



Coronavirus Disease 2019 (COVID-19)

Collection and Submission of Postmortem Specimens from Deceased Persons with Known or Suspected COVID-19

Interim Guidance

Summary of Recent Changes:

- Criteria for fixed autopsy tissue specimen submission to CDC's Infectious Diseases Pathology Branch (IDPB) for COVID-19 testing

These changes were made **June 2, 2020**.

CDC guidance for COVID-19 may be adapted by state and local health departments to respond to rapidly changing local circumstances.

Background

Medical examiners, coroners, and pathologists should **immediately** notify their [local](#) or [state](#) health department in the event of the identification of a deceased person with known or suspected COVID-19.

State and local health departments can contact CDC's Emergency Operations Center (EOC) at 770-488-7100 for urgent consultation if an autopsy is being considered for a deceased person with known or suspected COVID-19 or if submission of autopsy tissue specimens or postmortem swabs to CDC for COVID-19 testing is desired. The EOC will assist local/state health departments to collect, store, and ship specimens appropriately to CDC, including during afterhours or on weekends/holidays.

This interim guidance is based on what is currently known about [coronavirus disease 2019 \(COVID-19\)](#).

Current knowledge supports that spread of SARS-CoV-2 (the virus that causes COVID-19) usually happens when a person is in close contact (i.e., within about 6 feet) via respiratory droplets produced when an infected person coughs, sneezes, or talks. This route of transmission is not a concern when handling human remains or performing postmortem procedures. It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes. This is not thought to be the main way the virus spreads, but we are still learning more about how this virus spreads. CDC will update this interim guidance as additional information becomes available.

This document provides specific guidance for the collection and submission of postmortem specimens from deceased known or suspected COVID-19 cases. This document also provides recommendations for biosafety and infection control practices during specimen collection and handling, including during autopsy procedures. The guidance can be used by medical examiners, coroners, pathologists, other workers involved in providing postmortem care, and local and state health departments. Postmortem activities should be conducted with a focus on avoiding aerosol generating procedures and ensuring that if aerosol generation is likely (e.g., when using an oscillating saw) that appropriate engineering controls and personal protective equipment (PPE) are used. These precautions and the use of [Standard Precautions](#) are appropriate work practices to help prevent direct contact with infectious material, percutaneous injury, and other hazards related to moving human remains and handling embalming chemicals.

Medical examiners, coroners, and other healthcare professionals should use professional judgment to determine if a decedent had signs and symptoms compatible with COVID-19 during life and whether postmortem testing is necessary. Many patients with confirmed COVID-19 have developed fever and/or symptoms of acute respiratory illness (e.g., fever, cough, difficulty breathing). There are epidemiologic factors that may also help guide decisions about COVID-19 testing, such as documented COVID-19 infections in a jurisdiction, known community transmission, contact with a known COVID-19 patient, or being a part of a cluster of respiratory illness in a closed setting (e.g., a long-term care facility). Testing for other causes of respiratory illness (e.g., influenza) is strongly encouraged.

Recommended Postmortem Specimens

Recommendations about the type of postmortem specimens to [collect](#) vary based on whether the case of COVID-19 is suspected or confirmed, as well as whether an autopsy is performed.

The following factors should be considered when determining if an autopsy will be performed for a deceased known or suspected COVID-19 case:

- Medicolegal jurisdiction
- Facility environmental controls
- Availability of recommended personal protective equipment (PPE)
- Family and cultural wishes

If an autopsy is performed for a suspected COVID-19 case, collection of the following postmortem specimens is recommended:

- Postmortem swab specimens for COVID-19 testing:
 - Upper respiratory tract swab: Nasopharyngeal Swab (NP swab)
 - Lower respiratory tract swab: Lung swab from each lung
- Separate swab specimens for testing of other respiratory pathogens and other postmortem testing, as indicated
- Formalin-fixed autopsy tissues from lung and upper airway

If an autopsy is NOT performed for a suspected COVID-19 case, collection of the following postmortem specimens is recommended:

- Postmortem Nasopharyngeal Swab (NP swab) specimen for COVID-19 testing
- Separate NP swab for testing of other respiratory pathogens

If an autopsy is performed for a confirmed COVID-19 case, collection of the following postmortem specimens should be considered:

- Postmortem swab specimens for testing of other respiratory pathogens,
- Other postmortem microbiologic and infectious disease testing, as indicated
- Formalin-fixed autopsy tissues from lung and upper airway

In addition to postmortem specimens, any remaining specimens (e.g., NP swab, sputum, serum, stool) that may have been collected prior to death should be retained. Please refer to [Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Persons for Coronavirus Disease 2019 \(COVID-19\)](#) for more information.

Recommended Biosafety and Infection Control Practices

Collection of Postmortem Nasopharyngeal Swab (NP Swab) Specimens Only

Instructions in this section apply if **only** postmortem NP swabs are being collected from a deceased person with known or suspected COVID-19. **If an autopsy is being performed or aerosol generating procedures (AGPs) are being conducted, instructions in the section Autopsy Procedures should be followed.**

If only a postmortem NP swab is being collected, individuals in the room during specimen collection should be limited to healthcare personnel (HCP) obtaining the specimen. HCP should follow [Standard Precautions](#).

Engineering Control Recommendations for NP Swab Collection

Since collection of nasopharyngeal swab specimens from deceased persons will not induce coughing or sneezing, a negative pressure room is **not** required if **only** a NP swab is being collected from the decedent. Personnel should adhere to Standard Precautions as described above.

PPE Recommendations for NP Swab Collection

Since collection of nasopharyngeal swab specimens from deceased persons will not induce coughing or sneezing, NIOSH-approved disposable N-95 respirator or higher is **not** required if **only** a NP swab is being collected from the decedent.

The following PPE should be worn at a minimum:

- Wear nonsterile, nitrile, latex or rubber gloves when handling potentially infectious materials.
- If there is a risk of cuts, puncture wounds, or other injuries that break the skin, wear heavy-duty gloves over the nitrile gloves.
- Wear a clean, long-sleeved fluid-resistant or impermeable hospital isolation gown to protect skin and clothing.
- Use a plastic face shield or a face mask and goggles to protect the face, eyes, nose, and mouth from splashes of potentially infectious bodily fluids.

Autopsy Procedures

Standard Precautions, Contact Precautions, and Airborne Precautions with eye protection (goggles or a face shield) should be followed during autopsy. Many of the following procedures are consistent with existing guidelines for safe work practices in the autopsy setting; see [Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories](#).

- AGPs such as use of an oscillating bone saw should be avoided for known or suspected COVID-19 cases. Consider using hand shears as an alternative cutting tool. If an oscillating saw is used, attach a vacuum shroud to contain aerosols.
- Allow only one person to cut at a given time.
- Limit the number of personnel working in the autopsy suite at any time to the minimum number of people necessary to safely conduct the autopsy.
- Limit the number of personnel working on the human body at any given time.
- Use a biosafety cabinet for the handling and examination of smaller specimens and [other containment equipment](#) whenever possible.
- Use caution when handling needles or other sharps, and dispose of contaminated sharps in puncture-proof, labeled, closable sharps containers.
- A logbook including names, dates, and activities of all workers participating in the postmortem and cleaning of the autopsy suite should be kept to assist in future follow up, if necessary. Include custodian staff entering after hours or during the day.

Engineering Control Recommendations for Autopsies

Autopsies on decedents known or suspected to be COVID-19 cases should be conducted in [Airborne Infection Isolation Rooms \(AIIRs\)](#). These rooms:

- Are at negative pressure to surrounding areas
- Have a minimum of 6 air changes per hour (ACH) for existing structures and 12 ACH for renovated or new structures
- Have air exhausted directly outside or through a high efficiency particulate aerosol (HEPA) filter


Doors to the room should be kept closed except during entry and egress. If an AIIR is not available, ensure the room is negative pressure with no air recirculation to adjacent spaces. A portable HEPA recirculation unit could also be placed in the room to provide further air filtration . Local airflow control (i.e., laminar flow systems) can be used to direct aerosols away from personnel. If use of an AIIR or HEPA unit is not possible, the procedure should be performed in the most protective environment possible. AIIR room air should never be recirculated in the building, but directly exhausted outdoors, away from windows, doors, areas of human traffic or gathering spaces, and from other building air intake systems.

PPE Recommendations for Autopsies

The following PPE should be worn during autopsy procedures:

- Double surgical gloves interposed with a layer of cut-proof synthetic mesh gloves
- Fluid-resistant or impermeable isolation gown
- Waterproof apron
- Goggles or face shield
- NIOSH-approved disposable N-95 or higher respirator

- Powered, air-purifying respirators (PAPRs) with HEPA filters may provide increased worker comfort during extended autopsy procedures.
- When respirators are necessary to protect workers, employers must implement a comprehensive respiratory protection program in accordance with the OSHA Respiratory Protection standard (29 CFR 1910.134 [↗](#)) that includes medical exams, fit-testing, and training.

Surgical scrubs, shoe covers, and surgical cap should be used per routine protocols. **Doff (take off) PPE**  carefully to avoid contaminating yourself and before leaving the autopsy suite or adjacent anteroom.

After removing PPE, discard the PPE in the appropriate laundry or waste receptacle. Reusable PPE (e.g., goggles, face shields, and PAPRs) must be cleaned and disinfected according to the manufacturer's recommendations before reuse. Immediately after doffing PPE, wash hands with soap and water for 20 seconds. If hands are not visibly dirty and soap and water are not available, an alcohol-based hand sanitizer that contains 60%-95% alcohol may be used. However, if hands are visibly dirty, always wash hands with soap and water before using alcohol-based hand sanitizer. Avoid touching the face with gloved or unwashed hands. Ensure that hand hygiene facilities are readily available at the point of use (e.g., at or adjacent to the PPE doffing area).

If the PPE supply is low, see [Strategies for Optimizing the Supply of PPE](#).

Additional safety and health guidance is available for workers handling deceased known or suspected COVID-19 cases at the [Occupational Safety and Health Administration \(OSHA\), COVID-19 website](#) [↗](#).

Collection of Postmortem Specimens

Implementing proper biosafety and infection control practices is critical when collecting specimens. Please refer to [Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with Coronavirus Disease 2019 \(COVID-19\)](#) for additional information.

Collection of Postmortem Swab Specimens for COVID-19 Testing

For suspected COVID-19 cases, CDC recommends collecting and testing postmortem nasopharyngeal swabs (NP swabs) and if an autopsy is performed, lower respiratory specimens (lung swabs). If the diagnosis of COVID-19 was established before death, collection of these specimens for COVID-19 testing may not be necessary. Medical examiners, coroners, and pathologists should work with their local or state health department to determine capacity for testing postmortem swab specimens.

NP specimen is the preferred choice for upper respiratory tract swab-based SARS-CoV-2 testing. When collection of a postmortem NP swab is not possible, each of the following is an acceptable alternative:

- An oropharyngeal (OP) specimen
- A nasal mid-turbinate (NMT) swab
- An anterior nares (nasal swab; NS) specimen
- Nasopharyngeal wash/aspirate or nasal aspirate (NA) specimen

Use only synthetic fiber swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and inhibit PCR testing. Place swabs immediately into sterile tubes containing 2-3 ml of viral transport media.

Nasal swabs (NS) or nasal mid-turbinate (NMT) swabs should be placed in a transport tube containing either viral transport medium, Amies transport medium, or sterile saline.

If both NP and OP swabs are collected, they should be combined in a single tube to maximize test sensitivity and limit use of testing resources.

Upper Respiratory Tract Specimen Collection: Nasopharyngeal Swab (NP swab)

- Insert flexible wire shaft minitip swab through the nares parallel to the palate (not upwards) until resistance is encountered or the distance is equivalent to that from the ear to the nostril of the patient, indicating contact with the nasopharynx. Swab should reach depth equal to distance from nostrils to outer opening of the ear. Gently rub and roll the swab. Leave swab in place for several seconds to absorb secretions. Slowly remove swab while rotating it.
- For nasal swabs (NS), a single polyester swab with a plastic shaft should be used to sample both anterior nares.
- For additional guidance, see [Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens for COVID-19](#)

Lower respiratory tract Specimen Collection: Lung swabs

- Collect one swab from each lung (left and right). Options for lung swab collection include the following, and may depend on the institution's standard practices or type of autopsy procedure (e.g., full or in-situ autopsy)
 - During the internal exam, after the heart-lung block is removed, insert one swab as far down into the tracheobronchial tree as possible on either side (left and right)
 - First wipe the surface of each lung with an iodine-containing disinfectant clean and dry the surface; then use a sterile scalpel to cut a slit of the lung and insert the swab to collect sample on either side.

No data are currently available on the frequency of detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, by RT-PCR on postmortem swabs collected at different durations after death. If COVID-19 testing on postmortem swab specimens is being considered for a suspected COVID-19 case, SARS-CoV-2 RNA may still be detected up to 3 days postmortem and possibly longer based on available data from experiences with MERS-CoV and SARS-CoV; however sensitivity may be reduced with a longer postmortem interval, and duration of illness may need to be considered in interpreting a negative result.

Storage of Postmortem Swab Specimens

Store specimens at 2-8°C for up to 72 hours after collection. If a delay in testing or shipping is expected, store specimens at -70°C or below.

Collection of Postmortem Specimens for Other Routine Testing

Separate postmortem specimens (e.g., NP or lung swabs) should be collected for routine testing of respiratory pathogens at either clinical or public health labs. Note that clinical laboratories should NOT attempt viral isolation from specimens collected from known or suspected COVID-19 cases.

Other postmortem specimen collection and evaluations should be directed by the decedent's clinical and exposure history, scene investigation, and gross autopsy findings, and may include routine bacterial cultures, toxicology, and other studies as indicated.

Collection of Autopsy Tissue Specimens

Formalin-fixed, and formalin-fixed-paraffin-embedded tissue specimens, obtained at autopsy, can be used to establish a postmortem diagnosis of COVID-19 infection by using immunohistochemical and molecular techniques available at the CDC's Infectious Diseases Pathology Branch (IDPB). An important advantage of this approach is that it allows the preservation and retention of relatively stable specimens that can be tested at a later date to provide a confirmatory diagnosis. The collection of fixed tissues can be particularly important when conventional swab-based testing methods are not available or have provided inconclusive results.

Viral antigens and nucleic acids may be focally distributed in respiratory tissues of patients with COVID-19 disease and the distribution and quantity of virus can vary among individual patients. For these reasons, we recommend collecting:

1. **A minimum of 3 representative sections of lung parenchyma, preferably from different locations.**

AND

2. **A minimum of 2 sections of airway, to include trachea, bronchi, or both airways.**

To minimize potential viral contamination of non-involved tissues, lung and airway specimens should be collected immediately following removal of the chest plate. Then place specimens into a separate sterile specimen cup containing 10% neutral buffered formalin.

Focused sampling of these tissues, collected by autopsies limited to the chest, or by directed collection accomplished by incision, can be used when deemed appropriate.

If involvement of one or more other organs (e.g., heart, kidneys) is suggested by clinical history or laboratory findings obtained prior to death, representative samples of these tissues should be considered for sampling and submission. Complete autopsies could be warranted in certain circumstances, as determined by the medical examiner, coroner, or community pathologist.

Collection of tissue samples approximately 5 mm in thickness (i.e., sample would fit in a tissue cassette) is recommended for optimal fixation. Tissues should be placed in 10% buffered formalin, in a volume that is approximately 10 times greater than the volume of tissue. Optimal fixation is three days (72 hours). Specimens should be shipped to CDC as soon as possible following complete fixation. Prolonged immersion in formalin (e.g., > 2 weeks) can diminish the sensitivity of virus detection assays.

Alternately, formalin-fixed, paraffin embedded tissues (original blocks obtained at autopsy) can be submitted for evaluation.

Considerations Regarding Postmortem Serologic Testing

Serologic tests for SARS-CoV-2 look for the presence of antibodies. It typically takes about one to two weeks after illness onset with COVID-19 for antibodies to develop; some people may take longer. Depending on when someone was infected and the timing of the test, the test may not find antibodies in someone with a current COVID-19 infection. Per FDA guidance, antibody tests have not been validated for diagnosis of COVID-19 infection, and antibody tests by themselves are of limited value in the immediate diagnosis of a patient where COVID-19 infection is suspected. For more information, see: [Interim Guidelines for COVID-19 Antibody Testing](#)

Safely Preparing the Specimens for Shipment

After collecting and properly securing and labeling specimens in primary containers with the appropriate media/solution, they must be transferred from the autopsy suite in a safe manner to laboratory staff who can process them for shipping.

1. Within the autopsy suite, primary containers should be placed into a larger secondary container.
2. If possible, the secondary container should then be placed into a resealable plastic bag that was not in the autopsy suite when the specimens were collected.
3. The resealable plastic bag should then be placed into a biological specimen bag with absorbent material; and then can be transferred outside of the autopsy suite.
4. Workers receiving the biological specimen bag outside the autopsy suite or anteroom should wear disposable nitrile gloves.

Submission of Specimens for COVID-19 Testing

Submission of Postmortem Swab Specimens to CDC

Medical examiners, coroners, and other healthcare professionals should work with their state and local health departments to coordinate testing through public health laboratories. In addition, COVID-19 testing, authorized by the Food and Drug Administration under an Emergency Use Authorization (EUA), is available in clinical laboratories.

Postmortem swab specimens may be shipped to CDC if testing is not available at public health or clinical laboratories in a jurisdiction, or if repeated testing results remain inconclusive or if other unusual results are obtained. State or local health departments should contact CDC at respvirus@cdc.gov prior to submitting samples.

If shipping samples to CDC: If specimens will ship without delay, store specimens at 2-8°C, and ship overnight to CDC on ice pack. If a delay in shipping will result in receipt at CDC more than 72 hours after collection, store specimens at -70°C or below and ship overnight to CDC on dry ice. Additional useful and detailed information on packing, shipping, and transporting specimens can be found at [Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with Coronavirus Disease 2019 \(COVID-19\)](#). Specimens must be packaged, shipped, and transported according to the current edition of the [International Air Transport Association \(IATA\) Dangerous Goods Regulations](#) [external icon](#).

Label each specimen container with the patient's ID number (e.g., medical record number), unique CDC or state-generated NCOV specimen ID (e.g., laboratory requisition number), specimen type (e.g., NP swab) and the date the sample was collected. Complete a [CDC Form 50.34](#) for each specimen submitted. In the upper left box of the form, 1) for *test requested* select "Respiratory virus molecular detection (non-influenza) CDC-10401" and 2) for *At CDC, bring to the attention of* enter "Stephen Lindstrom: 2019-nCoV PUI-Autopsy".

Please refer to our instruction guidance for submitting CDC Form 50.34 found here: [Guidelines For Submitting Specimens to CDC](#). 

For additional information, consultation, or the CDC shipping address, contact the CDC Emergency Operations Center (EOC) at 770-488-7100.

Submission of Fixed Autopsy Tissue Specimens to CDC

At this time, CDC's Infectious Diseases Pathology Branch is accepting formalin-fixed (wet) tissues and formalin-fixed, paraffin-embedded autopsy tissue blocks for COVID-19 testing from decedents when the **following three criteria** are met:

1. **Clinical or pathologic findings, and epidemiologic history indicate need for COVID-19 testing (i.e., meets criteria A OR B):**

A. **Unexplained death occurring on or after 12/1/2019 with clinical or pathologic findings and epidemiologic history consistent with possible COVID-19, (i.e., meets all of the following three criteria):**

1. Death occurring on or after 12/1/2019,

AND

2. Clinical or pathologic findings for possible COVID-19 (i.e., meets criteria a OR b below):

a. History of fever, cough, shortness of breath, influenza-like illness, or other [signs or symptoms concerning for COVID-19](#)

OR

b. Histopathologic evidence in respiratory tissues consistent with a possible infectious process, including acute lung injury (e.g., diffuse alveolar damage), interstitial pneumonitis, pneumonia, or tracheobronchitis

AND

3. No alternative plausible diagnosis

1. Decedents may have infectious disease testing positive for one or more other pathogens, but review of clinical, pathologic, and epidemiologic information suggests that COVID-19 should also be considered.

OR

B. **Death with laboratory evidence of SARS-CoV-2 by other antemortem or postmortem testing but with questions regarding the relationship of results to reported clinical history, observed gross or histopathologic findings at autopsy, or the cause of death**

AND

2. **Adequate specimens are available:**

- Formalin-fixed (wet) tissues or formalin-fixed, paraffin-embedded (FFPE) tissue blocks from lung or upper airway:
 - If >4 weeks have elapsed since autopsy, original FFPE tissue blocks from the time of autopsy are available.
 - If FFPE tissue blocks are submitted, a minimum of two respiratory tissue blocks are required.

AND

3. **Approval of appropriate state or local health department for specimen submission to CDC has been obtained.**

For cases meeting the above criteria, follow the steps outlined below to obtain pre-approval from CDC's Infectious Diseases Pathology Branch to submit specimens for evaluation:

A. **Reminder – Healthcare providers, pathologists, medical examiners, and coroners—please first contact your state, tribal, local, or territorial health department.**

B. **Contact CDC's Infectious Diseases Pathology Branch at pathology@cdc.gov for pre-approval. Include the following information in the email:**

1. A brief clinical history
2. A description of gross or histopathologic findings in the tissues to be submitted

In your email correspondence, **do not** include patient identifiers such as name, date of birth, or medical record number. You must follow all applicable federal, state, and local regulations to adhere to patient confidentiality and privacy protections.

C. **After you receive email approval from CDC:**

1. Electronically fill, save, and print both pages of the [CDC Form 50.34](#).
2. In the upper left box of the form, select Test Order Code CDC-10365 ("Pathologic Evaluation of Tissues for

Possible Infectious Etiologies”).

3. Enter “COVID-19” and provide any applicable CDC and State NCOV Case ID numbers in the Comments section on Page 2 of the CDC 50.34 form.
4. In addition to the CDC 50.34 form, enclose the following in the specimen submission package:
 - a. Surgical pathology, autopsy report (preliminary is acceptable), or both
 - b. Relevant clinical notes, including admission History and Physical (H&P), discharge summary, if applicable

D. Mailing/Contact Info:

1. Formalin-fixed wet tissues and/or formalin-fixed, paraffin-embedded tissue blocks should be shipped in suitable packaging at ambient temperature. Do not freeze fixed tissues.
2. Ship to: Dr. Sherif Zaki, CDC, IDPB, 1600 Clifton Rd NE, MS: H18-SB, Atlanta, GA 30329-4027
3. Send tracking number to pathology@cdc.gov
4. Tel: 404-639-3132, Fax: 404-639-3043, Email: pathology@cdc.gov




Cleaning and Waste Disposal Recommendations

The following are general guidelines for cleaning and waste disposal following an autopsy of a decedent with confirmed or suspected COVID-19. Current evidence suggests that novel coronavirus may remain viable for hours to days on surfaces made from a variety of materials.

Use routine cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces) prior to applying [Environmental Protection Agency \(EPA\)-approved disinfectant](#)[external icon](#) that meet the criteria for use against SARS-CoV-2, the virus that causes COVID-19.

After an autopsy of a decedent with confirmed or suspected COVID-19, the following recommendations apply for the autopsy room (and anteroom if applicable):

- Keep ventilation systems active while cleaning is conducted; before cleaning, wait 24 hours in a non-healthcare setting, or if you know the air changes per hour of the room or area in a healthcare setting, follow the [recommended wait time](#) before cleaning.
- Wear disposable gloves recommended by the manufacturer of the cleaner or disinfectant while cleaning and when handling cleaning or disinfecting solutions.
 - Dispose of gloves if they become damaged or soiled and when cleaning is completed, as described below. Never wash or reuse gloves.
- Use eye protection, such as a face shield or goggles, if splashing of water, cleaner/disinfectant, or other fluids, is expected.
- Wear a clean, long-sleeved fluid-resistant gown to protect skin and clothing.
- Wear a NIOSH-approved disposable N95 or higher respirator if you need to clean the room or area in less than 24 hours or the [recommended wait time](#) cannot be met.
- Additional PPE may be required to protect workers against potential hazards associated with the cleaning and disinfectant products used and in accordance with the label instructions.
- If PPE is in low supply, and cleaning must occur before the [recommended wait time](#) has passed, consider having workers who performed autopsies conduct the cleaning and sanitizing of the area.
- When respirators are necessary to protect workers, employers must implement a comprehensive respiratory protection program in accordance with the OSHA Respiratory Protection standard ([29 CFR 1910.134](#) [external icon](#)) that includes medical exams, fit-testing, and training.

- Ensure workers are trained on OSHA's Hazard Communication standard, [29 CFR 1910.1200](#) , to communicate with workers about the hazardous chemicals used in the workplace.
- Use [Environmental Protection Agency \(EPA\)-approved disinfectants](#)  that meet the criteria for use against SARS-CoV-2, the virus that causes COVID-19. Follow the manufacturer's instructions for all cleaning and disinfection products (e.g., concentration, application method, contact time).
 - Clean the surface first, and then apply the disinfectant as instructed on the disinfectant manufacturer's label. Ensure adequate contact time for effective disinfection.
 - Adhere to any safety precautions or other label recommendations as directed (e.g., allowing adequate ventilation in confined areas and proper disposal of unused product or used containers).
 - Avoid using product application methods that cause splashing or generate aerosols.
 - Cleaning activities should be supervised and inspected periodically to ensure correct procedures are followed.
- Do not use compressed air and/or water under pressure for cleaning, or any other methods that can cause splashing or might re-aerosolize infectious material.
- Gross contamination and liquids should be collected with absorbent materials, such as towels, by staff conducting the autopsy wearing designated PPE. Gross contamination and liquids should then be disposed of as described below:
 - Use of tongs and other utensils can minimize the need for personal contact with soiled absorbent materials.
 - Large areas contaminated with body fluids should be treated with disinfectant following removal of the fluid with absorbent material. The area should then be cleaned and given a final disinfection.
 - Small amounts of liquid waste (e.g., body fluids) can be flushed or washed down ordinary sanitary drains without special procedures.
 - Hard, nonporous surfaces may then be cleaned and disinfected as described above.
- Follow standard operating procedures for the containment and disposal of used PPE and regulated medical waste. State and local governments should be consulted for appropriate disposal decisions.
- Dispose of human tissues according to routine procedures for pathological waste.
- Clean and disinfect or autoclave non-disposable instruments using routine procedures, taking appropriate precautions with sharp objects.
- Materials or clothing that will be laundered can be removed from the autopsy suite (or anteroom, if applicable) in a sturdy, leak-proof biohazard bag that is tied shut and not reopened. These materials should then be sent for laundering according to routine procedures.
- Wash reusable, non-launderable items (e.g., aprons) with a detergent solution on the warmest setting possible, rinse with water, decontaminate using disinfectant, and allow items to dry completely before next use.
- Keep camera, telephones, computer keyboards, and other items that remain in the autopsy suite (or anteroom, if applicable) as clean as possible, but treat as if they are contaminated and handle with gloves. Wipe the items after use with appropriate [Environmental Protection Agency \(EPA\)-approved disinfectants](#)  that meet the criteria for use against SARS-CoV-2, the virus that causes COVID-19. If being removed from the autopsy suite, ensure decontamination to the extent possible with appropriate disinfectant according to the manufacturer's recommendations prior to removal and reuse.
- When cleaning is complete and PPE has been removed, wash hands immediately with soap and water for 20 seconds. If hands are not visibly dirty and soap and water are not available, an alcohol-based hand sanitizer that contains at least 60% alcohol may be used. However, if hands are visibly dirty, always wash hands with soap and water before using an alcohol-based hand sanitizer. Avoid touching the face with gloved or unwashed hands. Ensure that hand hygiene facilities are readily available at the point of use (e.g., at or adjacent to the PPE doffing area).


Transportation of Human Remains

If it is necessary to transfer a body to a bag, follow [Standard Precautions](#), including additional personal protective equipment (PPE) if splashing of fluids is expected. Standard body bagging procedures should be followed, consistent with procedures used for deaths where COVID-19 is not suspected. Given the varying weights of decedents and variety, construction, and conditions of body bag materials, postmortem care workers should use prudent judgement determining if risks for puncture, tearing, or failure of body bags could occur and whether a second body bag or a body bag of thicker, stronger material (e.g. minimum of 6 mil thickness) is necessary. Risk factors include but are not limited to:

- Presence of sharp objects on the decedent that could cause punctures or tears (e.g. jewelry, piercings, medical instruments)
- Weight of the decedent that could cause the bag/bag handle to fail during transport (if available, verify body bag weight capacities as provided by the manufacturer)
- Bodily fluids posing exposure risks to workers transporting the body should a puncture, tear, or failure occur (e.g. SARS-CoV-2 has been detected in the feces of some patients diagnosed with COVID-19, though whether the virus in stool is infectious is unknown, [Standard Precautions](#) for bloodborne pathogens should always be taken.)
- Damage or degradation to the body bag that may have occurred in shipment or storage (e.g. the bag is broken or brittle)

Follow standard routine procedures when transporting the body after specimens have been collected and the body has been bagged. Disinfect the outside of the bag with [Environmental Protection Agency \(EPA\)-approved disinfectants](#) [☞](#) that meet the criteria for use against SARS-CoV-2, the virus that causes COVID-19, applied according to the manufacturer's recommendations. Wear disposable nitrile gloves when handling the body bag.

Additional Resources:

- [CDC Guidelines for Safe Work Practices in Human and Animal Diagnostic Laboratories](#) 
- [OSHA COVID-19 Guidance](#) [☞](#)
- [WHO Guidance on regulations for the transport of infectious substances 2017–2018](#) [☞](#)
- [CDC Tools for Protecting Healthcare Personnel](#)
- [CDC Environmental Infection Control Guidelines](#)
- [CDC Medical Examiners, Coroners, and Biologic Terrorism](#)
- [COVID-19 and Funerals](#)
- [COVID-19 Death Data and Reporting Guidance](#)

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Content source: [National Center for Immunization and Respiratory Diseases \(NCIRD\)](#), [Division of Viral Diseases](#)