



## COVID-19

# Clinical Questions about COVID-19: Questions and Answers

Updated Apr. 8, 2022

CDC's [COVID-19 Community Levels](#) recommendations do not apply in healthcare settings, such as hospitals and nursing homes. Instead, healthcare settings should continue to use [community transmission rates](#) and continue to follow CDC's infection prevention and control recommendations for healthcare settings.

## COVID-19 Risk

Who is at risk for infection with SARS-CoV-2, the virus that causes COVID-19? 

Currently, those at greatest risk of infection are persons who have had prolonged, unprotected close contact (i.e., within 6 feet for 15 minutes or longer) with a patient with confirmed SARS-CoV-2 infection, regardless of whether the patient has symptoms. Persons frequently in congregate settings (e.g., homeless shelters, assisted living facilities, college or university dormitories) are at increased risk of acquiring infection because of the increased likelihood of close contact. Those who live in or have recently been to areas with sustained transmission may also be at higher risk of infection. All persons can reduce the risk to themselves and others by wearing a mask, practicing physical distancing, washing their hands often, and taking [other prevention measures](#). For more information, see [Risk Assessment and Your Health](#).

Who is at risk for severe COVID-19? 

Among adults, the risk for severe illness from COVID-19 increases with age, with older adults at highest risk. Severe illness means that the person with COVID-19 may require hospitalization, intensive care, or a ventilator to help them breathe, or they may even die. People of any age with certain underlying medical conditions are also at increased risk for severe illness from SARS-CoV-2 infection.

What is multisystem inflammatory syndrome in children (MIS-C) and who is at risk? 

CDC continues to investigate multisystem inflammatory syndrome in children (MIS-C) associated with COVID-19. Children and adolescents with MIS-C have presented with a persistent fever and a variety of signs and symptoms including involvement of multiple organs (e.g., cardiac, gastrointestinal, renal, hematologic, dermatologic, neurologic) and elevated inflammatory markers. CDC is collaborating with domestic and international partners to better understand this new syndrome, including how common it is and its risk factors. For more information, including a full case definition and how to report MIS-C to your health department, visit [MIS-C Information for Healthcare Providers](#).

# Infection Control

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## Can employees choose to wear respirators when not required by the employer?

In situations where the use of a respirator is not required either by the employer or by an Occupational Safety and Health Administration (OSHA) standard, the employer may still offer filtering facepiece respirators or permit employees to use their own respirators as long as the employer determines that such respirator use will not in itself create a hazard. This is considered voluntary use under the [Respiratory Protection Standard](#). CDC encourages employers to permit workers to voluntarily use filtering facepiece respirators like N95s. If an employer allows voluntary use of filtering facepiece respirators, the employer must provide users with 29 CFR 1910.134 Appendix D – Information for Employees Using Respirators When Not Required Under the Standard. See 29 CFR 1910.134(c)(2) for additional requirements applicable to voluntary respirator use.

Healthcare personnel, both paid and unpaid, should be allowed to bring their own highly protective masks (such as N95 respirators) as long as the mask does not violate the facility's safety and health requirements. They should not be asked to remove their more protective source control device (a well-fitting N95 respirator, for example) for a less protective device (such as a procedure mask) unless the mask or respirator is visibly soiled, damaged, or hard to breathe through. However, devices brought from home may not be appropriate for protecting healthcare personnel from all job hazards, and they should change to recommended personal protective equipment when indicated (for instance, before entering the room of a patient managed with Transmission-Based Precautions). Learn more about the [types of masks and respirators](#) and [infection control recommendations for healthcare personnel](#).

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## What should visitors use for source control (masks or respirators) when visiting healthcare facilities?

CDC recommends that people visiting healthcare facilities use the most protective form of [source control](#) (masks or respirators) that fits well and will be worn consistently. Healthcare facilities may choose to offer well-fitting facemasks as a source control option for visitors but should allow the use of a clean mask or respirator with higher level protection by people who chose that option based on their individual preference. Masks and respirators used for source control should be changed if they become visibly soiled, damaged, or hard to breathe through. Learn more about the [types of masks and respirators](#) and [infection control recommendations for healthcare personnel](#).

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## Should facilities that perform elective medical pre-procedural testing of asymptomatic patients modify their testing based on a patient's report of a positive viral test for SARS-CoV-2 in the prior 90 days?

In general, viral testing is not necessary for asymptomatic patients who have recovered from SARS-CoV-2 infection in the prior 90 days. However, if a facility is performing medical pre-procedural viral testing and the patient cannot provide documentation of their prior positive viral test, the safest approach is for the facility to retest using their current protocol. In this situation, antigen testing is preferred. As viral tests for SARS-CoV-2 can remain positive for extended periods, even among patients who are no longer infectious, this approach could result in unnecessary isolation of the patient or delay of an elective medical procedure. Facilities may choose to accept self-test results to determine when to proceed with elective medical procedures. Such an approach assumes that the patient self-administered the viral test properly and interpreted the viral test results correctly. If there is uncertainty about the validity of reported self-test results, facilities might attempt to acquire documentation of the test results or elect to proceed with their own pre-procedure viral testing.

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## How should isolation and quarantine recommendations be applied to outpatients and visitors in healthcare settings?

Healthcare facilities should generally refer to the [isolation and quarantine recommendations for patients](#) when making decisions about visitation, non-urgent in-person appointments, and the recommended precautions that should be implemented to accommodate visits.

#### *Outpatients and visitors who are infected with SARS-CoV-2*


It is safest to defer non-urgent, in-person care and visitation until the outpatient/visitor has met the same [criteria to discontinue Transmission-based Precautions](#) that are applied to patients in a healthcare setting. If visitation or an in-person outpatient visit is allowed for a person who has not met criteria to discontinue Transmission-based Precautions, then facilities should follow [healthcare infection prevention and control recommendations for people with suspected or confirmed SARS-CoV-2 infection](#).

#### *Outpatients and visitors who have had close-contact with someone with SARS-CoV-2 infection and are not up to date with all recommended COVID-19 vaccine doses*

It is safest to defer non-urgent, in-person care and visitation until the outpatient/visitor has met the [same criteria to discontinue empiric Transmission-Based Precautions \(quarantine\)](#) that are applied to patients in a healthcare setting. Although CDC does provide an option for inpatients who remain asymptomatic to discontinue their quarantine after 7 days, provided they have a negative test within 48 hours, outpatients and visitors should consider postponing their non-urgent, in-person appointment or visit until 10 days have passed since their close contact. If visitation or an in-person outpatient visit is allowed for a person who has not met these criteria, then facilities should ensure visitors use well-fitting source control and (to the extent possible) physically distance from others while in the facility and that healthcare personnel care for patients using [precautions recommended for patients with suspected or confirmed SARS-CoV-2 infection](#).

#### *Outpatients and visitors who have had close-contact with someone with SARS-CoV-2 infection and are up to date with all recommended COVID-19 vaccine doses or who have recovered from SARS-CoV-2 infection in the prior 90 days*

In general, CDC does not currently recommend quarantine following close contact with someone with SARS-CoV-2 infection if someone is up to date with all recommended COVID-19 vaccine doses or has recovered from SARS-CoV-2 infection in the prior 90 days. However, it is recommended that these people avoid contact with people who are at high risk for severe outcomes for the 10 days following their exposure. As it may not be possible to avoid contact with people at high risk for severe outcomes in a healthcare setting, it is safest to defer non-urgent in-person appointments and visitation until the outpatient/visitor has met criteria to discontinue quarantine in a healthcare setting as described above. If visitation or an in-person outpatient visit is allowed for a person who has not met these criteria, then facilities should ensure these individuals wear well-fitting source control and (to the extent possible) physically distance from

Can self-tests (also known as over-the-counter or home tests) be used when determining when healthcare personnel (HCP) with SARS-CoV-2 infection or higher-risk exposures may return to work? 

Viral testing is recommended following a [higher-risk exposure](#) and might also be used to inform when HCP with SARS-CoV-2 infection may [return to work](#). Using laboratory-based or point-of-care tests are generally preferred in these situations; these tests help ensure the test was administered correctly by a trained provider and allow for official results to be shared with occupational health services.

Use of self-tests might be considered in some situations. However, such an approach

- May inappropriately transfer the cost of testing to HCP,
- Requires trust that HCP self-administered and interpreted the test results correctly, and
- Requires that HCP report their own results to occupational health services.

If self-tests are used, consideration should be given to performing a second test at least 24 hours following an initial negative test; if negative, this increases the confidence the HCP are not infectious. Facilities could also consider having HCP present for a proctored test to assist with ensuring appropriate collection and interpretation. CDC has [resources](#) to assist individuals with self-testing.

## Do CDC's interim infection prevention and control recommendations for COVID-19 apply to psychiatric hospitals or other behavioral health facilities?

Yes. To keep patients and healthcare personnel (HCP) healthy and safe, CDC's infection prevention and control guidance applies to all settings where healthcare is delivered. However, as with any guidance, facilities can tailor certain recommendations to their setting. For example, inpatient psychiatric care includes communal experiences and group activities that may need to continue. If so, these activities might need to be adapted to align with [physical distancing](#) recommendations. Other recommended infection control measures (for example, ensuring access to alcohol-based hand sanitizer, cohorting patients with COVID-19 and assigning dedicated staff, or implementing universal source control measures) might not be safe or appropriate to implement in all locations or for all patients due to security and behavioral concerns.

Challenges and potential solutions specific to behavioral health settings might include:

- Cohorting
  - **Challenge:** To prevent transmission, it is generally recommended that patients with SARS-CoV-2 infection be transferred to a separate area of the facility where they can be cared for by dedicated HCP. Because of security concerns or specialized care needs, it might not be possible to cohort certain patients together or change HCP assigned to their care.
  - **Potential Solutions:** When cohorting is not possible, implement measures to maintain physical distancing (at least 6 feet) between patients with SARS-CoV-2 infection and others on the unit. Ideally, this would include a separate bathroom for patients with SARS-CoV-2 infection. Ensure HCP wear [all recommended personal protective equipment \(PPE\)](#) when caring for patients with suspected or confirmed SARS-CoV-2 infection.
- Group Therapy Sessions
  - **Challenge:** Group counseling, therapy, and discussion sessions are critical components of psychiatric treatment and care plans, but the traditional set-up for these activities is not compatible with physical distancing recommendations.
  - **Potential Solutions:** When possible, use virtual methods, or decrease group size so physical distancing can be maintained. In the event that SARS-CoV-2 is transmitted in the facility, sessions should stop or move to a video discussion forum until additional infection prevention measures are in place to stop the spread.
- Source Control
  - **Challenge:** For some patients, the use of [well-fitting source control](#) (respirators, facemasks or cloth masks) might cause distress or pose an additional danger to themselves or others. Some patients may be unable or unwilling to use them as intended. Elastic and cloth straps can be used for strangling oneself or others, and metal nasal bridges can be used for self-harm or as a weapon.
  - **Potential Solutions:** Consider allowing patients at low risk for misuse to wear facemasks or cloth masks, with a preference for those with short ear-loops rather than longer ties. Consider use of facemasks or cloth masks during supervised group activities. In areas of substantial to high community transmission, ensure that HCP interacting with patients (who are not suspected or confirmed to have SARS-CoV-2 infection) are still wearing eye protection in addition to well-fitting source control. HCP should always wear [all recommended personal protective equipment \(PPE\)](#) when caring for patients with suspected or confirmed SARS-CoV-2 infection.
- Alcohol-based Hand Sanitizer
  - **Challenge:** While alcohol-based hand sanitizer (ABHS) containing 60-95% alcohol is an important tool to increase adherence to [hand hygiene](#) recommendations, ABHS must be used carefully in psychiatric facilities to ensure it is not ingested by patients.
  - **Potential Solutions:** Consider not placing ABHS in patients' rooms in psychiatric facilities, nor in locations where the patients have unsupervised access. Encourage frequent hand washing with soap and water for patients and HCP. Consider providing personal, pocket-sized ABHS dispensers for HCP.
- Dining
  - **Challenge:** As part of physical distancing, communal dining is generally not recommended. However, eating needs to remain supervised due to the potential for self-harm with eating utensils and because commonly used psychiatric medications may cause side effects (e.g., tardive dyskinesia, dysphagia, hypo- and hypersalivation) that increase choking risk for patients.

hypertransmission, and increase smoking among patients.

- **Potential Solutions:** One option is to position staff in patients' rooms to monitor their dining. Another option is to allow communal dining in shifts so that staff can monitor patients while ensuring they remain at least 6 feet apart. A third option is to have patients sit in appropriately spaced chairs in the hallway outside their rooms so they can be monitored while they eat.
- Smoking
  - **Challenge:** A higher proportion of psychiatric patients smoke cigarettes compared to the general population. Patients might congregate in outdoor smoking spaces without practicing appropriate physical distancing.
  - **Potential Solutions:** Limit the number of patients allowed to access smoking spaces at the same time, and position staff to observe and ensure patients are practicing appropriate physical distancing.

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Why does CDC continue to recommend respiratory protection equivalent or higher to the level provided by an N95 disposable filtering facepiece respirator for care of patients with known or suspected COVID-19? ^

CDC's guidance to use NIOSH-approved N95 or equivalent or higher level respirators when providing care for patients with suspected or confirmed SARS-CoV-2 infection is [based](#) on the current understanding of SARS-CoV-2 and related respiratory viruses. Current knowledge about modes of SARS-CoV-2 transmission are described in the [Scientific Brief: SARS-CoV-2 Transmission](#).

Facemasks commonly used during surgical procedures will provide barrier protection against droplet sprays contacting mucous membranes of the nose and mouth, but they are not designed to protect wearers from inhaling small particles. N95 and equivalent or higher level respirators, such as other disposable filtering facepiece respirators, powered air-purifying respirators (PAPRs), and elastomeric respirators, provide both barrier and respiratory protection because of their fit and filtration characteristics.

Respirators should be used as part of a respiratory protection program that provides staff with medical evaluations, training, and fit testing.

Although facemasks are routinely used for the care of patients with common viral respiratory infections, N95 or equivalent or higher level respirators are routinely recommended for emerging pathogens like SARS CoV-2, which have the potential for transmission via small particles, the ability to cause severe infections, and limited or no treatment options. While the situation is evolving for SARS-CoV-2, CDC continues to recommend respiratory protection while the impact of new variants are being assessed.

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What personal protective equipment (PPE) should be worn by individuals transporting patients with suspected or confirmed SARS-CoV-2 infection within a healthcare facility? For example, what PPE should be worn when transporting the patient to radiology for imaging that cannot be performed in the patient room? ^

In general, transport and movement of a patient with suspected or confirmed SARS-CoV-2 infection outside of their room should be limited to medically essential purposes. If being transported outside of the room, such as to radiology, healthcare personnel (HCP) in the receiving area should be notified in advance of transporting the patient. For transport, the patient should wear a facemask or cloth face covering (if tolerated) to contain secretions and their body should be covered with a clean sheet.

If transport personnel must prepare the patient for transport (e.g., transfer them to the wheelchair or gurney), transport personnel should wear [all recommended PPE](#) (gloves, a gown, respiratory protection that is at least as protective as a fit tested NIOSH-certified disposable N95 filtering facepiece respirator and eye protection [i.e., goggles or disposable face shield that covers the front and sides of the face]). This recommendation is needed because these interactions typically involve close, often face-to-face, contact with the patient in an enclosed space (e.g., patient room). Once the patient has been transferred to the wheelchair or gurney (and prior to exiting the room), transporters should remove their gown and gloves and perform hand hygiene.

The transporter should continue to wear their respirator. The continued use of eye protection by the transporter is also recommended if there is potential that the patient might not be able to tolerate their facemask or cloth face covering for the duration of transport. Additional PPE should not be required unless there is an anticipated need to provide medical assistance during transport (e.g., helping the patient replace a dislodged facemask).

After arrival at their destination, receiving personnel (e.g., in radiology) and the transporter (if assisting with transfer) should perform hand hygiene and wear [all recommended PPE](#). If still wearing their original respirator and eye protection, the transporter should take care to avoid self-contamination when donning the remainder of the recommended PPE. This cautious approach will be refined and updated as more information becomes available and as response needs change in the United States.

Interim guidance for EMS personnel transporting patients with confirmed or suspected SARS-CoV-2 infection is [available here](#). EMS personnel should wear all recommended PPE because they are providing direct medical care and in close contact with the patient for longer periods of time.

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### What personal protective equipment (PPE) should be worn by environmental services (EVS) personnel who clean and disinfect rooms of hospitalized patients with SARS-CoV-2 infection?

In general, minimize the number of personnel entering the room of patients with SARS-CoV-2 infection. Healthcare facilities should consider assigning daily cleaning and disinfection of high-touch surfaces to nursing personnel who will already be in the room providing care to the patient. If this responsibility is assigned to EVS personnel, they should wear [all recommended PPE](#) when in the room. PPE should be removed upon leaving the room, immediately followed by performance of hand hygiene.

After discharge, terminal cleaning can be performed by EVS personnel. They should delay entry into the room until [time has elapsed](#) for enough air changes to remove potentially infectious particles. After this time has elapsed, EVS personnel can enter the room and should wear [well-fitting source control](#) along with a gown and gloves when performing terminal cleaning. Eye protection should be added if splashes or sprays during cleaning and disinfection activities are anticipated or otherwise required based on the selected cleaning products. Shoe covers are not recommended at this time for SARS-CoV-2.

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### Which procedures are considered aerosol generating procedures in healthcare settings?

Some procedures performed on patients are more likely to generate higher concentrations of infectious respiratory aerosols than coughing, sneezing, talking, or breathing. These aerosol generating procedures (AGPs) potentially put healthcare personnel and others at an increased risk for pathogen exposure and infection.

Development of a comprehensive list of AGPs for healthcare settings has not been possible, due to limitations in available data on which procedures may generate potentially infectious aerosols and the challenges in determining if reported transmissions during AGPs are due to aerosols or other exposures.

There is neither expert consensus, nor sufficient supporting data, to create a definitive and comprehensive list of AGPs for healthcare settings.

Commonly performed medical procedures that are often considered AGPs, or that might create uncontrolled respiratory secretions, include:

- open suctioning of airways
- sputum induction
- cardiopulmonary resuscitation
- endotracheal intubation and extubation
- non-invasive ventilation (e.g., BiPAP, CPAP)

NON-INVASIVE VENTILATION (e.g., BIPAP, CPAP)


- bronchoscopy
- manual ventilation


Based on limited available data, it is uncertain whether aerosols generated from some procedures may be infectious, such as:

- nebulizer administration\*
- high flow O2 delivery

\*Aerosols generated by nebulizers are derived from medication in the nebulizer. It is uncertain whether potential associations between performing this common procedure and increased risk of infection might be due to aerosols generated by the procedure or due to increased contact between those administering the nebulized medication and infected patients.

References related to aerosol generating procedures:

Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J (2012) Aerosol Generating Procedures and Risk of Transmission of Acute Respiratory Infections to Healthcare Workers: A Systematic Review. PLoS ONE 7(4); <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3338532/#!po=72.2222>[external icon](#)[external icon](#) .


How long does an examination room need to remain vacant after being occupied by a patient with confirmed or suspected COVID-19? 

The amount of time that the air inside an examination room remains potentially infectious depends on a number of factors including the size of the room, the number of air changes per hour, how long the patient was in the room, if the patient was coughing or sneezing, and if an aerosol-generating procedure was performed.

In general, it is recommended to restrict HCP and patients without PPE from entering the room until sufficient time has elapsed for enough air changes to remove potentially infectious particles.

General guidance is available on [clearance rates under differing ventilation conditions](#).

In addition to ensuring sufficient time for enough air changes to remove potentially infectious particles, HCP should clean and disinfect environmental surfaces and shared equipment before the room is used for another patient.

My hospital is experiencing a shortage of isolation gowns. To preserve our supply, can we stop using gowns for the care of patients with methicillin-resistant *Staphylococcus aureus* (MRSA) and other endemic multidrug-resistant organisms (MDROs), and *Clostridioides difficile*? 


CDC has released information about [strategies to optimize the supply of isolation gowns](#). Healthcare facilities should refer to that guidance and implement the recommended strategies to optimize their current supply of gowns. This includes shifting toward the use of washable cloth gowns, if feasible.

The use of gowns as part of Contact Precautions in the context of MDROs has been implemented primarily to reduce the risk of transmission to other patients rather than to protect healthcare personnel (HCP). Facilities with shortages could consider suspending the use of gowns for the care of patients with endemic MDROs, such as MRSA, VRE, and ESBL-producing Gram-negative bacilli except as required for [Standard Precautions](#). Facilities should assess their local epidemiology to determine which MDROs are considered endemic. Regardless of the use of gowns, HCP at facilities should continue to wear gloves for contact with these patients and their environment. Hand hygiene should continue to be emphasized. Facilities should also attempt to place patients colonized or infected with an MDRO in a private room, if available.

- **Caring for patients who have highly resistant Gram-negative organisms (e.g., carbapenem-resistant Enterobacteriaceae) and other MDROs (e.g., *Candida auris*) that are not considered endemic:** Rather than gowns

being donned for every room entry, they could be reserved for use as part of [Standard Precautions](#) and also prioritized for high-contact patient care activities that pose highest risk for transfer of pathogens from the patient to HCP. Examples of such high-contact care activities include dressing, bathing/showering, transferring, providing hygiene, changing linens, changing briefs or assisting with toileting, device care or use (central line, urinary catheter, feeding tube, tracheostomy/ventilator), and wound care. To further preserve gowns, HCP are recommended to bundle high-contact care activities as part of individual care encounters. Regardless of the use of gowns, HCP at facilities should continue to wear gloves for contact with these patients and their environment. Hand hygiene should continue to be emphasized. Facilities should also attempt to place patients colonized or infected with an MDRO in a private room, if available.

- **Caring for patients with *Clostridioides difficile* infections (CDI):** Facilities should continue using Contact Precautions (putting on a gown and gloves upon entry into the patient's room and placing the patient in a private room) for the care of symptomatic patients with CDI. As part of a [supplemental strategy to prevent transmission of CDI](#), some facilities have implemented Contact Precautions for the care of patients at high risk for CDI who have asymptomatic carriage of *Clostridioides difficile*. There are limited data about the role of asymptomatic carriage in transmission of CDI. In this setting of a critical national shortage of gowns, facilities should consider suspending this approach until the shortage is addressed. Gowns should still be used as part of [Standard Precautions](#).

A healthcare provider at our facility was recently diagnosed with COVID-19. What time period and criteria do we use to determine the patients, visitors, and other healthcare personnel (HCP) who might have been exposed to this individual while he/she was potentially infectious? 

Anyone who had prolonged close contact (within 6 feet for a cumulative total of 15 minutes or more over a 24-hour period) with the infected healthcare provider might be at risk for transmission.

- **If the provider had COVID-19 symptoms**, the provider is considered potentially infectious beginning 2 days before symptoms first appeared until the provider meets [criteria to return to work](#).
- **If the provider did not have symptoms**, collecting information about when the provider may have been exposed could help inform the period when they were infectious.
  - **If an exposure is identified.** The provider should be considered potentially infectious beginning 24 hours after the exposure until [criteria to return to work](#) are met.
  - **If the date of exposure cannot be determined.** For the purposes of contact tracing, it is reasonable to use a cutoff of 2 days before the specimen testing positive for SARS-CoV-2 was collected as the starting point, continuing until the criteria to [criteria to return to work](#) are met.

Contact tracing is generally recommended for anyone who had prolonged close contact with the person with SARS-CoV-2 infection during these time periods. While this question addresses exposure to a potentially infectious provider, the following actions are also recommended if the potentially infectious individual is a patient or visitor.

Recommended actions for HCP, patients, and visitors:

- Perform a risk assessment and perform testing and apply work restrictions for other HCP who were exposed to the infected provider as described in the [Interim Guidance for Managing Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2](#).
- Test and manage exposed patients who are currently admitted to the healthcare facility as described in the [Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the COVID-19 Pandemic](#)
- Perform contact tracing of exposed patients who are not currently admitted to the healthcare facility and for visitors as described in the [Interim Guidance on Developing a COVID-19 Case Investigation and Contact Tracing Plan: Overview](#).

Healthcare facilities should have a process for notifying the health department about known or suspected cases of SARS-CoV-2 infection, and should establish a plan, in consultation with local public health authorities, for how exposures in a healthcare facility will be investigated and how contact tracing will be performed. The plan should address the following:

- Who is responsible for identifying contacts and notifying potentially exposed individuals?



- Who is responsible for identifying contacts and notifying potentially exposed individuals?
- How will such notifications occur?
- What actions and follow-up are recommended for those who were exposed?

Contact tracing should be carried out in a way that protects the confidentiality of affected individuals to the extent possible and is consistent with applicable laws and regulations. HCP and patients who are currently admitted to the facility or were transferred to another healthcare facility should be prioritized for notification. These groups, if infected, have the potential to expose a large number of individuals at higher risk for severe disease, or in the situation of admitted patients, be at higher risk for severe illness themselves.

Information for health departments about case investigation and contact tracing is available in the [Interim Guidance on Developing a COVID-19 Case Investigation and Contact Tracing Plan: Overview](#). This guidance could also be helpful to healthcare facilities performing such activities.

A healthcare provider in our facility worked while infected with SARS-CoV-2. However, the provider wore a facemask at all times while interacting with patients. Are the patients at risk for SARS-CoV-2 and should they be notified?

Anyone who had prolonged close contact (within 6 feet for at least 15 minutes) should be considered potentially exposed. The use of a [facemask](#) for source control and adherence to other recommended infection prevention and control (IPC) measures (e.g., hand hygiene) by the provider help to reduce the risk of transmission.

The following should be considered when determining which patients are at higher risk for transmission and might be prioritized for evaluation and testing:

- [Facemask](#) use by the patient – Mirroring the [risk assessment guidance for healthcare personnel](#), patients not wearing a facemask would likely be at higher risk for infection compared to those that were wearing a facemask.
- Type of interaction that occurred between the patient and infected provider – An interaction involving manipulation or prolonged close contact with the patient’s eyes, nose, or mouth (e.g., dental cleaning) likely poses higher risk of transmission to the patient compared to other interactions (e.g., blood pressure check).
- PPE used by infected HCP – HCP wearing a well-fitting respirator might have had better source control than wearing only a facemask.
- Current status of patient – Is the patient currently admitted to a hospital or long-term care facility? These individuals, if infected, can be at higher risk for severe illness and have the potential to expose large numbers of individuals at risk for severe disease.

Questions addressing the proper handling of healthcare personnel (HCP) who have recovered from SARS-CoV-2 infection, but are still within 3 months of onset of their prior infection.

**1. If HCP within 3 months of their initial infection develop symptoms consistent with COVID-19, should they be excluded from work or retested?**


If HCP develop symptoms consistent with COVID-19 within 3 months of a confirmed SARS-CoV-2 infection they should be evaluated to identify potential etiologies for their symptoms. If an etiology for the symptoms other than SARS-CoV-2 cannot be identified, they may need to be retested for SARS-CoV-2 infection. If testing is performed, an antigen test instead of a nucleic acid amplification test (NAAT) is recommended. Decisions about the need for and duration of work restriction should be based upon their suspected diagnosis (e.g., influenza, SARS-CoV-2 infection).

**2. Do HCP within 3 months of their initial infection need to wear all recommended personal protective equipment (PPE) when caring for patients with suspected or confirmed SARS-CoV-2 infection? For example, if there are limited**

## respirators, should respirators be prioritized for HCP who have not been previously infected?

Regardless of suspected or confirmed immunity, HCP should always wear [all recommended PPE](#) when caring for patients. In situations of PPE shortages, facilities should refer to CDC [strategies for optimizing PPE supply](#). However, as with other infectious diseases (e.g., measles), allocation of available PPE should not be based on whether HCP have been previously infected or have evidence of immunity.

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If healthcare personnel (HCP) are living with someone who has been diagnosed with SARS-CoV-2 infection, should they be excluded from work? If so, for how long? 

HCP with exposures in the community should be managed in the same way that HCP with exposure in a healthcare facility are managed. HCP who have been in close contact (within 6 feet of someone for a cumulative total of 15 minutes or more over a 24-hour period) with someone who has SARS-CoV-2 infection in the community should report their exposure to their occupational health program for guidance on need for testing and work restriction.

The timing and risk level of exposures in the home can be difficult to characterize. If possible, HCP should avoid contact with the individual while they are potentially infectious (e.g., avoid being in same room). If they have been able to consistently avoid close contact with the infected individual (including in the 2 days prior to symptom onset) then they would not be classified as having a [higher-risk exposure](#). However, if close contact could not be avoided, they should generally be classified as having a higher-risk exposure.

The HCP's last exposure is considered their last day of contact with the infected individual while they were potentially infectious, which may differ from when that individual was permitted to end isolation. For example, while an infected individual in the community who is asymptomatic or mildly ill ([and meets other criteria](#)) is allowed to end isolation 5 days after their symptom onset, they may remain infectious beyond 5 days. This is why patients or residents with SARS-CoV-2 in healthcare settings are recommended to remain in Transmission-Based Precautions for 10 days following their symptom onset.

For the purposes of determining an exposure period for HCP living with an infected individual, the most conservative approach is to consider the infected individual to be infectious until 10 days following their symptom onset (assuming they do not meet [other criteria requiring a longer duration of isolation](#)). However, the risk for transmission might be diminished if at least 5 days have passed from onset of symptoms, contact with the infected individual is minimized, and both the HCP and the infected individual wear well-fitting source control while together in the home. If these mitigating factors are present, facilities could consider beginning the post-exposure quarantine period after Day 5 of the infected individual's symptom onset.

HCP who have had one or more isolated exposures, but **are then able to avoid ongoing contact** with the infected individual living with them, should be managed as described in the Table in the [Interim Guidance for Managing Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2](#).

HCP who **are not able to** avoid ongoing close contact with the infected individual while they are contagious, should be managed as follows:


- If they are **not** up to date with all recommended COVID-19 vaccine doses, [work restriction](#) should include the entire exposure period when their household contact is potentially infectious (generally 10 days unless mitigating factors are present) and extend through the recommended post exposure quarantine period. For example, if the infected individual developed mild symptoms on October 1 (DAY 0), they may be considered potentially infectious from September 29 through October 11 (DAY 10). Work restriction for HCP would then be recommended from the date of their initial exposure though October 21 (10 days after their last exposure when the individual was potentially infectious), or October 18 (7 days after their last exposure if a viral test is collected within 48 hours prior to their return to work and is negative for SARS-CoV-2 and they do not develop symptoms).
- If they **are** up to date with all recommended COVID-19 vaccine doses, they do not require work restriction unless they develop symptoms, test positive for SARS-CoV-2 infection, are moderately to severely immunocompromised, or are otherwise advised to be excluded from work by their occupational health program or public health authorities. **If these HCP continue to work, they should be tested immediately (but not earlier than 24 hours after**

the initial exposure) and, if negative, again every 3 to 7 days with the final test occurring 5 to 7 days after their last exposure.

If HCP develop SARS-CoV-2 infection, they should be restricted from work until they meet the [return to work](#) criteria.

Work restriction and post exposure testing of asymptomatic exposed HCP who have recovered from SARS-CoV-2 infection in the prior 3 months might not be necessary. If testing is performed, an antigen test instead of a nucleic acid amplification test (NAAT) is recommended.

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Does CDC recommend the use of oral antimicrobial rinses before dental appointments to prevent the transmission of SARS-CoV-2? 


Preprocedural mouth rinses (PPMR) with an antimicrobial product (e.g. chlorhexidine gluconate, povidone-iodine) have been shown to reduce the level of oral microorganisms in aerosols and spatter generated during dental procedures. Evidence from recent studies suggest that some PPMR solutions are efficacious and may temporarily decrease the viral load of SARS-CoV-2 in the oral cavity. Targeted clinical studies are currently underway to learn more about the potential role of PPMR and the prevention of SARS-CoV-2 transmission.


Because more research is needed to demonstrate the effectiveness of PPMR in preventing transmission of SARS-CoV-2 in the dental setting, CDC does not provide a recommendation for or against the use of PPMR before dental procedures. However, if PPMR are used before dental procedures, they should be used as an adjunct to other [infection prevention and control measures recommended to decrease the spread of infectious diseases in dental settings](#). Such measures include delaying elective dental procedures for patients with suspected or confirmed SARS-CoV-2 infection until they are no longer infectious or for patients who meet criteria for quarantine until they complete quarantine.

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## Testing, Diagnosis, and Notification


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How do you test a patient for infection with SARS-CoV-2? 


- Clinicians are able to access laboratory testing through state and local public health laboratories, as well as commercial and clinical laboratories across the country. The [Association of Public Health Laboratories](#)  provides a list of states and territories with laboratories that are using COVID-19 viral tests. For more information, see [Testing in U.S.](#) Clinicians should direct testing questions to their [state health departments](#). Commercial reference laboratories are also able to offer a larger volume of testing for SARS-CoV-2.
- CDC has [guidance](#) for who should be tested, but decisions about testing are at the discretion of state and local health departments and/or individual clinicians.
- Healthcare providers should report positive results to their local/state health department CDC does not directly collect these data directly.

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Do existing commercially available multiple respiratory virus panels detect SARS-CoV-2? 


Yes. There are commercially developed respiratory panels with multi-pathogen molecular assays that can detect respiratory pathogens, including SARS-CoV-2, influenza, and other human coronaviruses that can cause acute respiratory illness. The U.S. Food and Drug Administration (FDA) maintains a list of tests that includes [viral tests with Emergency Use Authorization](#)  (EUA).

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If a patient tests positive for another respiratory virus, should that exclude SARS-CoV-2 as a cause of illness? 

Patients can be infected with more than one virus at the same time. Coinfections with other respiratory viruses in people with COVID-19 have been reported. Therefore, identifying infection with one respiratory virus does not exclude SARS-CoV-2 virus infection.

### Should chest CT be used for diagnosis of COVID-19?


Clinicians considering use of chest CT scans for diagnosis or management of COVID-19 patients should consider whether such imaging will change clinical management. The American College of Radiology (ACR) recommends that CT should not be used to screen for COVID-19, or as a first-line test to diagnose COVID-19, and that CT should be used sparingly and reserved for hospitalized, symptomatic patients with specific clinical indications for CT. Appropriate infection control procedures should be followed before scanning subsequent patients. For more information see, [ACR Recommendations for the use of Chest Radiography and Computed Tomography \(CT\) for Suspected COVID-19 Infection](#) .

### Whom should healthcare providers notify if they suspect a patient has COVID-19?

Healthcare providers should immediately notify infection control personnel at their facility if they suspect COVID-19 in a patient. If a patient tests positive, providers should report that positive result to their local/state health department.


### How do you diagnose and report a potential case of multisystem inflammatory syndrome in children (MIS-C)?

Patients with MIS-C have presented with a persistent fever and a variety of signs and symptoms including multiorgan (e.g., cardiac, gastrointestinal, renal, hematologic, dermatologic, neurologic) involvement and elevated inflammatory markers. Not all children will have the same symptoms. For children who may have MIS-C, further evaluation for signs of this syndrome may include (but are not limited to) chest radiograph, echocardiography, and blood testing to evaluate for evidence of inflammation.


Healthcare providers who have cared or are caring for patients younger than 21 years of age meeting MIS-C criteria should report suspected cases to their local, state, or territorial health department. After hour phone numbers for health departments are available at the [Council of State and Territorial Epidemiologists website](#).  For additional reporting questions, please contact CDC's 24-hour Emergency Operations Center at 770-488-7100. For more information, including a full case definition, please visit [MIS-C Information for Healthcare Providers](#).

## Treatment and Management

### Should post-exposure prophylaxis be used for people who may have been exposed to a person with COVID-19?

There is currently no FDA-approved post-exposure prophylaxis for people who may have been exposed to COVID-19. For information about registered clinical trials of investigational therapeutics for pre- or post-exposure prophylaxis of SARS-CoV-2 infection, visit [ClinicalTrials.gov](#) .


For more information on movement restrictions, monitoring for symptoms, and evaluation after possible exposure to COVID-19, see [Interim US Guidance for Risk Assessment and Public Health Management of Persons with Potential Coronavirus Disease 2019 \(COVID-19\) Exposure in Travel-associated or Community Settings](#) and [Interim U.S Guidance for Risk Assessment and Public Health Management of Healthcare Personnel with Potential Exposure in a Healthcare Setting to Patients with Coronavirus Disease 2019 \(COVID-19\)](#).

The National Institutes of Health recently published guidelines on prophylaxis use for COVID-19 and testing and management of COVID-19 patients. For more information, please visit: [National Institutes of Health: Coronavirus Disease 2019 \(COVID-19\) Treatment Guidelines](#) .

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## How are COVID-19 patients treated?

Not all patients with COVID-19 will require medical supportive care. Clinical management for hospitalized patients with COVID-19 is focused on supportive care for complications, including supplemental oxygen and advanced organ support for respiratory failure, septic shock, and multi-organ failure. Empiric testing and treatment for other viral or bacterial etiologies may be warranted.

The National Institutes of Health has published [interim guidelines for the medical management of COVID-19](#)  prepared by the COVID-19 Treatment Guidelines Panel.

For information on investigational therapies, see [Therapeutic Options for Patients with COVID-19](#).

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## Do patients with confirmed or suspected COVID-19 need to be admitted to the hospital?

Not all patients with COVID-19 require hospital admission. Patients whose clinical presentation warrants in-patient clinical management for supportive medical care should be admitted to the hospital under appropriate Transmission-Based Precautions.

Some patients with initial mild clinical presentation may [worsen in the second week of illness](#). The decision to monitor these patients in the inpatient or outpatient setting should be made on a case-by-case basis. This decision will depend not only on the clinical presentation, but also on the patient's ability to engage in self-monitoring, the feasibility of safe isolation at home, and the risk of transmission in the patient's home environment. For more information, see [Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 \(COVID-19\) in a Healthcare Setting](#) and [Interim Guidance for Implementing Home Care of People Not Requiring Hospitalization for Coronavirus Disease 2019 \(COVID-19\)](#).

References related to hospitalization and outcomes among patients with COVID-19:

Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497-506.

Wang D, Hu B, Hu C, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA* 2020.

Dong Y, Mo X, Hu Y, et al. Epidemiology of COVID-19 Among Children in China. *Pediatrics* 2020.

Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA* 2020.

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## When can patients with confirmed COVID-19 be discharged from the hospital?

Patients can be discharged from the healthcare facility whenever clinically indicated. Meeting criteria for discontinuation of [Transmission-Based Precautions](#) is not a prerequisite for discharge from a healthcare facility. Isolation should be maintained at home if the patient returns home before the time period recommended for discontinuation of hospital Transmission-Based Precautions.

Decisions to discontinue Transmission-Based Precautions or in-home isolation should be made according to the following guidance:

- For hospitalized persons, see [Discontinuation of Transmission-Based Precautions and Disposition of Patients with SARS-CoV-2 Infection in Healthcare Settings](#).
- For non-hospitalized persons, see [Interim Guidance for Implementing Home Care of People Not Requiring Hospitalization for COVID-19](#) and [Discontinuation of Isolation for Persons with COVID-19 Not in Healthcare Settings](#).

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## Testing, Isolation, and Quarantine for Persons Who Have Recovered from Previous SARS-CoV-2 Infection

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What do we know about detection of SARS-CoV-2 RNA after clinical recovery from COVID-19? 

Many recovered persons do not have detectable SARS-CoV-2 RNA in upper respiratory tract specimens. However, viral RNA can be persistently detected by reverse transcription polymerase chain reaction (RT-PCR) in respiratory tract samples in some persons after apparent clinical recovery. In some persons, after testing negative by RT-PCR in two consecutive samples, later samples can test positive again. These persistent detections of viral RNA usually are associated with higher cycle threshold (Ct) values (i.e., fewer RNA copies) than Ct values found in RT-PCR results from samples collected shortly before or during clinical illness. Studies that have examined how long SARS-CoV-2 RNA can be detected in adults have demonstrated that, in some persons, it can be detected for weeks.

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Are clinically recovered persons infectious to others if they test persistently or recurrently positive for SARS-CoV-2 RNA? 

Whether the presence of detectable but low concentrations of viral RNA after clinical recovery represents the presence of potentially infectious virus is unknown. Based on experience with other viruses, it is unlikely that such persons pose an important infectious risk to others. However, whether this is true for SARS-CoV-2 infection has not been definitively established.

After the onset of illness, the detectable viral burden usually declines. After a week or more, anti-SARS-CoV-2 immunoglobulin becomes detectable and then antibody levels increase. Some of these antibodies may prevent the virus from infecting cells in cell culture. A decline in viral RNA is associated with a decreased ability to isolate live virus. For most patients with COVID-19, efforts to isolate live virus from upper respiratory tract specimens have been unsuccessful when specimens are collected more than 10 days after illness onset. Recovery of live virus between 10 and 20 days after symptom onset has been documented in some persons with severe COVID-19; in some cases, these persons were in an immunocompromised state.

Persons who have tested persistently or recurrently positive for SARS-CoV-2 RNA have, in some cases, had their signs and symptoms of COVID-19 improve. When viral isolation in tissue culture has been attempted in such persons in South Korea and the United States, live virus has not been isolated. There is no evidence to date that clinically recovered persons with persistent or recurrent detection of viral RNA have transmitted SARS-CoV-2 to others.


Despite these observations, it's not possible to conclude that all persons with persistent or recurrent detection of SARS-CoV-2 RNA are no longer infectious. There is no firm evidence that the antibodies that develop in response to SARS-CoV-2 infection are protective. If these antibodies are protective, it's not known what antibody levels are needed to protect against reinfection.

These data and experience with other viral respiratory infections indicate that most persons recovered from COVID-19 who test persistently or recurrently positive by RT-PCR are likely no longer infectious. Isolation and precautions may be discontinued for persons with COVID-19 10 days after symptom onset (the date on which symptoms first began,


including non-respiratory symptoms), provided their fever has resolved for at least 24 hours, without the use of fever-reducing medications, and their other symptoms have improved. For some persons with [severe or critical illness](#), or who

Can cycle threshold (Ct) values be used to assess when a person is no longer infectious? 


No. Although attempts to culture virus from upper respiratory specimens have been largely unsuccessful when Ct values are in high but detectable ranges, Ct values are not a quantitative measure of viral burden. In addition, Ct values are not standardized by RT-PCR platform nor have they been approved by FDA for use in clinical management. CDC does not endorse or recommend use of Ct values to assess when a person is no longer infectious. However, serial Ct values may be useful in the context of the entire body of information available when assessing recovery and resolution of infection.

What further evidence is needed to be reassured that persistent or recurrent shedding of SARS-CoV-2 RNA after recovery does not represent the presence of infectious virus? 


Prospectively collecting serial respiratory samples and attempting to isolate live virus in tissue culture from multiple persons testing positive by RT-PCR following illness recovery is needed. If repeated attempts to recover replication-competent virus in culture from such serial samples are unsuccessful, that data would be sufficient evidence that infectious virus is absent. Then we would be sure that persons continuing to test positive do not pose an infectious risk to others.

Can viral culture be used to demonstrate that a person who had persistently or recurrently detectable viral RNA is not infectious to others? 

Yes. However, viral culture is not widely performed for SARS-CoV-2. It must be conducted in Biosafety Level 3 (BSL-3) laboratories using BSL-3 practices by experienced virologists and culture results can take a week or more. Therefore, while persons whose specimens do not yield live virus are considered no longer infectious, the complexity of such testing and the time required to complete it mean that culture cannot be used routinely to guide management of infected persons.

A person who previously tested positive by RT-PCR for SARS-CoV-2 and clinically recovered from COVID-19 is later tested again, for example, as part of a contact tracing investigation. If that person again tests positive by RT-PCR, should they be managed as potentially infectious to others, and isolated again for COVID-19? 

For persons who remain asymptomatic following recovery from COVID-19, retesting (e.g., as part of a contact tracing investigation) is not necessary during the first 3 months after the date of symptom onset. When a positive test occurs less than 3 months after the person's symptom onset of their most recent illness, it is possible that the positive test represents a new infection or a persistently positive test associated with the previous infection. If a positive test occurs more than 3 months after a person's symptom onset, clinicians and public health authorities should consider the possibility of reinfection. Until we have more information, the determination of whether a patient with a positive test in these situations is contagious to others should be made on a case-by-case basis. Consider consultation with infectious diseases specialists and public health authorities to review all available information (e.g., medical history, time from initial positive test, RT-PCR Ct values, and presence of COVID-19 signs or symptoms). Persons who are determined to be potentially infectious should undergo evaluation and remain isolated until they again meet criteria for discontinuation of isolation or discontinuation of [transmission-based precautions](#), depending on their circumstances.

If a previously infected person has clinically recovered but later experiences symptoms consistent with COVID-19, should the person be isolated again and tested for SARS-CoV-2? 


If a previously infected person experiences new symptoms consistent with COVID-19 3 months or more after the date of

... previously infected person experiences new symptoms consistent with COVID-19 within 3 months since the date of the previous illness onset (or date of last positive viral diagnostic test [RT-PCR or antigen test] if the person never experienced symptoms), the person should undergo repeat viral diagnostic testing. **However, serologic testing should not be used to establish the presence or absence of SARS-CoV-2 infection or reinfection.** These people who have a positive test result should be considered infectious and remain isolated until they again meet criteria for discontinuation of isolation or of transmission-based precautions. Contact tracing during the person's second episode of symptoms is warranted.

For persons who have recovered from laboratory-confirmed SARS-CoV-2 infection and who experience new symptoms consistent with COVID-19 within 3 months since the date of symptom onset of the previous illness episode (or date of last positive viral diagnostic test if the person never experienced symptoms), repeating viral diagnostic testing may be warranted if alternative etiologies for the illness cannot be identified. If reinfection is suspected and retesting is undertaken, the person should follow isolation recommendations for cases of COVID-19 pending clinical evaluation and testing results. Results of repeat testing should also be interpreted in consultation with an infectious disease specialist with consideration of cycle threshold values (if available) and clinical presentations. The determination of whether a patient with a subsequently positive test is contagious to others should be made on a case-by-case basis, in consultation with infectious diseases specialists and/or public health authorities, after review of available information (e.g., medical history, time from initial positive test, RT-PCR Ct values, and presence of COVID-19 signs or symptoms).

Note: Serologic testing should not be used to establish the presence or absence of SARS-CoV-2 infection or reinfection.


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If an infected person has clinically recovered and then later is identified as a contact of another person with COVID-19, do they need to be quarantined? 

If a person has clinically recovered from SARS-CoV-2 infection and is then identified as a contact of a new case 3 months or more after the date of symptom onset of their previous illness episode (or date of positive viral diagnostic test [RT-PCR or antigen test] if the person never experienced symptoms), then they should follow general [quarantine recommendations](#) for contacts and undergo repeat viral diagnostic testing.


The following applies to a person who has clinically recovered from SARS-CoV-2 infection that was confirmed with a viral diagnostic test and then, within 3 months since the date of symptom onset of the previous illness episode (or date of positive viral diagnostic test if the person never experienced symptoms), is identified as a contact of a new case. If the person remains asymptomatic since the new exposure, then they do not need to be retested for SARS-CoV-2 and do not need to be quarantined. However, if the person experiences new symptoms consistent with COVID-19 and an evaluation fails to identify a diagnosis other than SARS-CoV-2 infection (e.g., influenza), then repeat viral diagnostic testing may be warranted, in consultation with an infectious disease specialist and public health authorities for isolation guidance.

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If an infected person has clinically recovered using the symptom-based strategy, do they need a test to show they are not infectious? 

No. The [symptom-based strategy](#) is intended to replace the need for repeated testing.


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If an infected person has clinically recovered, should the person continue to wear a cloth face covering in public? 

Yes. It is recommended that all persons, with a few exceptions, wear [cloth face coverings](#) in public.<sup>1</sup> The primary purpose of cloth face coverings is to limit transmission of SARS-CoV-2 from infected persons who may be infectious but do not have clinical symptoms of illness or may have early or mild symptoms that they do not recognize. Cloth face coverings may provide reassurance to others in public settings and be a reminder of the need to maintain social distancing. However, cloth face coverings are not personal protective equipment (PPE) and should not be used instead of a respirator or a facemask to protect a healthcare worker.





[1] Cloth face coverings should not be placed on young children under age 2, anyone who has trouble breathing, or anyone who is unconscious, incapacitated, or otherwise unable to remove the mask without assistance.

What should I do if I suspect a potential case of reinfection? 



Although current understanding of reinfection remains limited, CDC is working with its partners to characterize the clinical features, transmissibility, and immunological profile around reinfection with SARS-CoV-2. Therefore, the guidance remains the same to reinfections as to primary infection with SARS-CoV-2. To further our shared understanding of reinfection, CDC has released the [Investigative Criteria for Suspected Cases of SARS-CoV-2 Reinfection](#) as well as the [Common Investigation Protocol for Investigating Suspected SARS-CoV-2 Reinfection](#). This protocol is to support public health investigations conducted by interested institutions and jurisdictions. Clinicians with available specimens for suspected cases of reinfection meeting the above investigative criteria are also invited to contact CDC at [eocevent461@cdc.gov](mailto:eocevent461@cdc.gov) after consulting with their local health department to pursue investigations with CDC support.

## Drugs and Investigational Therapies


Are empiric antibiotics recommended for patients suspected of having COVID-19? 

Several patients with COVID-19 have been reported to present with concurrent community-acquired bacterial pneumonia. Decisions to administer antibiotics to COVID-19 patients should be based on the likelihood of bacterial infection (community-acquired or hospital-acquired), illness severity, and antimicrobial stewardship issues. For more information, see [Diagnosis and Treatment of Adults with Community-acquired Pneumonia: An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America](#) .


What antiviral drugs are available to treat COVID-19? 



The National Institutes of Health (NIH) has published guidelines on testing and management of patients with COVID-19. For more information, please visit [the NIH Coronavirus Disease 2019 \(COVID-19\) Treatment Guidelines](#) . The [recommendations](#)  are based on scientific evidence and expert opinion and are regularly updated as more data become available.

Current [clinical management of COVID-19](#) includes infection prevention and control measures and supportive care, including supplemental oxygen and mechanical ventilatory support when indicated. The U.S. Food and Drug Administration (FDA) has approved one drug, remdesivir (Veklury), for the treatment of COVID-19 in certain situations.

Persons seeking information about registered clinical trials for COVID-19 in the United States can search for such information here: [ClinicalTrials.gov](#) .

For more information on investigational therapies, see [Therapeutic Options for Patients with COVID-19](#).

Do nonsteroidal anti-inflammatory drugs (NSAIDs) worsen the course of disease for people with COVID-19? 


CDC is currently not aware of scientific evidence establishing a link between NSAIDs (e.g., ibuprofen, naproxen) and worsening of COVID-19. [FDA](#) , the [European Medicines Agency](#) , the [World Health Organization](#), and CDC are continuing to monitor the situation and will review new information on the effects of NSAIDs and COVID-19 disease as it becomes available. For those who wish to use treatment options other than NSAIDs, there are other over-the-counter and prescription medications approved for pain relief and fever reduction. Patients who rely on NSAIDs to treat chronic

conditions and have additional questions should speak to their healthcare provider for individualized management. Patients should use NSAIDs and all medications according to the product labels and advice of their healthcare


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## Patients with Asthma


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If I have patients with asthma, do I need to make any changes to their daily asthma preventive management regimens to reduce their risk of getting sick with COVID-19? 


People with moderate to severe **asthma**, particularly if not well controlled, [might be at higher risk](#) of getting very sick from COVID-19.

Based on what we currently know about COVID-19, the selection of therapeutic options through guideline-recommended treatment of asthma has not been affected. [National asthma guidelines](#)  are available. Continuation of inhaled corticosteroids is particularly important for patients already using these medications because there is no evidence of increased risk of COVID-19 morbidity with use of inhaled corticosteroids and an abundance of data showing reduced risk of asthma exacerbation with maintenance of asthma controller therapy.


Patients with asthma but without symptoms or a diagnosis of COVID-19 should continue any required nebulizer treatments.


If my patient experiences an asthma exacerbation, should the exacerbation be treated any differently to reduce risk of COVID-19? 

Selection of therapeutic options through guideline-recommended treatment of asthma exacerbations has not been affected by what we currently know about COVID-19.

Systemic corticosteroids should be used to treat an asthma exacerbation per [national asthma guidelines](#)  and current standards of care, even if it is caused by COVID-19. Short-term use of systemic corticosteroids to treat asthma exacerbations should be continued. There is currently no evidence to suggest that short-term use of systemic corticosteroids to treat asthma exacerbations increases the risk of developing severe COVID-19, whereas there is an abundance of data to support use of systemic steroids for moderate or severe asthma exacerbations.

Patients with asthma but without symptoms or a diagnosis of COVID-19 should continue any required nebulizer for treatments, as recommended by national professional organizations, including the American Academy of Allergy, Asthma & Immunology (AAAAI) and the American College of Allergy, Asthma & Immunology (ACAAI). If healthcare providers need to be present during nebulizer use among patients who have either symptoms or a diagnosis of COVID-19, use [CDC's recommended precautions when performing aerosol-generating procedures \(AGPs\)](#).

Clinicians may be concerned that an asthma exacerbation is related to an underlying infection with COVID-19. Clinicians can access laboratory testing for COVID-19 through a network of state and local public health laboratories across the country. Lists of [states and territories with laboratories](#) that are using COVID-19 viral tests are available. For more information, see [Testing in U.S.](#) Clinicians should direct testing questions to their [state](#) and [local](#)  health departments.

Are any changes recommended to the asthma treatment plan if my patient with asthma has COVID-19? 



Patients can be referred to [CDC's recommendations for caring for themselves or someone else at home sick with COVID-19](#).


If nebulizer use at home is necessary for patients with asthma who have symptoms or a diagnosis of COVID-19, use of the nebulizer in a location that minimizes and preferably avoids exposure to any other members of the household, and preferably a location where air is not recirculated into the home (like a porch, patio, or garage) is recommended by national professional organizations, including the American College of Allergy, Asthma & Immunology (ACAAI) by the ACAAI and the Allergy & Asthma Network (AAN). Limiting the number of people in the room or location where the nebulizer is used is also recommended by the Asthma & Allergy Foundation of America (AAFA). Nebulizers should be used and cleaned according to the manufacturer's instructions.


## Patients with Hypertension

Are patients with hypertension at increased risk for severe illness from COVID-19? 


Many patients with severe illness from COVID-19 have underlying hypertension.<sup>1</sup> Hypertension is common in the United States. [Hypertension](#) is more frequent with advancing age and among non-Hispanic blacks and people with other underlying medical conditions such as obesity and diabetes. At this time, people whose only underlying medical condition is hypertension [might be at increased risk](#) for severe illness from COVID-19.<sup>2</sup>

1. Garg S, Kim L, Whitaker M, et al. Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:458–464. DOI: <http://dx.doi.org/10.15585/mmwr.mm6915e3>  .
2. Killerby ME, Link-Gelles R, Haight SC, et al. Characteristics Associated with Hospitalization Among Patients with COVID-19 — Metropolitan Atlanta, Georgia, March–April 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:790–794. DOI: <http://dx.doi.org/10.15585/mmwr.mm6925e1>  .


Should angiotensin-converting enzyme inhibitors (ACE-Is) or angiotensin receptor blockers (ARBs)  be stopped in patients with COVID-19?

No. The American Heart Association, the Heart Failure Society of America, and the American College of Cardiology [recommend](#)  continuing ACE-I or ARB medications for all patients already prescribed those medications for indications such as heart failure, hypertension, or ischemic heart disease. At this time, available evidence demonstrates no indication of COVID-specific harm from these agents. Several randomized controlled trials are under way to better answer this important clinical question. Cardiovascular disease patients diagnosed with COVID-19 should be fully evaluated by a healthcare professional before adding or removing any treatments, and any changes to their treatment should be based on the latest scientific evidence. Patients who rely on ACE-Is or ARBs to treat chronic conditions and have additional questions should speak to their healthcare provider for individualized management


## Waste Management

What do waste management companies need to know about wastewater and sewage coming  from a healthcare facility or community setting with either a known COVID-19 patient or person under investigation (PUI)?

Waste generated in the care of PUIs or patients with confirmed COVID-19 does not present additional considerations for wastewater disinfection in the United States. Coronaviruses are susceptible to the same disinfection conditions in community and healthcare settings as other viruses, so current disinfection conditions in wastewater treatment facilities are expected to be sufficient. This includes conditions for practices such as oxidation with hypochlorite (i.e., chlorine bleach) and peracetic acid, as well as inactivation using UV irradiation.

Do wastewater and sewage workers need any additional protection when handling untreated waste from healthcare or community setting with either a known COVID-19 patient or PUI? 

Wastewater workers should use standard practices including [basic hygiene precautions](#) and wear the recommended [PPE](#) as prescribed for their current work tasks when handling untreated waste. There is no evidence to suggest that employees of wastewater plants need any additional protections in relation to COVID-19.

Should medical waste or general waste from healthcare facilities treating PUIs and patients with confirmed COVID-19 be handled any differently or need any additional disinfection? 

Medical waste (trash) coming from healthcare facilities treating COVID-2019 patients is no different than waste coming from facilities without COVID-19 patients. CDC's guidance states that management of laundry, food service utensils, and medical waste should be performed in accordance with routine procedures. There is no evidence to suggest that facility waste needs any additional disinfection.

More guidance about environmental infection control is available in section 7 of CDC's [Interim Infection Prevention and Control Recommendations](#) for Patients with Confirmed COVID-19 or Persons Under Investigation for COVID-19 in Healthcare Settings.


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## Cleaning and Disinfection of Environmental Surfaces

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How are environmental surfaces involved in the transmission of infections? 

Surfaces can become contaminated with microorganisms and potential pathogens. However, many of these surfaces are generally not directly associated with transmission of infections to either healthcare workers or patients. The transfer of pathogens from environmental surfaces is largely due to hand contact with the surface (e.g., frequently touched surfaces). Touch contamination may lead to cross contamination of patient care items, other environmental surfaces, self-contamination, and possible infection after touching one's face or mouth.


How does one interrupt transmission of pathogens from environmental surfaces? 

Both hand hygiene and the cleaning and disinfection of environmental surfaces are fundamental practices to reduce the incidence of healthcare-associated infections.

Where can I find detailed information on cleaning and disinfection? 

For more information see our guidelines for healthcare facilities that cover cleaning, disinfection, sterilization, and hand hygiene:

- [Guideline for Environmental Infection Control, 2003](#)
- [Guideline for Disinfection and Sterilization, 2008](#)
- [Guideline for Hand Hygiene in Healthcare Settings](#)

Why is cleaning of surfaces important? 

Cleaning is an important first step for any process that involves disinfection or sterilization because the presence of organic and inorganic soils may cause disinfection or sterilization to fail. Cleaning is the process of removing both organic and inorganic matter from surfaces with the use of detergents (e.g., anionic, cationic, non-ionic, and zwitter ionic) or enzymatic cleaners. Cleaning may involve manual, automated, or a combination of manual and automated methods.

- Depending on the cleaning method and the surface being cleaned, a  $10^2$ - $10^6$  log reduction of microorganisms may be possible.
- Proper cleaning may be enough to make an environmental surface safe to handle and to prevent transmission of pathogens.
- Currently, no cleaning guidelines apply to all devices or surfaces, nor is there a single accepted standard method to measure the effectiveness of cleaning (examples include adenosine triphosphate (ATP), fluorescent markers, blood, protein, carbohydrate, RODAC™ plates, or touch plates).
- See the [CDC Environmental Toolkit](#) for additional information on developing a cleaning evaluation program.

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### What detergents are used for routine environmental cleaning in healthcare settings?

Many cleaners used in healthcare settings for routine cleaning of the general environment are cationic detergents, with many of these being quaternary ammonium compounds which are also low- to intermediate-level disinfectants. For EPA registered detergent disinfectants, refer to the label to determine if the product is a one-step or multiple-step product, and follow the product label instructions for use.

- One-step disinfection product and process combine cleaning and disinfection of a noncritical environmental surface or item into a single step. Depending on the instructions for product use, some do not have to be rinsed off.
- Multi-step products and processes require the user to clean the surface before it is disinfected. In some cases, the disinfectant must be rinsed from the surface following the wet contact time listed on the product label.

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### Are there ways to audit the cleaning process?

- Cleaning guidelines vary based on devices and surfaces being cleaned. Multiple methods are used to measure the residual bioburden or effectiveness of cleaning (e.g., ATP, fluorescent markers, blood, protein, carbohydrate, and RODAC™ plates, or touch plates)
- See the [CDC Environmental Toolkit](#) for additional information on developing a cleaning evaluation program.



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### What are no-touch devices or NTDs?

- No-touch devices (NTDs) are sometimes used in healthcare settings as an adjunct to terminal room cleaning (i.e., after patient discharge or transfer). They are not currently able to replace existing cleaning and disinfection processes. These devices use a variety of different disinfection technologies such as ultraviolet germicidal irradiation (UVGI) and chemical agents. They are called no-touch devices because they use a pre-determined program that allows the device to run unmanned in an unoccupied, pre-cleaned room (e.g., patient room) for a defined period.
- Chemical disinfectants used for NTDs vary according to the specific device. Examples include vapor phase hydrogen peroxide, dry mist hydrogen peroxide, combined hydrogen peroxide + antimicrobial silver, dry fog hydrogen peroxide + peroxyacetic acid, ionized hydrogen peroxide, and chlorine dioxide gas.
- The effectiveness of NTDs is still under investigation; most data are laboratory demonstrations of pathogen inactivation. Thus far, only one study of NTD use has shown a decrease in patient infection rates. the [Duke BETR](#)



## What information is available about the use of electrostatic sprayers or foggers for the disinfection of rooms and surfaces in healthcare environments?

These devices are typically used as an adjunct technology to terminal room cleaning. This means that the patient has been transferred or discharged and is no longer occupying the space. So that EVS may begin cleaning and disinfecting the room in preparation for a new patient (e.g., terminal cleaning).

For information about the application of [EPA List N disinfectants](#)  with electrostatic sprayers and foggers, refer to the [EPA's Frequent Questions about Disinfectants and Coronavirus \(COVID-19\)](#) . If a product does not have an electrostatic spraying or fogging use on a label, the EPA has not evaluated the safety and efficacy of using that product with an electrostatic sprayer or a fogger.


- Foggers can be hand-held or no-touch devices (NTDs).
- When using an electrostatic sprayer or a fogger to apply disinfectants, always follow manufacturer directions for operation and maintenance of the sprayer or fogger and the disinfectant label's use directions (e.g., application rate, distance to surface while applying, and contact time).
- Follow the disinfectant's label recommendations for appropriate personal protective equipment (PPE) for the operator, and adhere to any recommended re-entry times for bystanders, other staff members, or patients.

## Is ultraviolet germicidal irradiation (UVGI) recommended for disinfection of air and surfaces in the healthcare setting?

- UVGI can be used as a supplemental treatment for disinfection of air in HVAC systems or above people in occupied spaces (upper-room or upper-air systems) and for supplemental disinfection of surfaces following routine cleaning and disinfection. UVGI, also known as Germicidal Ultraviolet (GUV), uses ultraviolet energy in the UV-C band (wavelengths of 220-280 nanometers), which is effective against SARS-CoV-2 under laboratory conditions. Efficacy of the applied dose (a function of irradiance and time) is highly dependent on many factors, such as the concentration of the virus, inoculum size (in experimental studies), the virus medium, contours and type of material being treated, as well as what the virus is suspended in (e.g., culture media, respiratory droplets, other proteinaceous material). These complex variables may explain the range of results presented in the published literature.
- For more information on these technologies see the CDC Business FAQs under the heading "[Cleaning and Disinfection in the Workplace](#)"
- UV-C can be applied on healthcare environmental surfaces using robots as NTDs following terminal cleaning and is still considered investigational; one study mentioned above the [Duke BETR Disinfection Study](#)   (Andersen DJ, et al. Lancet Infect Dis 2018; 18(8): 845–853) has shown a decrease in Healthcare-associated infections.

## More Information

- [Management of Patients with Confirmed COVID-19](#)
- [Therapeutic Options for Patient with COVID-19](#)
- [Ending Isolation and Precautions for People with COVID-19](#)
- [Information for Pediatric Healthcare Providers](#)
- [Disposition of Hospitalized Patients with COVID-19](#)
- [Considerations for Inpatient Obstetric Healthcare Settings](#)
- [Pregnant and Recently Pregnant People](#)

- [Managing Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2](#)
- [Infection Prevention and Control Recommendations for Healthcare Personnel Patients During the Coronavirus Disease 2019 \(COVID-19\) Pandemic](#)
- [Strategies for Optimizing the Supply of N95 Respirators](#)
- [National Institutes of Health: Coronavirus Disease 2019 \(COVID-19\) Treatment Guidelines](#) 

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