# Guidelines for collection of research sample during and after the COVID-19 pandemic

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# Contents

# Collection of research samples during and after the COVID-19 pandemic

## Purpose of this document

The purpose of this document is to collate and share available guidelines for the collection of human specimens for clinical and translational research during and after the COVID-19 pandemic. This document does not cover sample handling for propagation, culturing or direct work on SARS-CoV-2 for diagnostic or research purposes which must be conducted at containment level 3 (CL3).

The information has been collected using available guidelines from PHE/NHSE and other international bodies (CDC, ESMO, FDA) together with the responses from a brief consultation with laboratory personnel and pathology personnel within the CRUK network.

## Introduction

COVID-19 is an infectious disease caused by the virus SARS-CoV-2, which belongs to a family of viruses called Coronaviruses known to cause also SARS and MERS.

At this point in time the pathogenic potential and transmission risks deriving from samples taken from people infected with SAR-CoV-2 is limited. SARS-CoV-2 has been classed as a Hazard Group 3 (HG3) pathogen by the Advisory Committee on Dangerous Pathogens (ACDP); therefore, any laboratory work with the live virus (i.e. culturing or propagating SARS-CoV-2 for diagnostic or research purposes) must be conducted at containment level 3 (CL3).

For any other laboratory work involving human specimens, the guidance set out by the government is based on the current knowledge of this virus and other coronaviruses; thus, it is subject to change when more information becomes available.

There is currently limited published data on the infectivity of human samples obtained from patients infected with SARS-CoV-2. Although the virus RNA can be detected in many different sample types, including samples from the upper and lower respiratory tract, sputum, blood, faeces, urine and cerebrospinal fluid, the isolation of infectious virus particles has been confirmed so far only in samples from the upper respiratory tract (see Wolfel et al., Nature 2020; https://www.ncbi.nlm.nih.gov/pubmed/32235945).

Therefore, exposure to these types of sample without appropriate protective measures represents the greatest risk of SARS-CoV-2 laboratory acquired infections. To date, **no** laboratory-acquired infection has been reported for SARS-CoV-2 (data updated by PHE to 19th March 2020).

Given the widespread diffusion of COVID-19 within the population, all human samples should be treated as suspected for COVID-19, unless a negative test is available, and should be processed at containment levels 2 (CL2) using normal good laboratory practice, including the use of standard biological safety precautions, regular staff training, and the use of standard operating procedures (which is the standard procedure in testing labs). This is essential to minimise potential risks.

In addition, it is important that all clinical and research laboratories perform their own risk assessments for handling biological samples with suspected or confirmed COVID-19 and take appropriate measures to contain potentially infectious materials and prevent secondary infections and transmissions.

## Pathology sample collection and processing

Based on knowledge available to date and that of other coronaviruses, potential risks of infection with SARS-CoV-2 for clinical and laboratory personnel could occur by inhalation of aerosolised virus or by contact with droplets.

The main identified risks include:

1. The potential infectiousness of any suspected positive sample types when improperly handled, including:
    a. blood aerosolisation from opening tubes or during extraction processes outside of a safety cabinet;
    b. inhalation of infectious tissues particles during the macro dissection process if carried out outside a safety cabinet;
    c. risk of aerosolisation of infectious saliva samples when opening samples outside of a safety cabinet.
2. Not using appropriate PPE.
3. Samples incorrectly labelled resulting in staff not taking the necessary precautions.

The Royal College of Pathologists (RCPath) and other Professional Bodies, including the Institute of Biomedical sciences (IBMS), ACP and ACB released in March a specific guidance for Pathology testing prioritization during the pandemic, which can be found at this link:

https://www.ibms.org/resources/documents/guidance-for-pathology-testing-prioritisation-v10-final/

Formalin fixation renders the virus non-viable, thereby reducing the risk of subsequent sample processing. An extended formalin fixation time for histology and additional fixation time with added alcohol decontamination in cytology samples has been advised, in line with current guidance from WHO/ CDC /IBMS/RCPath. The clinical staff at sites working during the pandemic consulted for this document have confirmed that the extended fixation time is the main change introduced for sample

handling.

Special category of samples that might need special handling due to higher safety risks include fresh samples, unfixed or partially fixed samples, and saliva. As a general rule, with the exception of emergency life-saving situations or when there would be clear benefit for patients, patients with confirmed COVID-19 should not be enrolled in any procedure involving sample handling.

Some specific guidance has been developed by RCPath on handling these types of samples:

Advice on frozen sections and fine needle aspirates:

https://www.rcpath.org/uploads/assets/936cee34-9f87-4cd8-af326efacc32aa74/RCPath-advice-on-histopathology-frozen-sections-and-cytology-FNA-during-infectious-disease-outbreaks.pdf

Advice on unfixed histological specimens

https://www.rcpath.org/uploads/assets/4556f1b9-3a6d-4132-b7d0d7c22dfc0a5c/7b8a6470-ac7c-4fe1-876ae3b2f051a258/RCPath-advice-on-the-opening-of-unfixed-histopathological-specimens-during-infectious-disease-outbreaks.pdf

## Safe handling of samples in laboratories

For staff working in laboratories and handling suspected or confirmed COVID19 samples, PHE has released updated guidelines on the safe handling and processing of samples in laboratories, which can be found at this link:

https://www.gov.uk/government/publications/wuhan-novel-coronavirus-guidance-for-clinical-diagnostic-laboratories/wuhan-novel-coronavirus-handling-and-processing-of-laboratory-specimens.

The guideline highlights two main points:

1. The need for site-specific and activity-specific risk assessment to identify and mitigate risks and determine if enhanced biosafety precautions are warranted.

   Risk assessments and mitigation measures are dependent on the procedures performed, identification of the hazards involved in the process and/or procedures, the competency level of the personnel who perform the procedures, the laboratory equipment and facility, and the resources available.
   The risk assessment should identify all potential scenarios of a particular activity that could produce a negative outcome, prioritize the potential risks, based on the evaluation of their likelihood and consequences, and determine the most appropriate control measures.

2. Where a risk is identified the following measures should be implemented:
   - reduce the number of operators to a minimum;
   - wear appropriate personal protective equipment (PPE).
   - use ventilated/fume cupboards at CL2.
   - use local standard decontamination procedures of every surface used for work.

## Packaging and transport requirements for patients' samples

Packaging and transport of patients' specimen are described in the PHE guidelines above.

The Department for Transport has provided further guidelines to assist testing laboratories, or others involved in healthcare, in the transport of patient specimens suspected of containing COVID-19.

The guidance is the UK government's interpretation of the requirements of Packing Instruction 650 of ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road) and can be found at this link:

https://www.gov.uk/government/publications/packaging-and-transport-requirements-for-patient-samples-un3373/packaging-and-transport-requirements-for-patient-samples-un3373#purpose-of-guidance

In brief, the packing should be strong enough to withstand the shocks and loadings normally encountered during carriage including removal from a pallet or overpack for subsequent manual or mechanical handling.

## Useful links

A list of links to recent Covid-19-related guidelines can be found on the Institute of Biomedical Science (IBMS) website:
https://www.ibms.org/resources/covid-19-resources/guidance/

NHSE guidance for cancer care and second phase update:
https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/nhs-genomic-medicine-service-covid-19-letter-26-march-2020.pdf

https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/06/C0511-second-phase-of-nhs-response-to-covid-19-for-cancer-services-letter.pdf

Guidelines from US Centre for disease control (CDC)
Lab biosafety guidelines:
https://www.cdc.gov/coronavirus/2019-nCoV/lab/lab-biosafety-guidelines.html
Frequently asked questions:
https://www.cdc.gov/coronavirus/2019-ncov/lab/biosafety-faqs.html

FDA guidance on conducting clinical trials updated on May 14th
https://www.fda.gov/media/136238/download

ESMO guidance on cancer patients care
https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic?page=1