



PRESERVATION IN PRACTICE: DISASTERS

CULTURAL RESOURCES AND COVID-19

Topics covered in this brief:

VIRUS SURVIVAL
ASSESSMENT
SAFETY MEASURES
ISOLATION
DEACTIVATION
DISINFECTION



National Center for Preservation
Technology and Training
www.nps.gov/ncptt

COVID-19 is a coronavirus. Coronaviruses are viruses that, under a microscope, look like they are covered with pointed structures that surround them like a corona, or crown. There is not a lot of data on this particular virus, but there is information on similar coronaviruses.

All viruses are bits of genetic code bundled inside a collection of lipids and proteins, which can include a fat-based casing known as a viral envelope. It's this fatty envelope that makes COVID-19 susceptible to soap and water, which washes it away and causes the virus to fall apart.

COVID-19 is transmitted by person-to-person contact and from coughs that produces aerosols containing the virus. These aerosols can land on you or surfaces and persist. That's why we need to stand at least six feet apart from each other and avoid touching surfaces or our face.

This document explores how COVID-19 persists on surfaces and how you can effectively deactivate the virus while preserving valuable cultural resources.

Published April 2020



VIRUS SURVIVAL

How long does COVID-19 survive or persist on surfaces? Does the survival rate vary depending upon the surface type?

The COVID-19 virus can live varying lengths of time on different materials. One of the best sources of information about its persistence on surfaces is found in a research article published in the *Journal of Hospital Infection*. In general, the virus can live on surfaces 6-9 days.

A correspondence published in the *New England Journal of Medicine* is another source of information. This letter gives shorter times for some surfaces. For example, 4 hours on copper, 2 days on stainless steel, and up to 3 days on other surfaces.

We prefer to follow recommendations based on the peer-reviewed article, and err on the side of caution. For the safety of the public and personnel, we recommend using the survival times represented in **Table 1**.

Table 1. Persistence of Coronavirus on Materials

Surface	Length of Time
Metals	5 days
Wood	4 days
Paper	4-5 days
Glass	4-5 days
Plastics	6-9 days
Ceramics	5 days
Stone*	2-12 days

*Source was not from a peer-reviewed journal.



ASSESSMENT

Determine best method to protect against the spread of the virus while protecting the integrity of the historic materials.

There are two general methods of preventing the spread of viruses: isolation and disinfection. Isolation causes the least potential damage to resources, while some cleaners can irreversibly damage historic materials. **Table 2** summarizes acceptable methods for each type of historic material.

Table 2. Methods for Virus Deactivation

Method	Applicable Materials
Isolation, 6-9 days	Paper Books Small objects
Orvus or Ivory liquid soap, diluted	Painted surfaces Metals Wood
Rubbing alcohol, 70%	Bricks Ceramics Stones



SAFETY MEASURES

Wear disposable gloves when cleaning and disinfecting surfaces. Gloves should be discarded after each cleaning. Consider wearing goggles or safety glasses and a mask if you have them. If you are responsible for cleaning the National Park Service visitor centers, museum collections, or government services buildings, you may have to enlist contractors. If you must clean, wear outer protective clothing, goggles or safety shield, surgical gloves, and an N95 filter mask.



ISOLATION

Isolation is the preferred method to deal with museum objects and collections.

We recommend isolating buildings, sites, or collections for a minimum of nine days based on literature review. You can isolate smaller items by double-bagging them in zipper-style plastic bags; label the bag with object information, date, and reason for isolation. Keep bagged items in isolation for at least 9 days since the virus can live on plastic for that long.



DEACTIVATION

What is the recommended protocol for deactivating COVID-19 by disinfection?

Surfaces must be disinfected using a disinfectant listed in **Table 3**. The disinfectant must rest on the surface for the minimum effective exposure time in order to deactivate the virus.

Table 3. Disinfectants and Exposure Time

<i>Disinfectant, Concentration</i>	<i>Effective Exposure Time</i>
<i>Ethanol, 95%</i>	<i>30 sec</i>
<i>Ethanol, 70%</i>	<i>10 min</i>
<i>2-Propanol (Isopropyl Alcohol), 95%</i>	<i>30 sec</i>
<i>2-Propanol (Isopropyl Alcohol), 70%</i>	<i>30 sec</i>
<i>Bleach, 0.2%</i>	<i>30 sec</i>
<i>Hydrogen Peroxide, 0.5%</i>	<i>1 min</i>



DISINFECTION

Disinfect items using these guidelines when isolation is absolutely not an option.

The CDC recommends using standard household bleach solutions diluted to 0.2% (i.e., 5 tablespoons bleach per gallon of water) or alcohol solutions with at least 70% alcohol for disinfection. Most common EPA-registered household disinfectants should be effective.

CAUTION! Do not use bleach to clean and disinfect cultural materials! Do not use rubbing alcohol on wood, as it can damage finishes. Choose other disinfectant methods that are both safe for cultural materials and effective at deactivating COVID-19 as outlined below.

Museums with exhibit objects & collections in storage: Do not take on large-scale disinfecting actions for entire collections or museum spaces. Fogging with a germicide, such as a quaternary ammonium chloride salt, may lead to byproducts and result in chemical attack to cultural materials such as pigments, paint, stone, and other materials. Moreover, CDC does not support disinfectant fogging. Do not clean/disinfect individual objects in storage.

Natural and painted wood and metal surfaces in historic structures: Note if surfaces are wood, metal, or have a unique finish. When in doubt, contact a conservator or conservation scientist. Concentrate disinfection actions to known contaminated/touched surfaces such as painted surfaces (door jambs), doorknobs, and handrails.

Make a soap and water mixture from Orvus or Ivory liquid soap or other mild detergents in a spray bottle. Wet a paper towel with the solution and wipe the surface or railing. Follow the soap and water wipe with a damp paper towel of freshwater to remove any soap residue.



DISINFECTION (CONT.)

Limit the amount of water or wet cleaning to avoid damage to fragile historic wallpaper and/or painted wall finishes. Dispose of the paper towel after wiping down the surface.

Bricks, ceramics, & stones: Bricks, ceramics, and stones, such as marble, limestone, or terrazzo countertops or floors, can be wiped down with soap and water and disinfected with isopropyl alcohol (i.e., rubbing alcohol). Apply rubbing alcohol to a paper towel, minimizing the amount of wetness applied to the surface. If surfaces are dirty, they should be cleaned using a detergent or soap and water prior to disinfection.

UV disinfection. While the data is very clear that you can kill and inactivate viruses with UV germicidal irradiation, we could not find a reliable research article recommending UV with COVID-19. UV can damage photographs and paper under long exposures. We will keep you updated as we learn more.



CONTRIBUTORS

A special thanks to the following people for their collaboration on this project: Vrinda Jariwala, National Park Service, National Center for Preservation Technology and Training; Brynn Bender, National Park Service, Northeast Museum Services Center; Margaret D. Brueker, National Park Service, Historic Architecture Conservation & Engineering Center; & Ralph Mitchell, Harvard University.



REFERENCES

- Kampf, G., Pfaender, S., & Steinmann, E. & Todt, D. (February 6, 2020). Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*, 104(3), 246-251. Retrieved from [https://www.journalofhospitalinfection.com/article/S0195-6701\(20\)30046-3/fulltext](https://www.journalofhospitalinfection.com/article/S0195-6701(20)30046-3/fulltext).
- Bender, B., Northeast Museum Services Center, & Brueker, M., National Park Service, Historic Architecture, Engineering, and Conservation Center. (Personal communication, March 20, 2020). Cleaning protocols for museums and historic sites.
- Centers for Disease Control and Prevention. (March 22, 2020). Interim recommendations for US households with suspected/confirmed coronavirus disease 2019. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/prepare/cleaning-disinfection.html>.
- Holbrook, M. G., Morris, D. H., van Doremalen, N., Morris, et. al. (March 20, 2017). Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1 [Letter to the Editor]. *The New England Journal of Medicine*. DOI: 10.1056/NEJMc2004973.
- The Stone and Tile Radio Show. (March 22, 2020). *How long can the new coronavirus last on stone surfaces and how do you properly* [Audio Podcast]. Retrieved from <https://www.blogtalkradio.com/drfred/2020/03/04/how-long-can-the-new-coronavirus-last-on-stone-surfaces-and-how-do-you-properly>.

Series Editor: Kirk A. Cordell, NCPTT Executive Director

Author: Mary F. Striegel, NCPTT Materials Conservation Chief

Cover Photo: Jason Church, NCPTT