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**2019-nCoV (Coronavirus):
FAQs for Organ Donation and Transplantation**

Updated: April 6, 2020 (changes highlighted)

The AST's Infectious Disease Community of Practice has received queries from transplant colleagues regarding the novel coronavirus (2019-nCoV). The following FAQs were developed to relay information on the current state of knowledge. This document is subject to change as more information becomes available.

Also see OPTN information link: <https://optn.transplant.hrsa.gov/news/information-fortransplant-programs-and-opos-regarding-2019-novel-coronavirus/>

Please note, information regarding organ donors is available in this resource, beginning on page 5.

1. What is the origin of the novel coronavirus?

COVID-19 is the disease caused by the novel coronavirus named Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) that was first recognized in the Hubei province of China in December 2019 subsequently spreading across China and has continued to spread worldwide and recently has been declared a pandemic. While many cases outside of China have been linked to travelers from China or other areas with high circulation of SARS-CoV-2, cases have also been diagnosed without obvious travel-related exposure. The first infections with SARS-CoV-2 likely came from a non-human host but now it is transmitted from person to person.

There are 7 coronaviruses known to infect humans. Four seasonal coronavirus strains normally circulate in humans. These are usually mild common cold viruses but on occasion can cause viral pneumonia in immunosuppressed persons and can be identified using multiplex respiratory virus panels. There is no laboratory cross reactivity between the seasonal coronaviruses and SARS-CoV-2. Two previous outbreaks from more virulent coronaviruses have been caused by Severe Acute Respiratory Syndrome (SARS-CoV) and Middle East Respiratory Syndrome (MERS CoV). There are published case reports of transplant patients acquiring SARS and MERS viruses, in some cases with fatal outcomes (AJT 2003; 3(8): 977-81 and AJT 2015; 15(4):1101-4).

2. How is SARS CoV-2 transmitted?

Infection is acquired from someone who is shedding virus. Person-to-person transmission was recognized early in the pandemic during close exposure (<6 feet) to a person infected with COVID-19, primarily via respiratory droplets produced when the infected person coughs or sneezes. Most frequently, transmission is presumed to be from symptomatic individuals with COVID-19 via droplet spread. Less commonly infection acquired from a person without symptoms has occurred, and it is presumed that transmission is possible from contact with contaminated objects. While stool has tested positive for SARS-CoV-2 in some cases by nucleic acid testing (NAT), it is not known whether this is

replicative virus. The incubation period is usually between 2-14 days in the general population although longer incubations have been documented (Bai Y et al JAMA 2020).

Healthcare transmissions of COVID-19 have occurred and given the potential for greater infectivity, strict isolation precautions should be followed for anyone with suspected SARS-CoV2. Recent studies now confirm that the virus is airborne, even in asymptomatic individuals who are testing positive for the virus. CDC has recommended use of airborne precautions for the general public (to include wearing cloth masks when going out in public or in instances where social distancing may be challenging), and N95 masks for healthcare workers while they remain available. Surgical masks are acceptable alternatives when supplies are limited. However, during periods of limited supplies, the N95 masks or their equivalents should be reserved for procedures that are more likely to generate respiratory aerosolization. Local institutional guidelines should be followed for personal protective equipment (PPE). The public is encouraged to make masks as recommended by the CDC.

3. Are transplant patients at higher risk for COVID-19?

Data on transplant recipients with COVID-19 are still limited to unpublished case reports and small case series but experience is accumulating. However, based on data from other viruses and SARS, severe infection in the immunocompromised population, including transplant recipients has occurred. Mild infections have also been reported. At this time, the risk factors for severe infection have not been fully characterized. It is anticipated that transplant recipients may have a greater viral burden and shedding resulting in greater infectivity and potential spread to other individuals.

For healthcare centers with active cases of COVID-19, consideration should be given to postponing non-essential transplant clinic visits to avoid exposing vulnerable populations.

4. Are there any treatments for COVID-19?

Currently, the treatment is supportive care. Potential antiviral medications are undergoing testing and vaccines are under development. However, it may be a number of months before any of these are approved.

Remdesivir is an investigational antiviral that is being studied in clinical trials for severe and moderate COVID-19 cases. It may be possible to obtain this via clinical trial or expanded access although its availability is limited. Its efficacy is still unknown.

Similarly, chloroquine, hydroxychloroquine, lopinavir/ritonavir, interferon-1 β , tocilizumab and several other compounds are being evaluated or considered as experimental therapy; results have been variable and based on small case series.

Drug-drug interactions with immunosuppressant medications need to be evaluated and managed, particularly with the HIV drug lopinavir/ritonavir which leads to marked elevations in the levels of calcineurin inhibitors and mTOR inhibitors due to profound CYP3A-mediated inhibition of their metabolism by ritonavir. We recommend against the use of lopinavir/ritonavir for first line therapy given early data that it lacks efficacy and the potential for severe drug-drug interactions.

There is a suggestion that continued ARB and ACE inhibitor therapy may be detrimental but data on this association are extremely limited and there is no firm recommendation for discontinuation of these medications at this time. The impact of immunosuppression on COVID-19 is not currently known but

decreasing immunosuppression should be considered for infected recipients, if no recent rejection episodes. Whether adjunctive corticosteroid therapy for patients with severe ARDS may be beneficial is also unknown and there is no current recommendation for the use of adjunctive corticosteroids.

5. Are there any specific travel restrictions for transplant patients?

The CDC has recommended to suspend all non-essential travel and restrictions are now in place in multiple locations.

We recommend that transplant patients not travel unless it is absolutely essential. Should transplant recipients need to travel, we recommend taking additional essential medicines with them, to ensure they have a sustainable supply in the event of an unexpected quarantine or travel delay. We also suggest that transplant patients' immediate household contacts not travel unless absolutely essential. Regardless, the household contact should avoid travel to high-risk areas. Given the rapidly evolving epidemiology of COVID-19, all nonessential travel should be carefully evaluated.

The CDC and WHO maintain websites that are being updated as the outbreak evolves, and travel recommendations will likely change over time.

- CDC: <https://www.cdc.gov/coronavirus/2019-nCoV/summary.html>
- World Health Organization: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
- In Canada: <https://www.canada.ca/en/publichealth/services/diseases/2019-novel-coronavirusinfection.html>

6. Should transplant patients wear a mask or avoid public places?

It is unknown how much wearing a mask will help prevent infection. Most surgical masks are not tight fitting and aerosols can get through. However, they may prevent patients from touching their nose and mouth. It is unclear if an N95 mask is better than a regular surgical mask since proper fit testing has not been performed. N95 mask can be uncomfortable to wear for prolonged periods. The CDC is not recommending mask use for infection protection outside the hospital at this time unless taking care of someone who is sick. **N95 masks should be reserved for healthcare workers.** Frequent handwashing or hand sanitizer use helps prevent infection. Transplant patients should exercise caution about being in overcrowded situations and practice social distancing.

Transplant candidates, recipients, and potential living donors should be educated about the importance of performing frequent hand hygiene, avoidance of crowds, and applying social distancing. If SARSCoV-2 is circulating in the recipient's area, avoid public places including school, and stay at home as much as possible to reduce risk of exposure SARS-CoV-2.

7. What is the approach to transplant recipients with flu-like/respiratory symptoms?

Transplant patients should be instructed to call the transplant center if they have symptoms of fever or cough, myalgias, flu like symptoms, unexplained gastrointestinal symptoms, or loss of sense of taste and/or smell instead of presenting to the clinic without notifying the center in advance. If patients are instructed to present for medical evaluation, transplant patients should wear a mask immediately upon entering the building. If the transplant patient has a medical emergency (e.g., shortness of breath),

they should call 911 and notify dispatch if they've been exposed to SARS-CoV-2 so that appropriate safety precautions can be taken.

There are many different causes for flu-like/respiratory symptoms. Each hospital should have protocols in place for transplant patients with flu-like/respiratory symptoms in the era of COVID-19. Consult your local hospital practices for outpatient transplant clinic screening or visitor restrictions for transplant recipients as these may evolve over time. A travel history or contact with recently returning travelers from high-risk geographic areas internationally and geographic areas including those in the US and Canada where there is local transmission, should be elicited, but given the widespread community infection, this is no longer a hallmark of COVID-19. Other causes of respiratory illness including influenza and RSV should be assessed but COVID-19 should also be considered based on epidemiologic factors and local transmission.

Patients suspected of COVID-19 should have a surgical mask placed on them, be placed in isolation and local infection control should be notified. CDC has updated guidelines for infection control <https://www.cdc.gov/coronavirus/2019-ncov/infection-control.html>.

The CDC has also established interim risk criteria for exposure to the SARS-CoV-2 <https://www.cdc.gov/coronavirus/2019-ncov/php/risk-assessment.html>. Testing for SARS-CoV-2 is done via a specific RT-PCR on nasopharyngeal and oropharyngeal swabs. However, testing availability is highly variable in much of the US and abroad. SARS-CoV2 is not detected using the standard respiratory virus multiplex tests at this time, so specific testing must be requested.

8. What is the approach to transplant candidates and recipients coming for routine appointments?

In general, if COVID-19 is circulating in the vicinity of a transplant center, issues of resource availability need to be balanced against the need for urgent organ transplantation. Local centers with circulating virus will need to consider the risk of nosocomial transmission to a recipient or to healthcare workers. Temporary suspension of elective living donor transplantation or non-urgent deceased donor transplants may need to be considered. Likewise, the need for performance of nonurgent procedures such as bronchoalveolar lavage and surveillance biopsies should be reviewed, and consideration given for deferring elective appointments. Increased use of telemedicine or phone consultation for nonurgent visits should be evaluated.

In addition, the need for routine elective ambulatory appointments and laboratory visits should be considered. In some stable patients with scheduled routine visits, virtual/telemedicine visits may be appropriate and laboratory testing may be performed locally. Organizational leadership will need to be involved in prioritization plans.

9. What is the approach to ill transplant candidates who are actively listed for transplant?

Given the paucity of data, it is not known if patients with active or recent COVID-19 can be safely transplanted. However, it is anticipated that transplantation of these patients could result in adverse outcomes. Given the absence of definitive treatment, candidates with active COVID-19 should be deferred from transplantation. The ideal disease-free interval is unknown at this time. However, median duration of viral shedding in one study was 20 days from illness onset (range 8 to 37 days) (Zhou F the Lancet published on line March 9, 2020). At this time, it is recommended that at least two negative

COVID PCRs should be documented with complete symptom resolution to avoid adverse events in post-transplant as well as avoid exposure to the healthcare team. The risk of transplantation must be balanced with the risk of not transplanting a patient with acute or recent COVID-19. It is not known whether asymptomatic transplant candidates should be screened prior to proceeding to transplant; for those at high risk of exposure, this may be prudent if the testing is available, although no data exist to inform this choice.

INFORMATION ON DONORS

Should living and deceased donors be screened?

Donors should be screened epidemiologically and by clinical history for concern for COVID-19 infection. If testing for the SARS-CoV-2 virus is available, it should be obtained and resulted prior to donation.

The risk of a COVID-19 infection from an infected donor is unknown at this time. Factors that could impact the risk of SARS-CoV-2 transmission include epidemiological risk factors, incubation period, degree of viremia and viability of the virus within the blood and specific organ compartments. Other factors to consider during organ acceptance are the risk of the transplant candidate's mortality while on the transplant waitlist, as well as the impact that a COVID-19 donor-derived infection could have on the recipients' medical system and community.

The optimal approach to donor screening may change over time as more data accumulate. At this time, organ procurement organizations (OPOs) and living donor hospitals should screen potential donors for exposure and clinical symptoms compatible with COVID-19 (Table 1). If available, diagnostic testing for SARS-CoV-2 is indicated for donors with a history of COVID-19 exposure (including residence in a community with high prevalence of COVID-19) or clinical symptoms suggestive of COVID-19. For deceased organ donors who are being tested we recommend testing upper (nasopharyngeal and oropharyngeal) or lower respiratory samples (bronchoalveolar lavage) for COVID-19. If donor testing is not available, or if the COVID-19 test result will not be available pre-procurement, then the criteria in Table 2 should be used to stratify deceased donors into high, intermediate, or low risk of a COVID-19 donor-derived infection. The recommendations for the different deceased donor scenarios are summarized in Table 3.

In general, if COVID-19 is circulating in the transplant center community, issues of resource availability need to be balanced against the need for an organ transplant. This should include evaluating availability of intensive care beds, ventilators and hospital staffing. In addition, local centers with circulating virus need to consider the risk of nosocomial transmission to a new transplant recipient or to healthcare workers.

CMS released [recommendations regarding elective surgeries and non-essential procedures](#) that include transplantation. Transplants fall into Tier 3b, noting that they should not be postponed in "high acuity/unhealthy patients." Some centers may still need to explore temporary suspension of elective living donor transplantation or non-urgent deceased donor transplants with involvement of organizational leadership based on prioritization planning. Issues impacting this decision may include the level of circulating infection in their areas and/or operational issues (e.g. testing availability, bed space, availability of basic supplies and equipment, including PPE).

Table 1: Exposure and clinical screening of potential donors for COVID-19

EPIDEMIOLOGIC SCREENING

Does the deceased donor meet any of the following criteria? Yes, No or Unknown
<ul style="list-style-type: none"> • Travel to or residing in an area in the preceding 21 days, where local COVID-19 transmission is occurring • Travel to or from a CDC high-risk area (Level 2- 3) • Direct contact with known or suspected case of COVID-19 in the preceding 21 days* • Confirmed Diagnosis of COVID-19 in the last 28 days

*this includes being within six feet of a person with suspected or proven COVID-19.

Close contact can occur while caring for, living with, visiting, or sharing a healthcare waiting area or room with a COVID-19 case or having direct contact with infectious secretions of a COVID-19 case (e.g., being coughed on)

CLINICAL SCREENING:

Has the deceased donor experienced any of the following symptoms in the last 21 days? Yes, no or unknown
<ul style="list-style-type: none"> • Fever (>38°C or 100.3°F or subjective fever) • Malaise or flu like symptoms, + /- myalgias • New cough • Shortness of breath • Unexplained abdominal pain, nausea, and/or diarrhea • Loss of sense of taste and/or smell

Table 2: Donor Classification for Donor Derived COVID-19 based on Clinical symptoms and epidemiologic screening above

<p>High Risk</p> <ul style="list-style-type: none"> • Yes, to one or more of the epidemiology screening criteria <u>PLUS</u> • Yes, to one or more of the clinical screening criteria
<p>Intermediate Risk</p> <ul style="list-style-type: none"> • Yes, to one or more of the epidemiology screening criteria <u>AND</u> • No or Unknown to the clinical screening criteria
<p>Intermediate Risk</p> <ul style="list-style-type: none"> • No or unknown to the epidemiology screening criteria <u>AND</u> • One or more clinical symptoms without another clear diagnosis and in the absence of testing for COVID-19
<p>Low Risk</p> <ul style="list-style-type: none"> • No epidemiologic risk factors <u>AND</u> • No clinical symptoms

Table 3: Preliminary Deceased Donor Recommendations to mitigate risk of COVID-19 Donor Derived Infection

<ul style="list-style-type: none"> • We do not recommend using organs from deceased donors at this time who have any of the following: <ul style="list-style-type: none"> ○ Have active COVID-19 infection ○ Test positive for COVID-19 as part of the OPO evaluation ○ Classified as high-risk on screening tool and SARS-CoV-2 testing not available or feasible
<ul style="list-style-type: none"> • Deceased donors who are classified as intermediate risk should be tested for COVID-19 if testing is available <ul style="list-style-type: none"> ○ If testing is not available, we recommend NOT using lungs or intestines ○ The use of other organs should be made with caution after careful consideration of the risks and benefits. The decision-making should include the candidate or their proxy and explaining lack of currently approved therapies. Transplant programs accepting organs from these donors should consider placing recipients in contact, and airborne isolation ○ As per OPTN Policy 2.2 OPOs maintain blood specimens appropriate for serologic or NAT testing on all deceased donors that can be made available for retrospective testing which may be of value if a concern for suspected donor derived infection arises after transplantation. Other specimens such as an NP or tracheal aspirate if available may also be invaluable but is not mandated to be stored at this time
<ul style="list-style-type: none"> • Organs from deceased donors that met epidemiological or clinical criteria and test negative during the OPO evaluation should be used with caution given the reports of false negatives. <ul style="list-style-type: none"> ○ The decision-making should include the candidate or their proxy. Transplant programs accepting organs from these donors should consider placing recipients in airborne isolation.
<ul style="list-style-type: none"> • Organs from deceased donors classified as low risk may be used <ul style="list-style-type: none"> ○ This recommendation is subject to modification if COVID-19 transmission from asymptomatic donors is confirmed in the future
<ul style="list-style-type: none"> • Organs from deceased donors who have recovered from COVID-19 and have resolution of symptoms greater than 28 days prior to procurement and repeated negative testing are more likely to be safe to use

Table 4 Preliminary Living Donor Recommendations to mitigate risk of COVID-19 Donor Derived infection

<ul style="list-style-type: none"> • We do not recommend using organs from a living donor with active COVID-19 at this time
<ul style="list-style-type: none"> • Living donors who are classified as high risk should have donation postponed until they are at least 28 days beyond symptom resolution and have a negative SARS-CoV-2 PCR test
<ul style="list-style-type: none"> • Consider delaying transplant for living donors who are classified as intermediate risk due to exposure questions but who have no symptoms of illness for 14 days <ul style="list-style-type: none"> ○ They should be counseled about ways to decrease transmission ○ They should be tested for SARS-CoV-2 prior to transplant to document negative status (nasopharyngeal/oropharyngeal) and blood NAT testing
<ul style="list-style-type: none"> • During periods of local transmission of SARS-CoV-2, temporary suspension of elective living donor transplantation may need to be considered to protect the potential donor as well as the recipient

The current outbreak is unpredictable. If widespread community-transmission occurs, healthcare infrastructure and capacity issues may have further impact on donation and transplantation. These recommendations will be regularly updated to account for the changing epidemiology and new information regarding treatment and testing.

Acknowledgement:

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