Centers for Disease Control and Prevention

COVID-19

Interim Guidelines for Collecting and Handling of Clinical Specimens for COVID-19 Testing

Updated May 18, 2022

Summary of Recent Changes

Updates as of October 25, 2021

- Added new language on ordering swabs and media, assessing specimens obtained through self-collection, and transporting specimens through pneumatic tube systems.

View Previous Updates

Key Points

- The type of specimen collected when testing for current or past infection with SARS-CoV-2 is based on the test being performed and its manufacturer's instructions. Some of the specimen types listed below will not be appropriate for all tests.
- For initial diagnostic testing for current SARS-CoV-2 infections, CDC recommends collecting and testing an upper respiratory specimen.
- This guidance is intended for healthcare providers or health department staff who are collecting specimens from others in a healthcare setting or at the point-of-care. Guidance for self-collection of specimens can be found here.

CDC has guidance for who should be tested, but decisions about who should be tested are at the discretion of State, Tribal, Local, and Territorial (STLT) health departments and/or healthcare providers. Testing for other pathogens by the provider should be done as part of the initial evaluation, as indicated, but should not delay testing for SARS-CoV-2, the virus that causes COVID-19.

Collecting and Handling Specimens Safely

For healthcare providers collecting specimens or working within 6 feet of patients suspected to be infected with SARS-CoV-2, maintain proper infection control and use recommended personal protective equipment (PPE), which includes an N95 or higher-level respirator (or face mask if a respirator is not available), eye protection, gloves, and a gown.

For healthcare providers who are handling specimens, but are not directly involved in collection (e.g. handling self-collected specimens) and not working within 6 feet of the patient, follow Standard Precautions. Healthcare providers should wear a form of source control (face mask) at all times while in the healthcare facility.

Healthcare providers can minimize PPE use if patients collect their own specimens while maintaining at least 6 feet of separation. For example, the provider should wear a face mask, gloves, and a gown.

Respiratory Specimen Collection

Respiratory specimens should be collected as soon as a decision has been made to test someone, regardless of the time of symptom onset. The guidance below addresses options for collecting specimens.

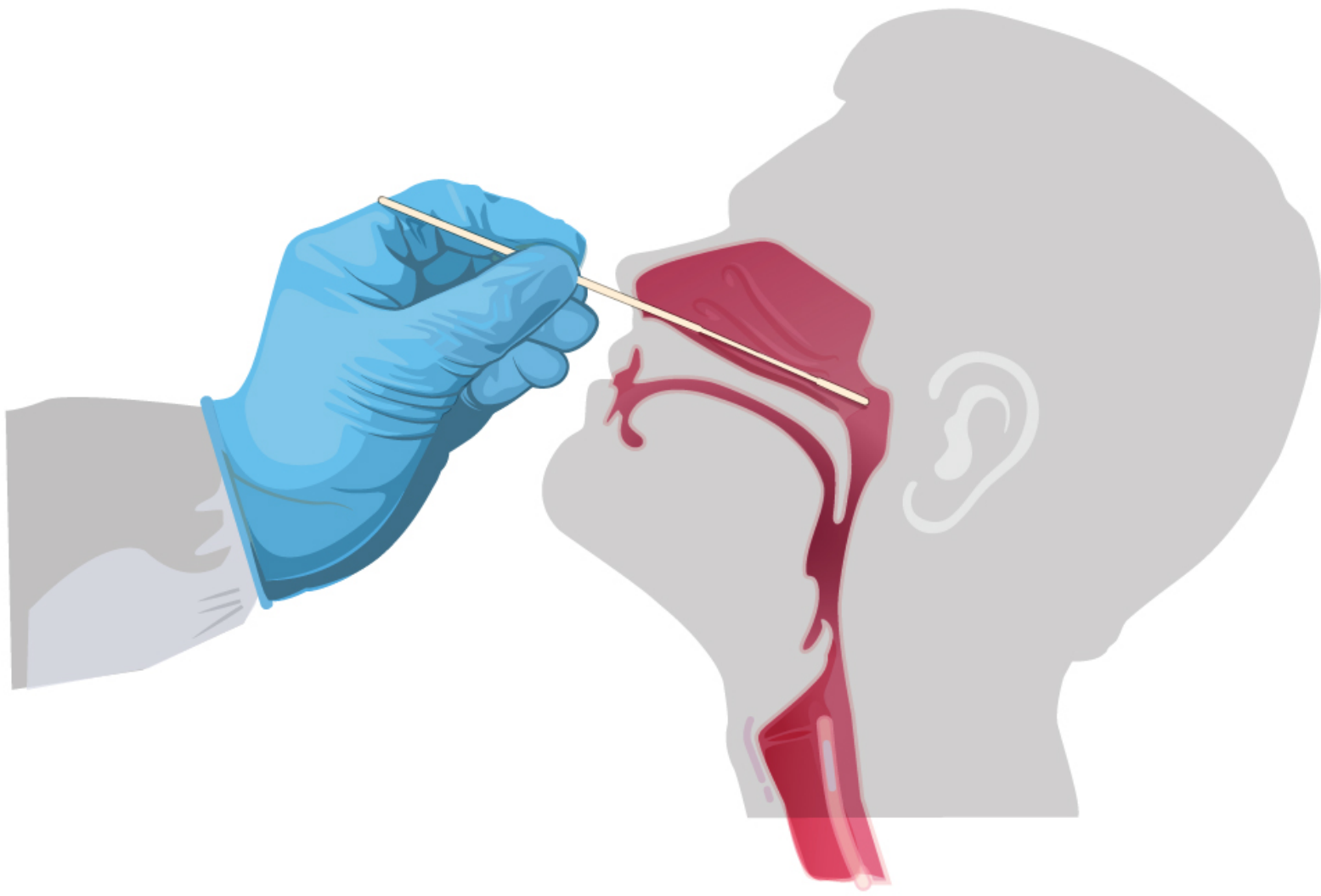
Proper specimen collection is the most important step in the laboratory diagnosis of infectious diseases. A specimen that is not collected correctly may lead to false or inconclusive test results. The following specimen collection guidelines follow standard recommended procedures.

For initial diagnostic testing for current SARS-CoV-2 infections, CDC recommends collecting and testing an upper respiratory specimen. Contact the testing laboratory to confirm accepted specimen types and follow the manufacturer instructions for specimen collection. Sterile swabs should be used for the collection of upper respiratory specimens. This is important both to ensure patient safety and preserve specimen integrity. Note that nasopharyngeal and oropharyngeal specimens are not appropriate for self-collection.

Testing lower respiratory tract specimens is also an option. For patients who develop a productive cough, sputum can be collected and tested for SARS-CoV-2 when available. However, the induction of sputum is not recommended due to the possibility of aerosol production during the procedure. Under certain clinical circumstances (e.g., for those receiving invasive mechanical ventilation), a lower respiratory tract aspirate or bronchoalveolar lavage specimen can be collected and tested as a lower respiratory tract specimen.

A. Upper respiratory tract

Nasopharyngeal specimen (NP) collection /Oropharyngeal (OP) (throat) specimen collection (performed by a trained healthcare provider, only)



Use only synthetic fiber swabs with thin plastic or wire shafts that have been designed for sampling the nasopharyngeal mucosa. Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and may inhibit molecular tests. CDC recommends collecting only the NP specimen, although an OP specimen is an acceptable specimen type. If both NP and OP specimens are collected, combine them in a single tube to maximize test sensitivity and limit use of testing resources.

Instructions for collecting an NP specimen (performed by a trained healthcare provider):

- Tilt patient's head back 70 degrees.

- Gently and slowly insert a minitip swab with a flexible shaft (wire or plastic) through the nostril 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.
- Gently rub and roll the swab.
- Leave swab in place for several seconds to absorb secretions.
- Slowly remove swab while rotating it. Specimens can be collected from both sides using the same swab, but it is not necessary to collect specimens from both sides if the minitip is saturated with fluid from the first collection.
- If a deviated septum or blockage create difficulty in obtaining the specimen from one nostril, use the same swab to obtain the specimen from the other nostril.
- Place swab, tip first, into the transport tube provided.

Instructions for collecting an OP specimen (performed by a trained healthcare provider):

- Insert swab into the posterior pharynx and tonsillar areas.
- Rub swab over both tonsillar pillars and posterior oropharynx and avoid touching the tongue, teeth, and gums.
- Place swab, tip first, into the transport tube provided.

Nasal mid-turbinate (NMT) specimen (performed by a healthcare provider or the patient after reviewing and following collection instructions):

- Use a tapered swab.
- Tilt patient's head back 70 degrees.
- While gently rotating the swab, insert swab less than one inch (about 2 cm) into nostril parallel to the palate (not upwards) until resistance is met at turbinates.
- Rotate the swab several times against nasal wall and repeat in other nostril using the same swab.
- Place swab, tip first, into the transport tube provided.

Visual guides

- For healthcare providers, see the Nasal Mid-Turbinate (NMT) Specimen Collection Steps [16 MB, 2 pages]
- For patients and consumers, see the How to Collect a Nasal Mid-Turbinate Specimen for COVID-19 Testing infographic [4 MB, 2 pages].

Anterior nasal specimen (performed by a healthcare provider or the patient after reviewing and following the collection instructions):

- Insert the entire collection tip of the swab provided (usually ½ to ¾ of an inch, or 1 to 1.5 cm) inside the nostril.
- Firmly sample the nasal wall by rotating the swab in a circular path against the nasal wall at least 4 times.
- Take approximately 15 seconds to collect the specimen. Be sure to collect any nasal drainage that may be present on the swab.
- Repeat in the other nostril using the same swab.
- Place swab, tip first, into the transport tube provided.

For a visual guide, see the How To Collect An Anterior Nasal Swab Specimen For COVID-19 Testing infographic [371 KB, 2 pages].

Nasopharyngeal wash/aspirate or nasal wash/aspirate (performed by a trained healthcare provider)

- Attach catheter to suction apparatus.
- Tilt patient's head back 70 degrees.
- Instill 1 mL-1.5 mL of non-bacteriostatic saline (pH 7.0) into one nostril.

- Insert the tubing into the nostril parallel to the palate (not upwards). Catheter should reach depth equal to distance from nostrils to outer opening of ear.
- Begin gentle suction/aspiration and remove catheter while rotating it gently.
- Place specimen in a sterile viral transport media tube.

For an additional visual guide, see the Nasopharyngeal/Nasal Aspirate or Nasopharyngeal/Nasal Wash sections in the Influenza Specimen Collection infographic.

Saliva (collected by patient with or without supervision)

Collect 1-5 mL of saliva in a sterile, leak-proof screw cap container. No preservative is required. Follow additional instructions from the healthcare provider or manufacturer.

Breath (performed by a qualified, trained operator under the supervision of a healthcare provider licensed or authorized by state law to prescribe tests)

Follow the instructions as explicitly described within the test's EUA Instructions for Use.

B. Lower respiratory tract

Bronchoalveolar lavage, tracheal aspirate, pleural fluid, lung biopsy (generally performed by a physician in the hospital setting)

- Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container.
- Due to the increased technical skill and equipment needs, collection of specimens other than sputum from the lower respiratory tract may be limited to patients presenting with more severe disease, including people admitted to the hospital and/or fatal cases.

Sputum (collected under the guidance of a trained healthcare professional)

- For patients who develop a productive cough, sputum can be collected and tested when available for SARS-CoV-2. However, the induction of sputum is not recommended. Educate the patient about the difference between sputum (deep cough) and oral secretions (saliva/spit). Have the patient rinse the mouth with water and then expectorate deep cough sputum directly into a sterile, leak-proof, screw-cap collection cup or sterile dry container.

Note: This is an aerosol-generating procedure and likely to generate higher concentrations of infectious respiratory aerosols. Aerosol-generating procedures potentially put healthcare providers and others at an increased risk for pathogen exposure and infection. Healthcare providers should maintain proper infection control, including standard precautions, and wear an N95 or equivalent or higher-level respirator, eye protection, gloves, and a gown, when collecting specimens.

C. How to order swabs and media

The US Department of Health and Human Services (HHS) is directly managing allocation of some swabs and media, including viral transport media (VTM), based on state and territory testing plans that were submitted in response to the Coronavirus Aid, Relief, and Economic Security (CARES) Act requirements. Allocations were predetermined to maximize state and territory testing using a data-driven algorithm based on population, high incidence areas, and COVID-19 Task Force's directives. A monthly web-based survey goes out to each state and territory where they can request the number of swabs and media required. As of August 2021, HHS is distributing the following swabs: nasopharyngeal (NP), nasal, foam, and poly swabs. For specific swab requests, delivery site changes, or other related requests contact COVID19.TestSupplies@hhs.gov.

Public health and clinical laboratories can also produce their own VTM if it is unavailable for purchase. In response to VTM shortages, CDC posted a standard operating procedure for the preparation of VTM . Saline is also an acceptable transport medium for some COVID-19 viral assays, including the Influenza SARS-CoV-2 (Flu SC2) Multiplex Assay. Check the Instructions for Use (IFU) to see which transport medium is acceptable.

Assessing Validity of Specimens Obtained Through Self-Collection

Self-collection of specimens, both unsupervised and supervised by a medical professional, is currently available for specific tests authorized by the FDA. Additional authorized diagnostic tests for the detection of SARS-CoV-2 will likely have this capability as well.

Laboratories should confirm the specimen has been obtained correctly and from the individual that is being tested. Generally, Clinical Laboratory Improvement Amendments (CLIA) requires laboratories to ensure positive specimen identification and optimum integrity of a patient's specimen using at least two separate (distinct) or unique identifiers, such as patient's name or another unique identifier. Other information that must be provided to the laboratory when requesting a test includes the sex and age or date of birth of the patient; the test(s) to be performed; the specimen source; the date and, if appropriate, the time of specimen collection.

Handling Bulk-Packaged Sterile Swabs Properly for Upper Respiratory Specimen Collection

Sterile swabs for upper respiratory specimen collection may be packaged in one of two ways:

- Individually wrapped (preferred when possible)
- Bulk packaged

When individually wrapped swabs are not available, bulk-packaged swabs may be used for specimen collection; however, care must be exercised to avoid SARS-CoV-2 contamination of any of the swabs in the bulk-packaged container.

- Before engaging with patients and while wearing a clean set of protective gloves, distribute individual swabs from the bulk container into individual sterile disposable plastic bags.
- If bulk-packaged swabs cannot be individually packaged:
  - Use only fresh, clean gloves to retrieve a single new swab from the bulk container.
  - Close the bulk swab container after each swab removal and leave it closed when not in use to avoid accidental contamination.
  - Store opened packages in a closed, airtight container to minimize contamination.
  - Keep all used swabs away from the bulk swab container to avoid contamination.
- As with all swabs, only grasp the swab by the distal end of the swab, using gloved hands only.
- When patients are self-collecting swabs under clinical supervision:
  - Hand a swab to the patient only while wearing a clean set of protective gloves.
  - The patient can then self-swab and place the swab in transport media or sterile transport device and seal.
  - If the patient needs assistance, you can help the patient place the swab into transport media or a transport device and seal it.

Storing and Shipping Respiratory Specimens

Store respiratory 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. Store extracted nucleic acid samples at -70°C or lower.

Pack and ship suspected and confirmed SARS-CoV-2 patient specimens, cultures, or isolates as UN 3373 Biological Substance, Category B, in accordance with the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations and U.S. Department of Transportation's (DOT) Transporting Infectious Substances Safely . Personnel must be trained to pack and ship according to the regulations and in a manner that corresponds to their function-specific responsibilities.

Additional 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).

Shipping Specimens to CDC

If necessary, and with advance approval, specimens may be shipped to CDC if repeated testing results remain inconclusive or if other unusual results are obtained. Please contact CDC at respvirus@cdc.gov prior to submitting specimens to confirm.

Additional information, including the specimen submission form and shipping address, can be found at Submitting Specimens to CDC.

Pneumatic Tube Transport

CDC recommends that each laboratory perform a risk assessment before using the pneumatic tube system to transport suspected or confirmed SARS-CoV-2 specimens. Each facility should conduct a site- and activity-specific risk assessment of the procedures performed, identifying the hazards involved in the process, the competency level of the personnel performing the methods, and the laboratory facility. An institution's biosafety professional, laboratory management, scientific/clinical, and safety staff should be involved in conducting the risk assessment process to determine the appropriate specimen transport practices to implement at the facility.

Facilities should ensure that all personnel who transport specimens via pneumatic tubes are trained in safe handling practices, specimen management, and spill decontamination procedures.

For additional information about performing a risk assessment, refer to the Biological Risk Assessment: General Considerations for Laboratories and the Biosafety in Microbiological and Biomedical Laboratories (BMBL) 6th Edition .

Capillary Fingerstick Specimen Collection

Blood specimens are used for antibody (or serological) tests and, for some tests authorized by the US Food and Drug Administration that are used at the point-of-care, specimens are collected by pricking the skin with a fingerstick device.

Anyone performing fingerstick procedures should review the following recommendations to ensure that they are not placing persons in their care at risk for infection. Fingerstick devices should **never** be used for more than one person due to risk of transmission of other bloodborne infectious diseases.

These recommendations apply not only to healthcare facilities but also to any setting where fingerstick procedures are performed.

Instructions for collecting a capillary blood specimen by fingerstick:

- Wash your hands with warm soapy water and dry hands thoroughly or perform hand hygiene using an alcohol-based hand sanitizer.
- Put on gloves for the collection of the fingerstick blood specimen.
- Hold the hand of the person being tested in a downward position and massage the hand to improve blood flow into the fingers.
- Use the middle or ring finger for the specimen collection. Locate a puncture site—it should be slightly off-center (lateral side of) on the fleshy part of the fingertip.
- Clean the puncture site with a 70% isopropyl alcohol pad and allow it to air dry.
- Use the manufacturer-provided collection device or a disposable, single-use lancet that retracts upon puncture for performing the fingerstick. Follow the manufacturer's instructions if using their collection device.
- Press the fingerstick collection device or lancet firmly against side of the finger pad and activate to perform the puncture. If using a lancet, make a single puncture in one smooth motion.
- Gently squeeze the base of the finger to form a drop of blood at the puncture site. Avoid squeezing the finger repeatedly or too tightly. Wipe away the first drop of blood and follow manufacturer instructions to fill the capillary collection tube or apply the second drop of blood to the test device.
- Dispose of used fingerstick collection devices and lancets immediately at the point of use in an approved sharps container. Never reuse lancets.

- Apply firm pressure to the puncture site with clean gauze for five to ten seconds after collecting the specimen to ensure bleeding has stopped. If needed, apply self-adhering latex-fee adhesive strip to site.
- Properly remove gloves and discard in appropriate receptacles. Change gloves between contacts with each person being tested. Change gloves that have touched potentially blood-contaminated objects or fingerstick wounds before touching clean surfaces.
- Wash and dry hands thoroughly or perform hand hygiene immediately after removal of gloves and before touching medical supplies intended for use on other persons.

For an additional visual guide, see the Steps for Collecting Finger Stick Capillary Blood Using a Microtainer® . Note: Follow manufacturer's instructions when using another collection device.

Additional Resources

- Biosafety in Microbiological and Biomedical Laboratories (BMBL) (6th edition)
- Nasal (Anterior Nasal) Specimen Collection for SARS-CoV-2 Diagnostic Testing
- How to Report COVID-19 Laboratory Data
- Guidance for SARS-CoV-2 Point-of-Care Testing
- Guidance – Proposed Use of Point-of-Care (POC) Testing Platforms for SARS-CoV-2 (COVID-19)
- Information for Clinicians on Influenza Virus Testing
- Information on Collection of Respiratory Specimens for Influenza Virus Testing
- FAQs on Testing for SARS-CoV-2
- WHO Guidelines on Drawing Blood: Best Practices in Phlebotomy

Previous Updates

Updates from Previous Content

As of February 26, 2020

- Added new guidance on capillary fingerstick specimen collection.

As of December 30, 2020

- Nasal mid-turbinate swab was added as an acceptable specimen for home or onsite self-collection.

Last Updated May 18, 2022