure of non-essential businesses or remote working, as much as possible. • Individuals should apply individual precautionary measures and behaviors such as hand hygiene, cough etiquette, staying home if unwell, wearing a mask where appropriate, physical distancing, and avoiding the "3Cs". • Limit in-person university teaching, and institute e-learning. • Childcare services and primary and secondary schools should remain open with adequate safety and surveillance measures in place, as long as the local context allows. Continuity of children's education, for their overall wellbeing, health, and safety should be at the

Situational level	Considerations for the implementation of PHSM, by situational level
	forefront of all relevant considerations and decisions. • Evaluate holding sporting and similar events, using a risk-based approach; if they are held, strict safety rules must be enforced, and no spectators allowed. Other mass meetings should be suspended, with a limited size for all social gatherings.
Situational level 4: An **uncontrolled epidemic with limited or no additional health system response capacity available, thus requiring extensive measures to avoid overwhelming of health services and substantial excess morbidity and mortality.**	Reducing transmission in the community will be challenging at this level; more stringent movement restrictions and related measures may be needed to significantly reduce the number of in-person encounters. Such measures should be geographically limited to where needed, and be as short as reasonably possible. In addition to measures on emergency preparedness, response, and surveillance, individual precautionary measures, and risk communication, authorities may consider implementing the following measures: • Individuals should stay at home and limit social contact with people outside the household. • Essential workers will need to continue activities, with maximum support and safety measures in place. • Closure of non-essential businesses or remote working. • Consider all options for continuity of in-person learning; if this is not possible, limit in-person contact. These options include in-person teaching, and combined or remote learning strategies that limit the number of persons on site (exceptions could include the children of essential workers and their teachers). The closure of educational facilities should only be considered when there are no other alternatives. • All long-term care and other residential facilities should consider strict measures to limit the risk of infection, such as prohibiting in-person visitors.

[a] Pan American Health Organization. Infographic: COVID-19. Cover your cough. Washington D.C.: PAHO; 2020. Available at: https://www.paho.org/en/documents/infographic-covid-19-cover-your-cough

Annex 2. Additional epidemiological indicators to evaluate the level of community transmission of COVID-19

Indicator	Description/limitations
Proportional occupancy of intensive care units (ICU)	The proportion of new ICU admissions attributed to COVID-19, out of all ICU admissions for the same period (alternatively, proportion of current ICU beds occupied by patients with COVID-19, out of all occupied ICU beds).
Effective reproductive number (Rt)	The average number of secondary cases per infectious case in a population made up of both susceptible and non-susceptible hosts, during the previous one or more epidemiological weeks. While this is a widely used indicator of transmission, it requires familiarity with the various methods for calculation and sufficiently reliable and timely data on incidence.
Doubling time	The number of days required to double the total cumulative number of cases; this is linked to Rt.
Proportion of unlinked cases among new cases	The proportion of cases not previously listed as contacts (alternatively, the proportion not linked to known clusters/transmission chains). It is a measure of the spread in the community beyond known clusters, and heavily influenced by case investigation and contact tracing capacity.
Overall (non-sentinel) test positivity	May be useful if there are limited sentinel sites, and may capture atypical cases better than sentinel surveillance; heavily influenced by testing strategy and capacity.
Influenza-like-illness (ILI) or severe acute respiratory infection (SARI) trends	Not directly indicative of COVID-19 cases, but sentinel surveillance for ILI and SARI can also capture a proportion of COVID-19 cases, and thus is useful for monitoring trends for COVID-19. This measure may be helpful where COVID-19-specific surveillance is not robust.
All-cause hospitalization rate trends	Not directly indicative of COVID-19 hospitalizations, but where COVID-19 cases make up a substantial proportion of overall hospitalizations, this measure can be useful for identifying trends in COVID-19 cases. These rates may decline due to restricted service provision and other public health measures. Trends must be analyzed in the context of other potential causes of changes in hospitalization rates (e.g., concurrent influenza circulation). These trends may be helpful where COVID-19-specific surveillance is not robust.
All-cause (excess) mortality trends	Not directly indicative of COVID-19 cases/deaths, but where COVID-19 deaths make up a substantial proportion of overall deaths, this measure can be useful for identifying trends in COVID-19 cases. Trends must be analyzed in the context of other potential causes of changes in mortality rates (e.g., concurrent influenza circulation); ideally, they should be compared with baseline data on mortality to identify excess above expected (e.g., seasonal) fluctuations. While this is a widely used indicator of transmission, it requires careful consideration of the inherent biases in mortality estimation methods. These trends may be helpful where COVID-19-specific surveillance is not robust.