Summary of Current Evidence and Information– Donor SARS-CoV-2 Testing & Organ Recovery from Donors with a History of COVID-19

Aim

This document is a summary of evidence and information regarding donor screening for SARS-CoV-2 and considerations for organ acceptance from donors with a history of COVID-19. It is based on peer-reviewed literature, and Organ Procurement and Transplantation Network (OPTN) and Centers for Disease Control and Prevention (CDC) data to date. This resource is subject to revision as new data accumulate. It will be reviewed quarterly for currency. The overarching objective of this document is to compile the latest information known for minimizing the risk of donor derived COVID-19 while maximizing donor utilization.

Terms to know

- **Nucleic Acid Test (NAT):** Nucleic acid tests are laboratory tests that detect viral genetic material. These include nucleic acid amplification tests (NAAT), RNA tests, and Polymerase Chain Reaction (PCR) tests.
- **Upper respiratory tract (URT) specimen:** A sample taken from the respiratory system above the trachea that includes a nasopharyngeal (NP) swab, NP wash or NP aspirate, nasal wash or nasal aspirate, mid-turbinate (MT) swab, or oropharyngeal (OP) swab sample.
- **Lower respiratory tract (LRT) specimen:** A sample taken from the respiratory system from the trachea or below that includes a sputum, tracheal aspirate, bronchial suction or wash, bronchoalveolar lavage (BAL), and lung biopsy.
• **Date of disease onset:** In this document will refer to the date of onset of COVID-19 symptoms or the initial date of test positivity if onset of symptoms cannot be confirmed or if asymptomatic.

• **Asymptomatic COVID-19 Infection:** Detection of SARS-CoV-2 in a respiratory sample without current or past symptoms compatible with COVID-19. If a donor symptom history is unknown, this person should not be considered asymptomatic.

• **Mild COVID-19:** Detection of SARS-CoV-2 in a respiratory sample in patients with symptoms consistent with COVID-19 infection who did not require oxygen supplementation or inpatient hospitalization for COVID-19.

• **Severe COVID-19:** Detection of SARS-CoV-2 in a respiratory sample in patients with symptoms consistent with COVID-19 infection who required oxygen supplementation or inpatient hospitalization for COVID-19.

• **Resolved COVID-19:** An immunocompetent donor with a history of confirmed COVID-19, with resolution of symptoms and more than 21 days from the date of onset of symptoms.

• **Active COVID-19:**
  
  - An immunocompetent donor with a history of confirmed COVID-19, less than 21 days from the date of disease onset and SARS-CoV-2 detected in a respiratory sample OR
  
  - An asymptomatic donor with detection of SARS-CoV-2 in a respiratory sample without a reliable history to determine the timeline of past symptoms of COVID-19.

**Methods**

The OPTN Ad Hoc Disease Transmission Advisory Committee (DTAC) and relevant stakeholders from the Centers for Disease Control and Prevention (CDC), American Society of Transplantation (AST), American Society of Transplant Surgeons (ASTS), Association of Organ Procurement Organizations (AOPO), and Health Resources & Services Administration (HRSA) reviewed published literature and data reported to the OPTN during the time period corresponding to the COVID-19 pandemic (from March 2020...
to April 2021). Specifically, DTAC and relevant stakeholders assessed the available evidence as it relates to living and deceased donor evaluation and testing and recovery of organs from living or deceased donors with a history of resolved or active COVID-19.

**Discussion**

**SARS-CoV-2 Deceased Donor Evaluation and Testing**

1. OPOs and transplant teams should adhere to [CDC Infection Prevention and Control Recommendations for Health Care Personnel during the Coronavirus Disease 2019 (COVID-19) pandemic](https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html) to minimize the risk of disease transmission to the procurement and transplant teams.

2. Available evidence indicates that testing deceased donors for SARS-CoV-2 by NAT from a respiratory sample within 72 hours, but ideally as close as possible to organ recovery, could decrease the risk of unrecognized infection.

3. When lungs will be recovered for transplantation, testing for SARS-CoV-2 by NAT in a lower respiratory sample is anticipated to significantly decrease the risk of unrecognized infection.
   - The CDC has investigated all potential donor derived COVID-19 events reported to DTAC. There are three transmissions to lung recipients. In these events, the donor tested negative for SARS-CoV-2 in an URT specimen but retrospectively tested positive in a LRT specimen. Prospective testing of a LRT sample would have informed the lung programs and recipients of the risk of transmission.
   - The United Kingdom National Health Service Blood and Transplant mandates testing for SARS-CoV-2 RNA in URT and LRT specimens in all potential deceased donors. Between April 2020 and January 2021, 987 deceased donors enabled 2469 transplants of which 75 were lung transplants, with no evidence of donor derived COVID-19.
   - The Food and Drug Administration (FDA) under Emergency Use Authorization (EUA) provides validated specimen types for all SARS-
CoV-2 assays. There are over 80 tests currently validated for lower respiratory tract specimens.

4. At this time there is insufficient evidence to support the use of SARS-CoV-2 antibody testing as a marker for assessing safety or potential transmission risk to recipients.

5. NAT testing of non-respiratory samples is not standardized, and there is insufficient evidence to support its use for clinical evaluation of donors at this time.

6. While evidence supports the use of chest computed tomography (CT) and chest x-ray in conjunction with other testing methods for SARS-CoV-2 infection, it does not currently support radiographic imaging as the sole diagnostic method for SARS-CoV-2 infection.

7. Available evidence supports an assessment for potential end-organ dysfunction if a donor has a history of COVID-19.

8. OPOs collecting a history and timeline of symptoms in a potential donor to understand if COVID-19 is Resolved or Active could lower the risk of undetected infection and maximize organ utilization.

9. OPOs collecting a history of SARS-CoV-2 vaccination in a potential deceased donor could help further evaluate the risk of infection for potential transplant recipients.

10. The FDA has issued notification of potential false positive and false negative results associated with certain SARS-CoV-2 testing platforms. These notifications can inform selection of testing platforms in order to minimize the possibility of donor deferral due to false test results.

Recovery of Organs from Deceased Donors with a History of Resolved COVID-19

1. Deceased donors with resolved COVID-19 and a negative SARS-CoV-2 NAT test at the time of donor evaluation are unlikely to transmit infection. Evidence suggests the decision to recover and transplant organs in this case include the following:
   o The recipient risk of mortality or further complications while delaying transplantation and remaining on the waiting list.
Current unknown long-term outcomes from donors with a history of resolved COVID-19 and the potential for changes in organ quality.

2. The safety of deceased donors with a history of mild COVID-19 more than 10 and less than 21 days after the date of disease onset and resolution of symptoms is unknown. It is believed that these donors are unlikely to transmit COVID-19 to non-lung recipients. Evidence suggests the decision in this case include the following:
   - The medical urgency of the candidate.
   - The recipient risk of mortality or further complications while delaying transplantation and remaining on the waiting list.
   - Current unknown long-term outcomes from donors with a history of resolved COVID-19 and allograft quality.
   - Infectious diseases experts can offer subject matter expertise when accepting organs from these donors.

3. Donors with resolved COVID-19 and a positive SARS-CoV-2 NAT test 21-90 days after the date of disease onset are unlikely to transmit infection. A positive SARS-CoV-2 NAT test likely represents non-viable virus. Evidence suggests the decision to recover organs in this case include the following:
   - The recipient risk of mortality or further complications while delaying transplantation and remaining on the waiting list.
   - Current unknown long-term outcomes from donors with a history of resolved COVID-19 and allograft quality.
   - Infectious diseases experts can offer subject matter expertise when accepting organs from these donors.

4. Donors with resolved COVID-19 and a positive SARS-CoV-2 NAT more than 90 days after the date of disease onset may reflect re-infection which may place the recipient at risk for disease transmission.

**Recovery of Organs from Deceased Donors with Active COVID-19**

1. Donors with active COVID-19 carry an unknown risk of disease transmission to recipients as well as to individuals on the OPO and
transplant teams. For recipients, the risk of disease transmission is higher for lung recipients.

- The CDC has investigated 3 cases of donor derived COVID-19 to 3 lung recipients. The six non-lung recipients did not develop clinical evidence of SARS-CoV-2 infection.
  - The CDC has also identified lack of transmission from four donors with infection identified around the time of organ recovery. The six non-lung recipients did not develop clinical evidence of SARS-CoV-2 infection.
- Although there is currently unknown risk of donor derived COVID-19 when transplanting non-lung organs, evidence suggests that the decision to recover organs from donors with active COVID-19 should include the following:
  - Unknown transmissibility of SARS-CoV-2 through non-lung organs
  - The recipients’ risk of mortality or further complications while delaying transplantation and remaining on the waiting list.
  - Current unknown long-term outcomes from donors with active COVID-19 and allograft quality.
  - Risk of transmission to the OPO and recovery team
- Infectious diseases experts can offer subject matter expertise when accepting organs from these donors.

**SARS-CoV-2 Living Donor Testing and other precautions to minimize the risk of Donor-Derived COVID-19**

1. [CDC recommendations on infection control practices](https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control.html) can help living donors reduce the risk of SARS-CoV-2 infection prior to donation and during recovery.
2. Self-quarantine during the 14 days prior to organ recovery could reduce the risk of SARS-CoV-2 infection for living donors and recipients.
3. Testing for SARS-CoV-2 with NAT in a respiratory sample as close to organ recovery as possible, but within 72 hours prior to recovery could reduce the risk of undetected infection.
Recovery of Organs from Living Donors with a History of Resolved COVID-19

1. Evidence suggests the decision to recover and transplant organs from living donors with resolved COVID-19 include the following:
   - Consideration of emerging data showing the risk of peri-operative mortality is increased after COVID-19, with a gradual decrease in risk over time to baseline risk by 7 weeks after COVID-19.
   - Currently unknown long-term effects of COVID-19 infection for the living donor.
   - Living donors with resolved COVID-19 are unlikely to transmit infection.
   - There is unclear evidence on the need for a negative SARS-CoV-2 NAT for living donors with a history of COVID-19 prior to donation within 90 days of disease onset. It is always important to follow local infection prevention and control policies.
   - Living Donors with resolved COVID-19 and a positive SARS-CoV-2 NAT more than 90 days after the date of disease onset may reflect reinfection.
   - The candidate risk of mortality or further complications while delaying transplantation and remaining on the waiting list.
   - The estimated risk of donor-derived COVID-19 transmission to the recipient.
   - Currently unknown long-term outcomes of recipients of organs from living donors with resolved COVID-19.

2. Infectious diseases experts can offer subject matter expertise when accepting organs from these donors.

Timing of Transplant for Recipients with a History of COVID-19

Although emerging data shows an increase risk of peri-operative mortality in the first 6 weeks after the diagnosis of COVID-19, the survival benefit of transplantation may offset this risk.
Themes

- COVID-19
- SARS-CoV-2 donor testing

Bibliography


https://doi.org/https://doi.org/10.1111/ajt.16575.


(optn.transplant.gov Link to 3-19 DTAC open session meeting summary once complete)


