

Question & Answer regarding COVID-19 and Mohs Lab

Question from Mohs Histotechnician:

I want to thank you for the continuous updates regarding recommended safety precautions. This is a frightening time for everyone, but I know we are all grateful that we have you to guide us through these challenging and stressful months. I try to stay current with newly published literature regarding COVID-19 and potential lab hazards, but I haven't had much success. I realize there is much we don't know and are learning daily. I was hoping you might be able to alleviate a few fears I have concerning frozen sections. I'm probably overthinking this but say a patient, positive for COVID-19, had Mohs performed on their nose, mouth, or hand. Could the freeze spray used during embedding and/or cryostat sectioning (since it lacks negative air flow) potentially cause aerosolization? I apologize if my apprehensions are unfounded. I've attached an older article I read that discusses aerosols and TB. Thank you for your time!

Answer from Quality Council Mohs Surgery Committee:

Thank you for posing the question and we are glad you feel comfortable asking because it shows that QualDerm has an open culture that invites dialogue.

The risk of 2019-nCoV coronavirus transmission from Mohs surgery excised tissue to laboratory personnel is unknown and no published literature addresses this question. No specific authoritative source or organization like The American College of Mohs Surgery, American Society of Mohs Histotechnology or American Academy of Dermatology has addressed this theoretical concern to date. According to CDC guidance, a safety risk assessment was performed, and this risk appears very low. All patients presenting for Mohs surgery have been screened with CDC recommended questionnaires and temperature measurements. Any unknown COVID-19 positive Mohs patient, therefore, is asymptomatic and any viral shedding occurs at much reduced rates. It appears, based on the limited autopsy study by Xu et al., that only lung tissues exhibit microscopic evidence of 2019-nCoV infection whereas no viral change was noted in liver and cardiac muscle.¹ Furthermore, those internal organ tissue specimens were from patients who died from Covid-19 with massive viral loads in the lung. It is very unlikely and unproven that *skin or mucosal tissue* itself contains viable virus. Therefore, aerosolization of virus-laden tissue during Mohs frozen sectioning or when using cryo-spray to rapidly freeze specimens is also unlikely and unproven to date.

In the Mohs lab, the primary potential risk would involve the following element of work:

- receipt of gross tissue from nasal, oral or conjunctival cases potentially harboring virus in blood/mucus/saliva/tears, since the mucosal surfaces may not be effectively prepped with surface disinfecting agents, and subsequent viral transfer to personnel through direct surface contact (e.g. touching face/eyes)

Cytopathological Biosafety of COVID-19/Chen and Chi

COVID-19 transmission routes: droplets, direct contact, and indirect contact

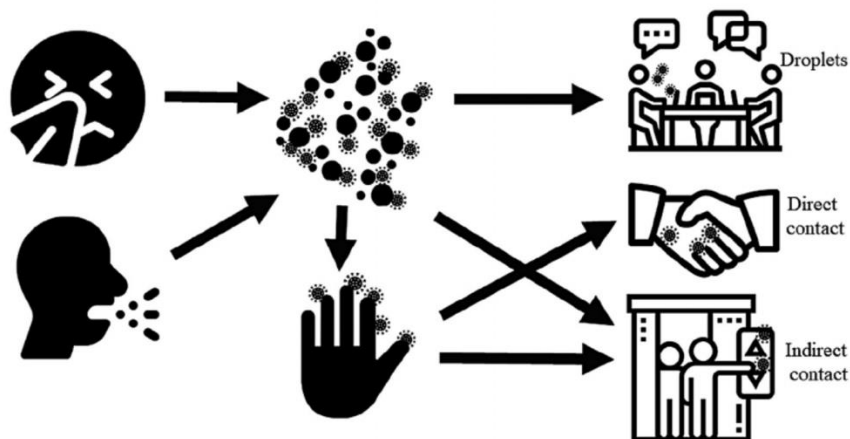


FIGURE 1. Drivers of transmission of coronavirus (COVID-19) infection consist of short-range, large-droplet transmission (>5 μm in diameter, traveling <1 meter); close, unprotected, direct contact; and indirect contact with contaminated surfaces.

All specimens collected for Mohs laboratory testing have always been considered potentially infectious (HIV, Hep B, Hep C) and we recommend all laboratory personnel follow standard universal precautions and standard PPE to

reduce risks. PPE should include gloves, surgical facemask and eye protection until definitive evidence-based guidelines are developed for COVID-19. (Note: In the Paraffin lab, formalin is validated as an effective antiseptic agent to inactivate coronavirus, so no additional precautions are required for fully fixed specimens.)

In the absence of definitive guidelines or scientific evidence of enhanced risk, any concerned Mohs surgeons and histotechnicians may consider rinsing off grossly excised tissue with hydrogen peroxide (>0.5%) or alcohol (>70%)[proven to inactivate coronavirus]² and blotting all blood/secretions prior to further transport, grossing, inking, embedding. Properly dispose of biowaste including toothpicks/cotton tipped applicators used for inking. Histotechnicians may elect to avoid using cryo-spray in the Mohs lab to potentially further eliminate the theoretical risk of aerosolization of viral particles from surface secretions on excised specimens. Other options include submerging chuck into LN2, blotting with LN2 soaked gauze or using freeze bars to expedite freezing process.

The following information is also provided from CDC guidelines and website.³

CDC Laboratory Biosafety and COVID-19: Questions and Answers

What are Standard Precautions?

Standard Precautions are based on the principle that all blood, body fluids, secretions, nonintact skin, mucous membranes, and excretions (except sweat) may contain transmissible infectious agents. Standard Precautions include hand hygiene and the use of personal protective equipment (PPE) such as laboratory coats or gowns, gloves, and eye protection.

What are infectious aerosols and droplets?

Aerosols and droplets containing particles that are <100 µm in diameter are not visible to the naked eye. Laboratory workers may not be aware that such particles can be generated during many laboratory procedures and that these particles could be inhaled or could cross-contaminate work surfaces, materials, and equipment.

Infectious aerosols are small liquid or solid particles suspended in the air that contain infectious agents. They can disperse throughout the laboratory and remain infective over time and distance. These particles are of a size that may be inhaled into the lower respiratory tract (<5 µm in diameter). Examples of organisms transmitted by aerosols include spores of *Aspergillus* spp., *Mycobacterium tuberculosis*, rubeola virus (measles), and varicella-zoster virus (chickenpox).

Droplets traditionally are defined as larger infectious particles (>5 µm in diameter) that rapidly fall out of the air, contaminating gloves, the immediate work area, and the mucous membranes of the persons performing the procedure.

Examples of infectious agents that are transmitted via the droplet route include *Bordetella pertussis*, influenza viruses, adenovirus, *Mycoplasma pneumoniae*, **SARS-associated coronavirus (SARS-CoV)**, group A streptococcus, and *Neisseria meningitidis*.

What procedures can generate aerosols and droplets?

Many routine laboratory procedures can potentially generate aerosols and droplets that are often undetectable. The following **laboratory procedures** have been associated with the generation of infectious aerosols and droplets: centrifugation, pipetting, vortexing, mixing, shaking, sonicating, removing caps, decanting liquids, preparing smears, flaming slides, aliquoting and loading specimens, loading syringes, manipulating needles, syringes or sharps, aspirating and transferring blood and body fluids, subculturing blood culture bottles, spilling specimens, and cleaning up spills.

General Biosafety Recommendations⁴

1. An effective and routine surface disinfection helps to ensure early containment and the prevention of further viral spread.
2. Put on, use, take off, and dispose of PPE properly.
 - a. PPE should consist of surgical mask, gloves, and eye protection
3. All technical procedures should be performed in a way that minimizes the generation of aerosols and droplets.
4. Appropriate disinfectants with proven activity against enveloped viruses should be used before and after processing.
 - a. The disinfectants with proven activity against enveloped viruses include 0.1% sodium hypochlorite, 62% to 71% ethanol, 0.5% hydrogen peroxide, quaternary ammonium compounds, and phenolic compounds.
5. Perform proper hand hygiene.
6. Cryostat maintenance should follow manufacturers recommendations and be documented according to CAP or CLIA regulations. Daily cleaning of trimmings and tissue remnants from chamber is recommended and

defrosting and decontamination should immediately follow frozen section processing of known infectious tissues (HIV, HCV, SARS CoV-2/Covid-19, TB). One may consider weekly defrost/decontamination for cryostats in daily use.⁵

References:

1. Xu Z, Shi L, Wang Y, et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir Med*. 2020. published online Feb 17. DOI:10.1016/S2213-2600(20)30076-X
2. Henwood AF. Coronavirus disinfection in histopathology, *Journal of Histotechnology* 2020;3:1-3. Published online 1 Mar 2020. DOI: 10.1080/01478885.2020.1734718
3. <https://www.cdc.gov/coronavirus/2019-ncov/lab/biosafety-faqs.html>
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