

EMERGENCY MANAGEMENT

3.5 Disinfecting Books and Other Collections

Last updated: April 9, 2021

This leaflet addresses general questions about disinfecting books and other cultural heritage collections. NEDCC has added a section to the beginning that addresses specific concerns about COVID-19.

COVID-19 CONCERNS

The advice in this section is based on the current research available from the cultural heritage, medical, and scientific communities regarding COVID-19; as their understanding of the virus evolves, NEDCC's advice for the cultural heritage community will, too. Each organization will need to exercise caution in accordance with its risk tolerance, its understanding of the available research, and guidance from local, state, tribal, and federal officials.

Human Health and Safety

The World Health Organization has stated that the SARS-CoV-2 virus is transmitted through direct, indirect (e.g. through contaminated objects or surfaces), or close contact with infected persons.ⁱ

The best way to protect staff and visitors at cultural heritage institutions from the virus is to follow CDC guidelines on "How to Protect Yourself and Others," specifically: wash your hands often, avoid close contact, and cover your nose and mouth with a mask when around others.ⁱⁱ Note that for collection safety, hand washing with soap and water is preferred over using hand sanitizer because the former removes dirt and oils and the latter does not. Dirt and oils can transfer to collections and stain or damage them.

Quarantine

To address concerns about possible transfer of the SARS-CoV-2 virus via collections materials, the Northeast Document Conservation Center (NEDCC)

recommends quarantining items after handling by staff and visitors; disinfection by other means is not recommended. (See the section below for more information about disinfection.) If a dedicated quarantine space cannot be established, staff can place items in bags or bins until the quarantine period is over so that staff do not accidentally handle the items. It is not advisable to tightly seal the containers because this can create potentially-damaging microclimates.

The CDC has provided additional guidelines for workers who handle and deliver mail and parcels,ⁱⁱⁱ and cultural heritage institutions may find these guidelines applicable to their operations.

In particular, NEDCC recommends that cultural heritage organizations consult the website of the REOpening Archives, Libraries, and Museums (REALM) project, which is conducting scientific research on collection-specific materials:

<https://www.webjunction.org/explore-topics/COVID-19-research-project.html>. A brief published by the U.S. Centers for Disease Control states that "the risk of fomite [surface] transmission after a person with COVID-19 has been in an indoor space is minor after 3 days (72 hours);"^{iv} however, **it is incumbent on each organization to understand how its collection materials are used and handled and to review research results for data that can guide its decisions about quarantine.** REALM's sortable table of lab testing results is particularly useful for evaluating risk.

The length of the quarantine periods should be determined by assessing the level of risk in your community, the type of materials to be quarantined, how materials will be stored during quarantine (e.g. stacked vs. unstacked), and ambient environmental conditions (e.g. temperature).

Decisions should be based on scientific studies that test the attenuation of the SARS-CoV-2 virus on collection-specific materials, such as paperback books,

and on studies that test general material types such as plastic and cardboard. For specific material types, quarantine periods of different lengths may ultimately be found to be appropriate. Research results do not yet agree on the timeframes; however, the SARS-CoV-2 virus appears to lose its viability more quickly on cardboard surfaces^v than on plastic surfaces (e.g. books covered in polyester, Mylar, or other plastics, as well as plastic-based materials such as CD's and DVD's).^{vi, vii}

Note that the REALM Project's Round 4 tests document that **stacking collection materials can prolong the survivability of the SARS-CoV-2 virus.**^{viii} For example, REALM Round 1 and Round 4 tests show attenuation of the virus after 3 days on a single paperback book cover but found the virus was still present after 6 days when the book was placed in a stack.^{ix} As a result, items quarantined in containers may require a longer quarantine period.^x

In addition, it has been demonstrated that cold temperatures prolong the life of SARS-CoV-2, while warmer temperatures decreased the lifespan of the virus.^{xi} This is an important consideration for libraries using outdoor book drops and for cultural heritage institutions without climate control in collection processing areas.

Information about quarantine decisions in libraries around the world is available from the REALM Project^{xii} and the International Federation of Library Associations and Institutions (IFLA).^{xiii}

DISINFECTING COLLECTIONS

Do not attempt to disinfect archival materials, museum objects, or other valuable collections unless under the guidance of a conservator. Instead of disinfection, NEDCC recommends implementing hygiene practices for both staff and patrons, and quarantining collection items as needed. Quarantine requires no special training to implement, is not expensive, and does not risk damaging collections.

Not Recommended: Cleaning and Disinfecting Products

Liquid disinfectants and powdered cleaners can damage cultural heritage collections if they come in contact with them and are therefore **not recommended** for disinfecting collections. Liquid disinfectants can cause moisture damage, discoloration, and staining. Chemicals in these

products can react over time with the components of media materials and objects (e.g. plastics, metals, paints, and dyes) and can cause paper-based materials to become weak and/or brittle as they age. Powdered cleaners are too abrasive in general to be used directly on cultural heritage collections.

Not Recommended: Fogging

The use of fogging disinfectants of any kind in spaces with collections is **not recommended**. Fogging is ineffective because the chemical fog has no impact on contaminants between stacked or shelved materials, inside an archive box or folder, or in between book and magazine pages. Additionally, the chemical components of the fog can react with collection materials and cause damage and degradation over time.^{xiv}

Not Recommended: Ultraviolet (UV) Radiation

Ultraviolet (UV) ray exposure as a means of sterilization is also **not recommended**. UV sterilization is effective only on surfaces that are directly exposed to UV radiation, so stacked materials or pages inside closed books will not be thoroughly sanitized. While potentially effective in the right application, UV exposure poses serious risks to human health, including cataracts and skin cancer.^{xv} Additionally, UV light is known to cause irreversible light damage to collections materials, including fading, discoloration, embrittlement, and accelerated aging.^{xvi}

Not Recommended: Heat Treatment

While heat has been shown to be effective at killing SARS-CoV-2, this requires exposure to high temperatures for 20 minutes or more.^{xvii} This amount and intensity of heat is potentially damaging to collections materials and is therefore **not recommended**.

Placing materials in a microwave oven is **not recommended**. Circulating library books and other materials may contain metal pieces (e.g. RFID tags) that can smolder or catch fire when heated.

DISINFECTING FACILITIES

Disinfection is a strategy that may reduce the spread of disease in public spaces, and the CDC has a helpful guide on this subject for community facilities in general.^{xviii} The guide includes information on disinfecting hard (non-porous) surfaces such as tables

and doorknobs, soft (porous) surfaces such as carpet and drapes, electronics such as touch screens and computer keyboards, and textiles that go in the laundry such as clothing and linens.

Not Recommended: Fogging

The use of fogging disinfectants of any kind **in spaces with collections is not recommended**. See the previous section for more information about this recommendation.

Recommendations: Cleaning and Disinfecting Products

If cleaning and disinfecting solutions must be used in collections spaces, follow the EPA's "6 Steps for Safe & Effective Disinfectant Use,"^{xix} and **do not splash or touch collections materials with the cleaning solution**. See the previous section for more information about this recommendation.

A safe and effective cleaning solution can be made quickly and easily by combining water and alcohol in a clean spray bottle. Fill 30% of the bottle with water and fill 70% of the bottle with ethanol (ethyl alcohol) or isopropyl alcohol. Note that the isopropyl alcohol sold at most pharmacies is typically diluted to 70% or 91%, and the 70% product can be used as-is for cleaning. A product with a percentage higher than 70% needs to be diluted with water. Concentrations of alcohol below 70% are not strong enough to be effective, and concentrations of alcohol above 80% will evaporate too quickly to be effective. For example:

- If using 70% Alcohol, then no dilution with water is required.
- If using 91% Alcohol, then combine 77ml alcohol with 23ml water to create a 70% solution.
- If using 100% Alcohol, then combine 70ml alcohol with 30ml water to create a 70% solution.

ADDITIONAL RESOURCES RELATED TO COVID-19

Department of Homeland Security. *Master Question List for COVID-19 (Caused by SARS-CoV-2)*. The most recently updated edition is available at: <https://www.dhs.gov/publication/st-master-question-list-covid-19>

Reopening Archives, Libraries, and Museums (REALM) Project.

If using a commercial cleaning product, select one that has the fewest ingredients possible; that has no additives such as fragrances and dyes; and that requires the shortest contact time to be effective. The EPA's "List N: Disinfectants for Use Against SARS-CoV-2 (COVID-19)" provides contact times for a number of cleaning products.^{xx}

HYGIENE PRACTICES

Staff and patrons should be encouraged to follow hygiene protocols to stop the spread of infectious diseases. These include:

- frequent handwashing, e.g. before and after handling collections materials (use hand sanitizer only if soap and water are not available);
- regular cleaning of frequently touched surfaces and shared workstations or equipment;
- using a disposable paper barrier on materials that cannot be cleaned, such as foam book cradles; and
- wearing a mask that covers the nose and mouth when interacting with persons outside of your household.

COMMUNICATION

NEDCC advises collecting institutions to inform the public about their approaches to disinfecting collection materials and to ensuring staff and patron safety. When customers understand what institutions are doing to mitigate risk, they are less likely to attempt their own, damaging disinfection methods at home.

- “Caring for Your Resources During COVID-19” [1 hour 30 minute video]. <https://www.connectingtocollections.org/realm/> and <https://youtu.be/34Bg6CNvmIQ>
- “Cleaning and disinfecting considerations.” February 5, 2021. <https://www.oclc.org/content/dam/realm/documents/cleaning-considerations.pdf>
- “REALM: Frequently Asked Questions.” <https://www.webjunction.org/news/webjunction/realm-faq.html>
- “Resources – Toolkits for Archives, Museums, and Libraries.” <https://www.oclc.org/realm/resources.html>
- “Visual aid: How long the virus survives on commonly used library, archive, and museum materials.” December 19, 2020. <https://www.oclc.org/content/dam/realm/documents/visual-aid.pdf>

ENDNOTES

ⁱ World Health Organization (WHO). “Q&A: How is COVID-19 transmitted?” October 20, 2020. <https://www.who.int/news-room/q-a-detail/q-a-how-is-covid-19-transmitted>

ⁱⁱ Centers for Disease Control and Prevention (CDC). “How to Protect Yourself & Others.” <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>

ⁱⁱⁱ Centers for Disease Control and Prevention (CDC). “What Mail and Parcel Delivery Drivers Need to Know about COVID-19.” <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/mail-parcel-drivers.html>

^{iv} Centers for Disease Control and Prevention (CDC). “Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments.” April 5, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/surface-transmission.html>

^v Neeltje van Doremalen, Dylan H. Morris, Myndi G. Holbrook, et. al. “Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1” (Correspondence). *The New England Journal of Medicine*. March 17, 2020. <https://www.nejm.org/doi/full/10.1056/NEJMc2004973>. PDF version at <https://www.nejm.org/doi/pdf/10.1056/>

^{vi} Alex W H Chin, Julie T S Chu, Mahen R A Perera, Kenrie P Y Hui, Hui-Ling Yen, Michael C W Chan, Malik Peiris, Leo M Poon. “Stability of SARS-CoV-2 in different environmental conditions.” *medRxiv*. May 2020. [10.1101/2020.05.07.20094805](https://doi.org/10.1101/2020.05.07.20094805)

^{vii} Yongjian Liu, Tianyi Li, Yongqiang Deng, Siyang Liu, Dong Zhang, Hanping Li, Xiaolin Wang, Lei Jia, Jingwan Han, Zhuchun Bei, Yusen Zhou, Lin Li, Jingyun. “Stability of SARS-CoV-2 on environmental surfaces and in human excreta.” *medRxiv*. May 12, 2020. <https://doi.org/10.1101/2020.05.07.20094805>

^{viii} REopening Archives, Libraries, and Museums (REALM) Project. “REALM Project Test 4 Results Available.” <https://www.webjunction.org/news/webjunction/test4-results.html>

^{ix} REopening Archives, Libraries, and Museums (REALM) Project. “Research.” Includes all test results. <https://www.oclc.org/realm/research.html>

^x REopening Archives, Libraries, and Museums (REALM) Project. “Lab testing.” <https://www.oclc.org/realm/research/lab-testing.html>

^{xi} REopening Archives, Libraries, and Museums (REALM) Project. “Test 7 and 8: Natural attenuation as a decontamination approach for SARS-CoV-2 on materials at various temperatures.” <https://www.oclc.org/content/dam/realm/documents/test-7-8-report.pdf>

^{xii} REopening Archives, Libraries, and Museums (REALM) Project. “Public Libraries Preparing to Reopen: Examples from the Field.” June 25, 2020. <https://www.webjunction.org/news/webjunction/preparing-to-reopen.html>

^{xiii} International Federation of Library Associations and Institutions (IFLA). “COVID-19 and the Global Library Field: Staying safe at home and work: Handling materials.” <https://www.ifla.org/covid-19-and-libraries#handling>

^{xiv} Canadian Conservation Institute. “Agent of Deterioration: Pollutants, Airborne.” <https://www.canada.ca/en/conservation-institute/services/agents-deterioration/pollutants.html#pollu2>

^{xv} U.S. Food and Drug Administration (FDA). “UV Lights and Lamps: Ultraviolet-C Radiation, Disinfection, and Coronavirus.” <https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/uv-lights-and-lamps-ultraviolet-c-radiation-disinfection-and-coronavirus>

^{xvi} American Institute for Conservation. “AIC Wiki: Light.” http://www.conservation-wiki.com/wiki/Light#Light_Damage

^{xvii} Abraham JP, Plourde BD, Cheng L. Using heat to kill SARS-CoV-2. *Rev Med Virol*. 2020 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7361064/>

^{xviii} Centers for Disease Control and Prevention (CDC). “Cleaning and Disinfecting Your Facility.” <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/cleaning-disinfection.html>

^{xix} United States Environmental Protection Agency. “6 Steps for Safe & Effective Disinfectant Use” (infographic). PDF version at <https://www.epa.gov/sites/production/files/2020-04/documents/disinfectants-onepager.pdf>

^{xx} United States Environmental Protection Agency. “List N: Products with Emerging Viral Pathogens AND Human Coronavirus claims for use against SARS-CoV-2.” <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19>.