



National Institute of
Environmental Health Sciences
Worker Training Program

Can SARS-CoV-2, the Virus that Causes COVID-19 Disease, Be Spread by Blood?

Since the SARS-CoV-2 virus can be detected in the blood (via serum blood testing), there is some confusion about whether that means it can be transmitted via blood as a bloodborne pathogen, like HIV or hepatitis C.

SARS-CoV-2 is a novel virus, which means that humans do not have a natural ability to fight it off with their immune systems. It also means that there are a lot of scientific uncertainties about characteristics of the virus, including whether or not it is a bloodborne pathogen. We know that the virus primarily enters the body through the eyes, nose, or mouth and progresses into the lungs, where the most severe illness occurs. However, the virus replicates in cells, including the blood, and when it does, it alters the blood's environment. This disruption challenges healthy levels of critical elements like oxygen, nitrogen, iron, and others essential for normal body function.

This change in normal biochemistry can negatively affect the body's ability to transfer oxygen from the lungs into the bloodstream and from the bloodstream into other organs. This can result in harming blood vessels and the heart, as well as other organ systems like the kidneys, gut, and pancreas.

It isn't that SARS-CoV-2 is a "bloodborne" virus per say, but that it can replicate in blood cells and affect the blood and its organelles' (red and white blood cells, hemoglobin) ability to work effectively. In fact, some people who have had COVID-19 and have recovered have donated their plasma to be used for experimental COVID-19 treatment. People who have fully recovered from COVID-19 have antibodies in their plasma that can help to attack the virus.

This "convalescent plasma" is being evaluated as treatment for patients with serious or immediately life-threatening COVID-19 infections, or those judged by a health care provider to be at high risk of progression to severe or life-threatening disease. We do not know yet whether these antibodies also provide immunity to people who have recovered, and if so for how long.

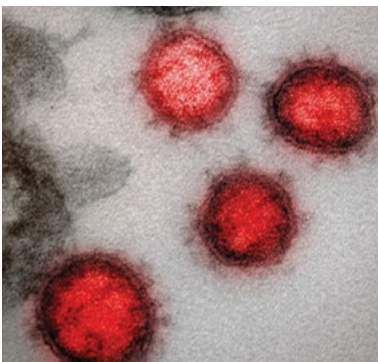


Photo courtesy of Nature

How are bloodborne pathogens like HIV different than SARS-CoV-2?

With bloodborne pathogens the risk has been known and well-established since the 1980s. It is unlikely that SARS-CoV-2 can be transmitted via occupational exposure to blood. Typically, blood exposures are caused by needlesticks, injuries involving contaminated sharps such as sutures, scalpel blades, etc., and splashes to non-intact skin in which there are cuts, abrasions, or open wounds that allow pathogens to enter. These types of exposures result in “contaminated” blood potentially entering a worker’s blood.

How are bloodborne pathogens and SARS-CoV-2 transmission similar?

One similarity between bloodborne pathogens and SARS-CoV-2 is that they can both be transmitted via mucus membrane exposures to the eyes, nose, and/or mouth. Spit, vomit, sputum, or mucus can also contain blood – these body fluids are classified by OSHA as “other potentially infectious materials.”

In this case, the best protective measures and controls are addressed in the OSHA Bloodborne Pathogens Standard. These measures should be instituted **in addition to** specific SARS-CoV-2 controls that address aerosol controls such as respirator use, eye protection, ventilation, and contact precautions such as gloves, gowns, handwashing, and surface disinfection.



What should I be doing differently?

Ultimately, to protect yourself from SARS-CoV-2, it is important to follow protocols for protecting yourself from aerosol contact, in addition to following protocols to protect yourself from a bloodborne pathogen. This

means adhering to the hierarchy of controls including early identification and isolation, physically distancing when possible, putting a barrier between you and the hazard such as partitions, using engineering controls such as ventilation, safer medical devices, and wearing appropriate PPE and respiratory protection.

If you work in healthcare, it is still critically important to remember that sharps safety is paramount to protecting yourself from bloodborne illnesses. Hepatitis C virus still remains the most prevalent bloodborne threat among people age 20-70, with about 40% unaware of their infection status. This means that protecting yourself with the use of devices with sharps injury prevention features (sheathing, retracting, blunting, needleless devices), activating safety features, safe disposal, and no-hands passing is essential.

Ultimately, whether SARS-CoV-2 virus and COVID-19 disease is determined to be bloodborne or not, the precautions you should take and the protective measures your employer should use should be the same.

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References

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