

REALM PROJECT

REopening Archives, Libraries, and Museums

oc.lc/realm-project

#REALMproject





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IMLS

- Project funder
- Consult on project goals and activities
- Convenes steering committee and working groups

Battelle

- Conduct scientific literature reviews
- Conduct laboratory research

OCLC

- Lead and manage execution of project deliverables
- Collect, synthesize stakeholder input to inform decisions
- Publish and distribute research and information to the field

Library, archives, and museum stakeholders

- Executive Project Steering Committee
- 3 Working Groups: Scientific, Operations, and Communications

PHASE 1

**MAY –
AUGUST 2020**

**Preparing for
reopened libraries:
Research on high-priority
materials and workflows**

PHASE 2

**JUNE –
OCTOBER 2020**

**Additional research
to support operations
of libraries, archives,
and museums**

PHASE 3

**OCTOBER 2020 –
SEPTEMBER 2021**

**Monitor, update,
and, communicate**

Project activities

- Review and summarize SARS-CoV-2 research
- Gather input from practitioners and subject experts
- Design, execute, iterate laboratory testing
- Develop communications, toolkit resources
- Distribute project information and resources
- Ongoing discussions with libraries, archives, museums

REALM is...

providing data that helps us better understand the virus. You can use that data to inform your practices and policies.

REALM is not...

making recommendations. Every institution is different and will need to develop policies that work for their local context.

REALM
data

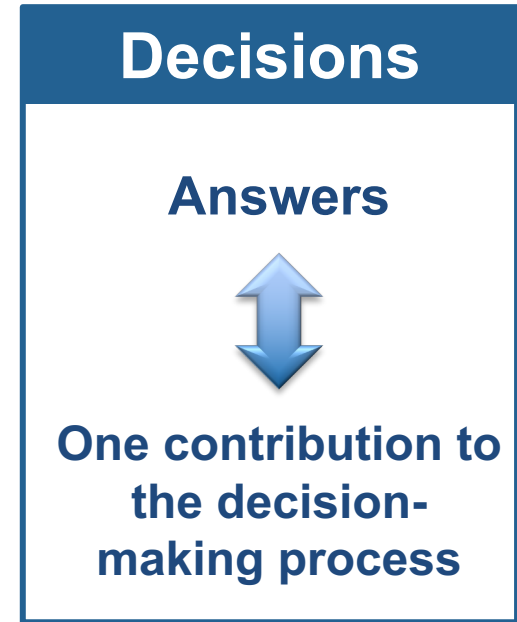
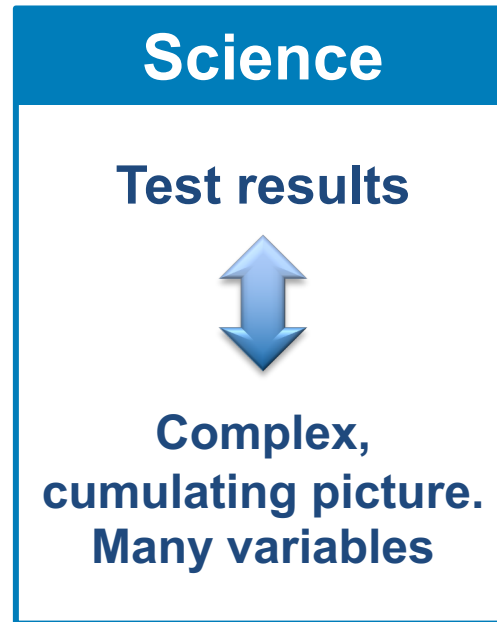
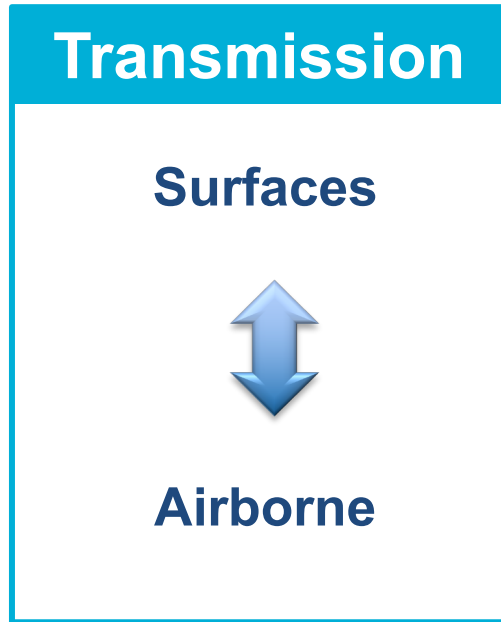


Your
institution



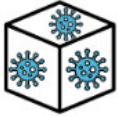
Local
policies

Urgency + complexity + uncertainty



STATUS OF COVID-19 RESEARCH

Known unknowns



how much virus an infected person “sheds”



whether people are getting infected by touching objects



how much (or little) virus is needed to cause infection

How the virus spreads

Most likely / dominant

- Direct contact between people
- Droplets passed between people

Possibly

- Aerosol particles
- Contaminated objects (*fomites*)
- Other body fluids, excretions



Environmental conditions are a factor

- Temperature
- Relative humidity
- Air quality
- Air flow



Prevention and decontamination tactics

- Social distancing
- Hand washing and toilet hygiene
- Masks/PPE
- Fresh air and open spaces
- Surface cleaners and disinfectants*
- UV light treatment*

} NEDCC

LAB TESTING



Research question

How long does the virus remain active on materials commonly found in libraries, archives, and museums?

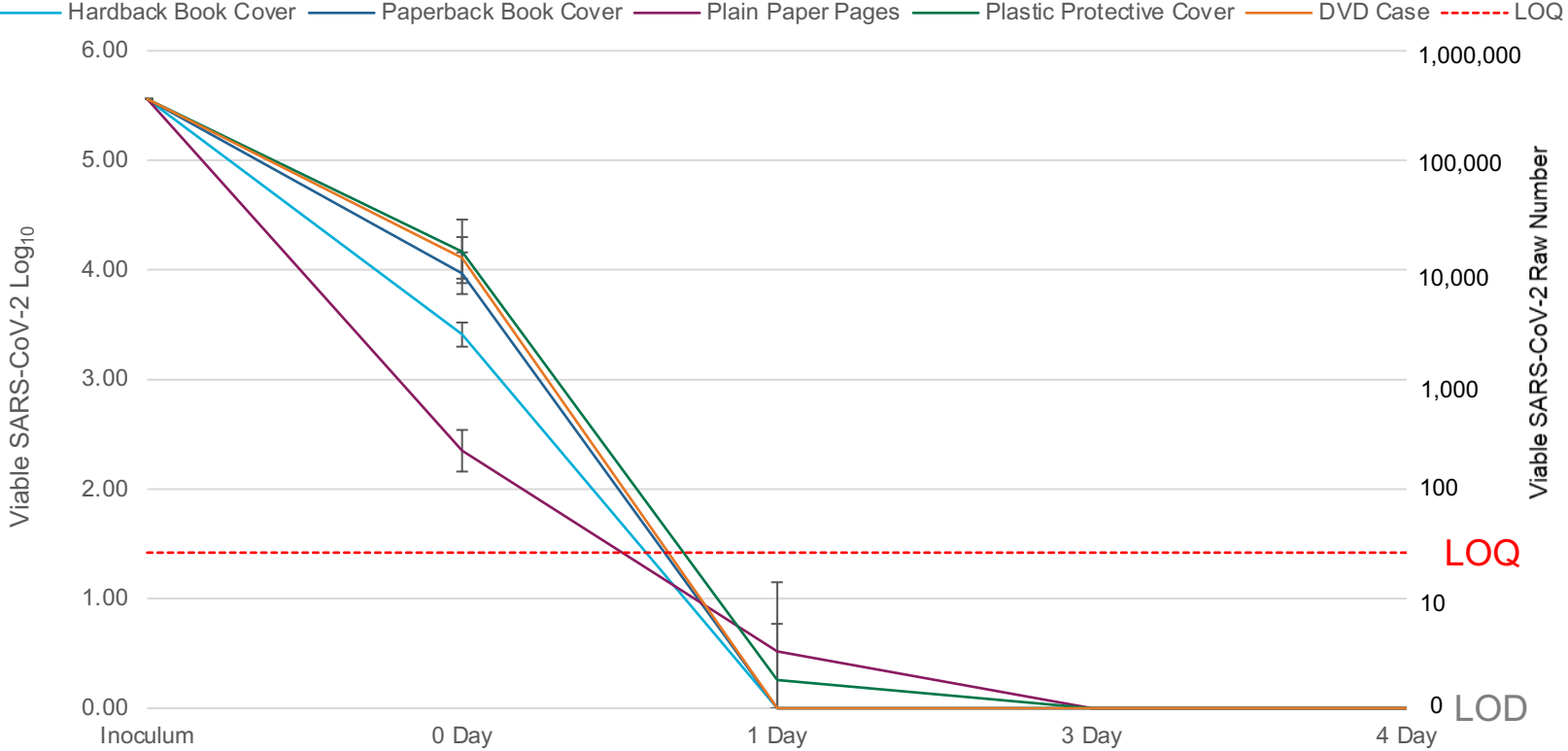
Active...viable...infectious...“alive”



Testing: TCID50 cell-based assay

- Cut each material into 5 rectangular coupons
- Apply drops of infectious virus via “fake spit”
- Put test coupons into chamber, stacked or unstacked
 - Held at standard office temperature, humidity; no outside light or airflow
- At each preselected timepoint, measure quantity of virus on coupons
 - Below limit of quantitation (LOQ): only record presence/absence of virus
 - Below limit of detection (LOD): do not see virus on any coupon

Test 1 Unstacked library materials

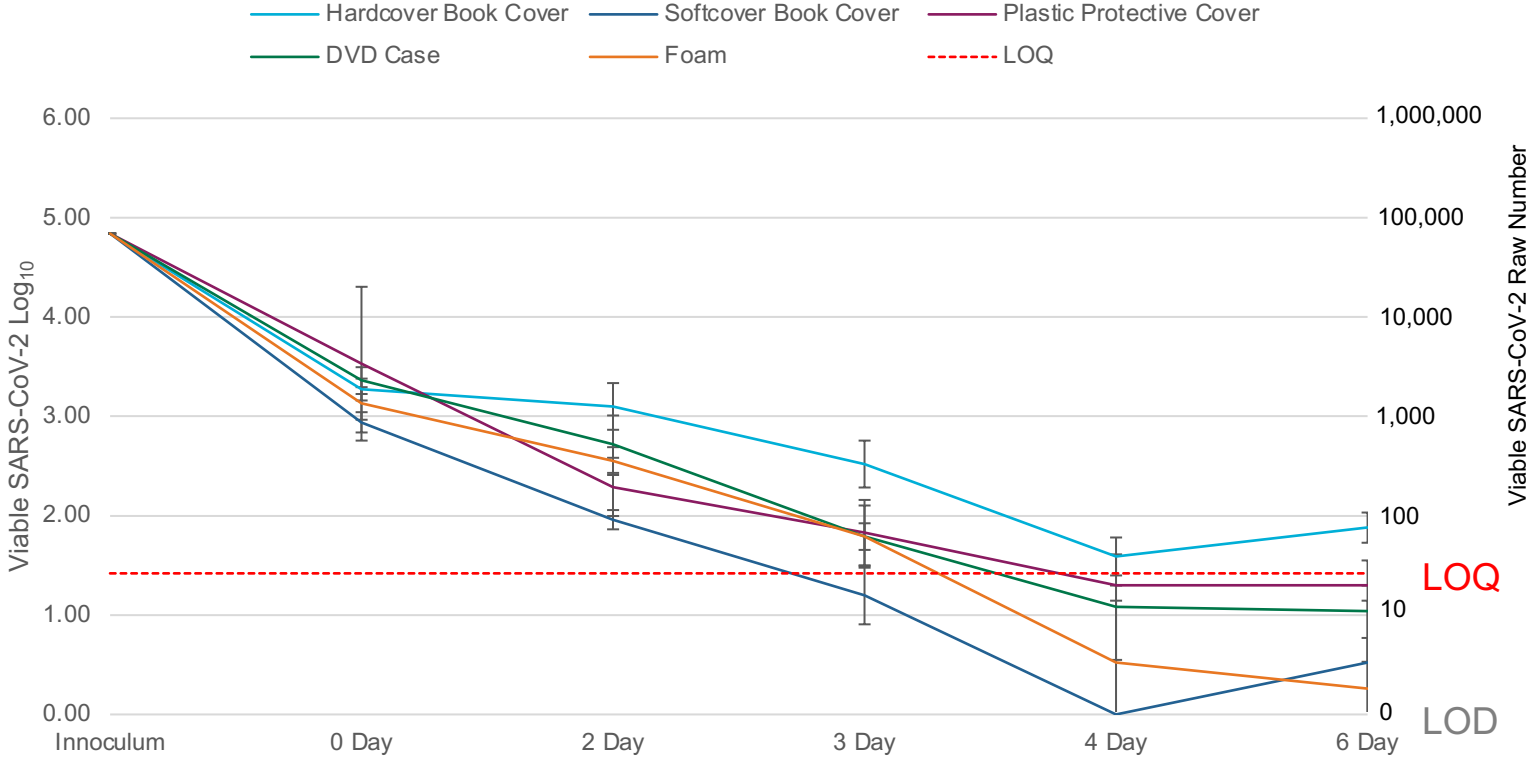




Photos courtesy of Battelle

Stacked books

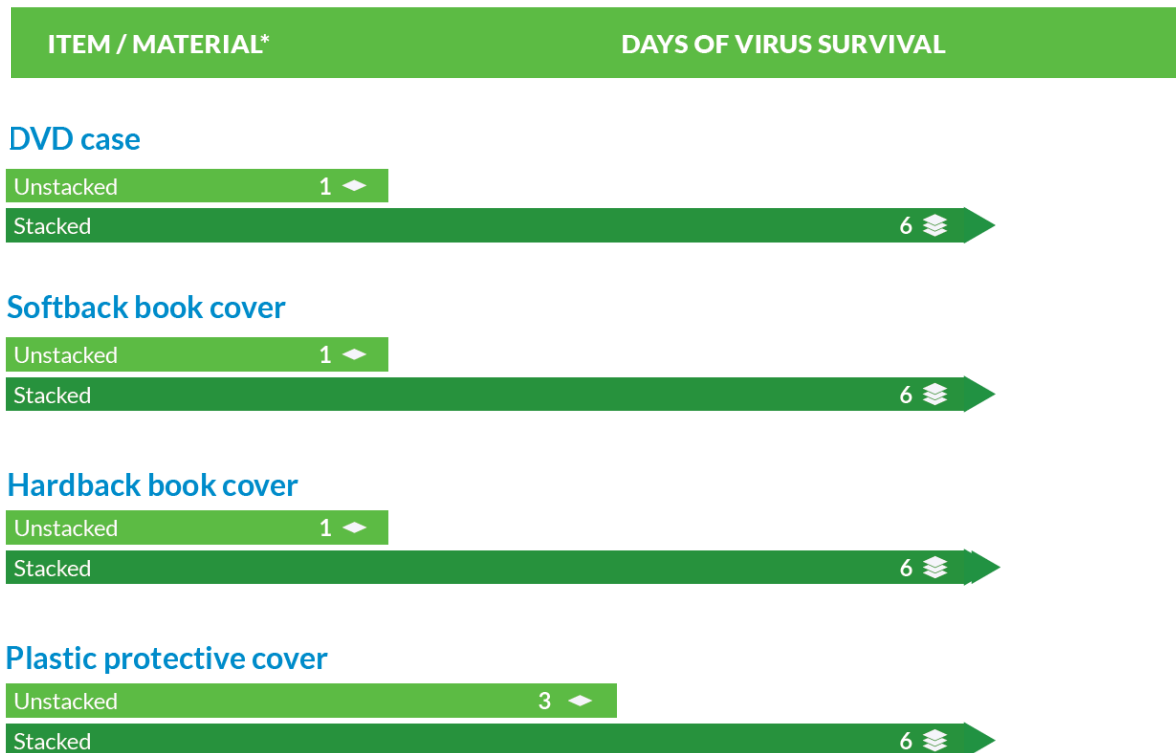
Test 4 Stacked library materials







How long the virus survives on commonly used library, archive, and museum materials

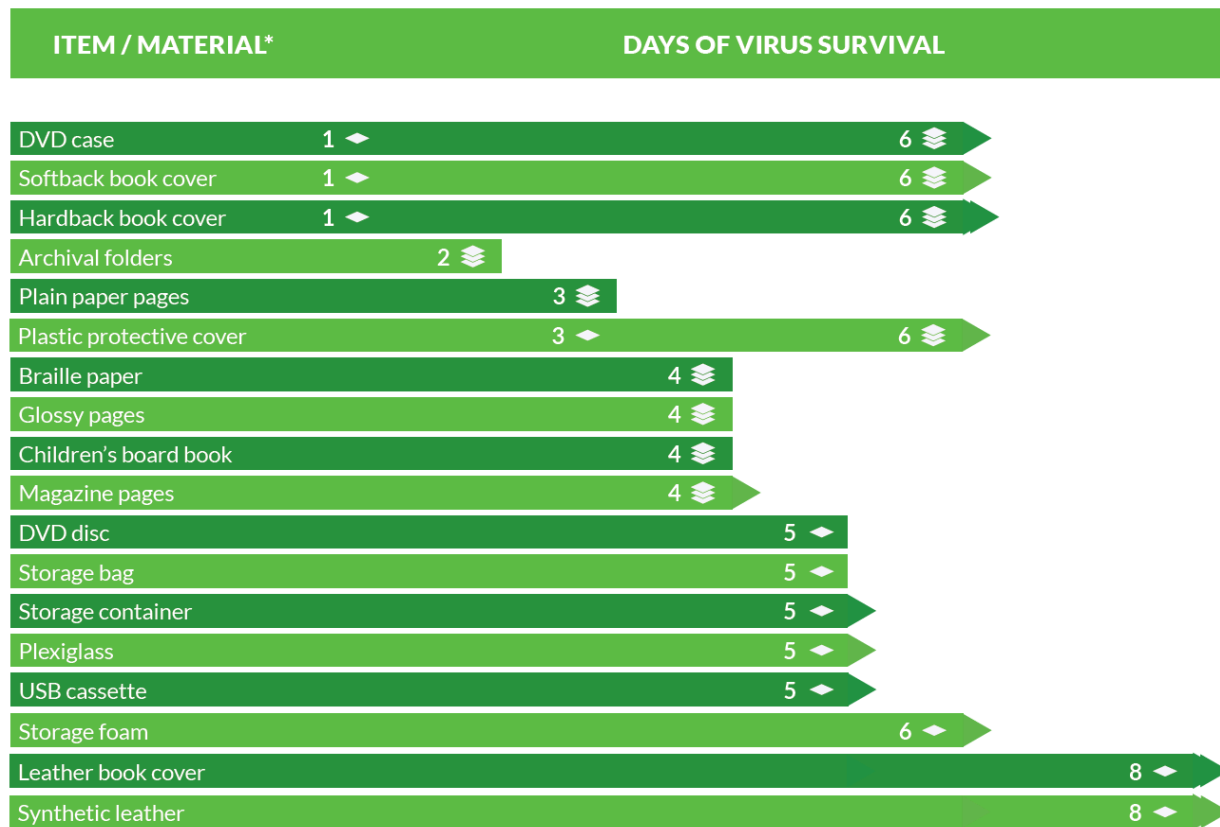
- Item tested in a **stacked** configuration.
- Item tested in an **unstacked** configuration.
- Item showed **trace amount** of virus after testing.
- Item was **above LOQ** after testing.

Stacked vs unstacked comparison



How long the virus survives on commonly used library, archive, and museum materials

-  Item tested in a **stacked** configuration.
-  Item tested in an **unstacked** configuration.
-  Item showed **trace amount** of virus after testing.
-  Item was **above LOQ** after testing.



REALM PROJECT

Reopening Archives, Libraries, and Museums

Research

As part of the REALM research, Battelle is conducting natural attenuation studies to provide information on how long the virus may survive on materials common to archives, libraries, and museums. The studies are conducted by applying the virulent SARS-CoV-2 virus on five materials (per test set) held at standard room temperature (20°F to 22°F) and relative humidity conditions (30 to 50 percent). Below are the results of tests completed to date.

- [Explore a sortable table of complete research test results](#) for the REALM project
- [See supporting documentation](#) for REALM research
- [Review the scientific literature](#) on SARS-CoV-2
- [Get answers to frequently asked questions](#) about research results

Supporting documentation

Documentation for this project will be published as it becomes available. All REALM project materials are published under a [Creative Commons Attribution-Non-Commercial-Share Alike 4.0 license](#).

[Literature reviews](#) [Test plan](#)

[Systematic literature review: Phase 2](#)

October 14, 2020

Updating the Phase 1 review with new research on SARS-CoV-2 published between mid-May and mid-August 2020 on how the virus spreads, the lifespan of the virus on materials, and effectiveness of various prevention and decontamination measures.

[Systematic literature review: Phase 1](#)

June 17, 2020

Detailed literature review exploring the scientific research on SARS-CoV-2 published through mid-May 2020.

[Preliminary literature review: Phase 1](#)

June 3, 2020

The information helps to set the context for the laboratory research that is being conducted during the REALM project.

Test 1 Results

21 June 2020

Five items commonly found in public libraries, which are also in high circulation and expected to arrive back in public libraries in large volumes, were selected for Test 1. The materials were provided by Columbus Metropolitan Library.

[Download Test 1 results](#)

Item	Material	Conditions	Result
Hardcover book cover	Sublimation book cover	Stacked	Results show that the SARS-CoV-2 virus survived on all of the materials after three days of exposure.
Softcover book cover	Thick paper book	Stacked	
Paper cover book	Thin paper book	Stacked	
Hardcover book	Thin paper book	Stacked	
Hardcover book	Thin paper book	Stacked	

Test 2 Results

22 July 2020

Materials were provided by Columbus Metropolitan Library, the National Archives and Records Administration, and the National Library of Medicine and the National Library of Congress.

[Download Test 2 results](#)

Item	Material	Conditions	Result
Archival folders	—	Stacked	Results show that after 10 days of exposure, the virus was not detected on the archival folders after four days of exposure. The virus was not detected on the CD/DVDs, the storage container for the CD/DVDs, the storage container for the CD/DVDs, the storage container for the CD/DVDs, the storage container for the CD/DVDs, the storage container for the CD/DVDs.
CD/DVD cases	—	Stacked	
CD/DVD storage container	—	Stacked	
CD/DVD storage container	—	Stacked	
CD/DVD storage container	—	Stacked	

Test 3 Results

22 August 2020

For Test 3, five plastic-based items were selected. The materials were provided by Columbus Metropolitan Library, the National Archives and Records Administration, and the National Library of Medicine and the National Library of Congress.

[Download Test 3 results](#)

Item	Material	Conditions	Result
CD/DVD case	Polycarbonate	Unstacked	Results show that after the end of exposure, the virus was not detected on the CD/DVD case, the storage container for the CD/DVD case, the storage container for the CD/DVD case, the storage container for the CD/DVD case, the storage container for the CD/DVD case.
Storage bag	Plastic polypropylene (PP)	Unstacked	
USB cassette	Acrylonitrile butadiene styrene (ABS)	Unstacked	
Storage container	Rigid plastic high-density polyethylene (HDPE)	Unstacked	
Penicillin	Acrylic copolymer	Unstacked	

Test 4 Results

12 October 2020

Four of the five items in Test 4 are similar book materials to Test 1, but in Test 4, these items were stacked to simulate their common storage configuration in bins and bookshelves and penicillin. The fifth item, expanded polystyrene foam, has not been tested previously and was done so in open-air conditions.

[Download Test 4 results](#)

Item	Material	Conditions	Result
CD/DVD case	Polycarbonate	Stacked	Results show that after 10 days of exposure, the SARS-CoV-2 virus was not detected on the CD/DVD case, the storage container for the CD/DVD case, the storage container for the CD/DVD case, the storage container for the CD/DVD case, the storage container for the CD/DVD case.
Hardcover book cover	Sublimation book cover	Stacked	
Softcover book cover	Thick paper book	Stacked	
Paper cover book	Thin paper book	Stacked	
Hardcover book	Thin paper book	Stacked	

Test 5 Results

14 October 2020

For Test 5, four fabrics and leather—materials commonly used for bookbinding, upholstery, and exotic controls—were selected. The materials were provided by the American Museum of Natural History, a private donation and through procurement from vendors.

[Download Test 5 results](#)

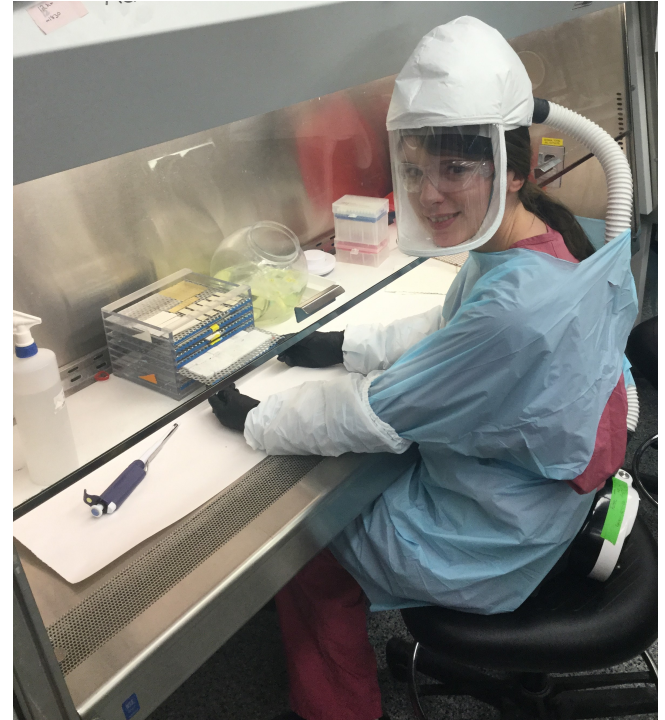
Item	Material	Conditions	Result
Leather book cover	Leather (Sims 2552)	Unstacked	Results show that after 10 days of exposure, the SARS-CoV-2 virus was not detected on any of the tested materials. For the cotton fabric, the virus was not detected after the 10-day period of being in the open air. However, for the cotton fabric, the virus was not detected after 10 days of exposure.
Softcover leather	Expanded polypropylene (PP)	Unstacked	
Polyester fabric	100% polyester	Unstacked	
Cotton fabric	100% cotton	Unstacked	

Test 6 – hard surfaces

- Marble (*flooring, counters*)
- Powder-coated steel (*lockers, shelving, book trucks, exhibit elements*)
- Laminate (*countertops*)
- Brass (*fixtures, railings*)
- Glass (*windows, display cases*)

Time points: 0, 2, 4, 6, and 8 days

Findings to be released next month



Researcher preparing Test 6 materials. Photo courtesy of Battelle.

TOOLKIT ITEM: OVERVIEW



The “known unknowns”

- 1** We don't know how many virus cells an infected person will leave on an object.
- 2** We don't know how many virus cells you can pick up from an object.
- 3** We don't know how many virus cells are needed to cause infection.

About REALM

Reopening Archives, Libraries, and Museums (REALM) is a research partnership between OCLC, the Institute of Museum and Library Services, and Battelle. Its aim is to conduct research on how long the COVID-19 virus survives on materials that are prevalent in libraries, archives, and museums (LAMs). The REALM project team is using that research to produce authoritative, science-based information on how—or if—materials can be handled to minimize exposure to staff and visitors.

REALM provides science-based information

REALM is not issuing recommendations or guidelines. We're working to create resources that help inform local decision-making. How LAMs are in conversations with their local and state health departments, as well as other aspects of government, as they seek information on how COVID-19 can be addressed in the workplace. REALM will be taking the results of the REALM project testing, literature reviews, and the suggestions of the project steering committee and working groups to release materials that help support LAM decisions.

REALM 101

- About the project
- What we know about COVID-19
- The “known unknowns”
- The testing process



What we know about COVID-19

Because SARS-CoV-2 is still emerging, knowledge about it is a work in progress. For COVID-19 prevention and decontamination recommendations, please refer to the [Center for Disease Control's guidelines](#).

How the virus spreads

DIRECT TRANSMISSION

Virus-containing droplets are expelled from an infected person and enter the system of an uninfected person.

INDIRECT TRANSMISSION

Objects can harbor the virus for an extended period after being contaminated by an infected person.

Survival of the virus on surfaces

If SARS-CoV-2 is transferred to a physical surface, its survival time appears to vary based on material composition and roughness, before it dies off on its own through natural attenuation. Disinfecting surfaces with the appropriate cleaning agents kill the virus quickly but is not always practical (one would have to wipe down every page of a book, for example). There may also be issues with the cleaning agents possibly damaging delicate materials, so caution will need to be taken.

Quarantining is an option for items that are not practical or possible to disinfect individually. Should you disinfect or quarantine? Check out our decision-making checklist [ocl.org/realm-project](#) for tips.

The testing process

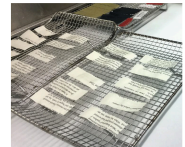
The tests are conducted by applying the virus on materials held at standard room temperature (68°F to 75°F) and relative humidity conditions (30 to 50 percent).

The quantity of viable virus is then measured at selected time points to capture the attenuation or drop in total virus. Some of the materials held trace amounts of the virus at the final testing time point.

Test points were selected to mimic real-world library options: quarantining items for a few days or a week. For most of the materials tested, only a trace amount of virus detected by the final time point examined.

We're releasing project plans and test results as they become available.

Visit [ocl.org/realm-project](#) for updates.



HOW CAN I USE THESE RESULTS?

When making decisions about policies...



Stay informed of federal, state, and local guidelines



Check CDC guidelines on PPE and hygiene practices



Consider if your collection/resources can be sanitized without damage



If quarantining, consider REALM results for the lifespan of the virus on relevant materials



Ask your peer institutions for their policies



Inform internal and external stakeholders of your policies

TOOLKIT ITEM: CHECKLIST

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CHECKLIST

Considerations for COVID-19 decision-making in libraries, archives, and museums

While working toward resuming operations and services to the public, many factors and resources (national, state, local) should inform your local decision-making. This list of considerations offers a starting point and includes links to guides and additional information.

STAY INFORMED

- Understand your current local COVID-19 situation and consult with local and state health departments. View the CDC's list of [State & Territorial Health Department Websites](#).
- Monitor federal, state, and local guidelines and data as conditions change. View the [CDC's COVID Data Tracker](#). Be prepared to be flexible and update policies and procedures as new information about COVID-19 becomes available.

PERSON-TO-PERSON TRANSMISSION

- Review guidelines for workplace safety as outlined in the AIHA's [Reopening: Guidance for Libraries and Reopening: Guidance for Museums](#).
- Familiarize yourself with personal hygiene practices outlined in the [CDC's guide on How to Protect Yourself and Others](#).

OBJECT-TO-PERSON TRANSMISSION

- Determine whether it is appropriate to quarantine or clean an object. Refer to the [NEDCC's guide on Disinfecting Books and Other Collections](#) for detailed considerations. If it's inadvisable to clean the object, consider quarantine.

If cleaning: disinfect the object with an [EPA recommended cleaning agent](#).

This document synthesizes various studies and data; however, the scientific understanding regarding COVID-19 is continuously evolving. This material is being provided for informational purposes only, and readers are encouraged to consult federal, state, and local guidelines. The authors, sponsors, and researchers are not liable for any damage resulting from use, misuse, or reliance upon this information, or any errors or omissions herein.

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CHECKLIST

If quarantining:

1. Determine what the object is made of to inform the length of quarantine.
2. Consider local factors when determining quarantine policies and duration. These include the number of COVID-19 cases, local public health guidelines (see 'Stay Informed' section), who is handling the materials (staff and/or community members), and where the materials are handled (onsite and/or at community members' homes).
3. Consider the [NEDCC's guide on Disinfecting Books and Other Collections](#) and learn about what other libraries are doing.
4. Consult [REALM test results](#) for information about virus lifespan on different materials.

COMMUNICATE

- Establish a list of internal and external stakeholders and develop messaging for the different groups. Stakeholder examples include a board, administration, staff, and public.
- Determine how changes will be communicated to stakeholders.
- Communicate changes to staff and provide training on new policies and procedures.
- Set an expectation that updates and revisions will be shared as more is learned about COVID-19.

Resources

www.cdc.gov/publichealthgateway/healthdirectories/healthdepartments.html
www.covid.cdc.gov/covid-data-tracker
www.aha-assets.sfs2.digitalocampspaces.com/AHA/resources/Reopening-Guidance-for-Libraries_GuidanceDocument.pdf
www.aha-assets.sfs2.digitalocampspaces.com/AHA/resources/Reopening-Guidance-for-Museums-and-Collecting-Institutions_GuidanceDocument.pdf
www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention-H.pdf
www.nedcc.org/free-resources/preservation-leaflets/3-emergency-management/3-5-disinfecting-books
www.epa.gov/pesticide-registration/list-n-disinfectants-coronavirus-covid-19
www.oclc.org/realm/research.html

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For more information

- New website: oclc.org/realm
- Updated FAQ
- REALM question in-box
- Mailing list (10,000+ subscribers)



Photo by [Mikaela Wiedenhoff](#) on [Unsplash](#)

Questions?

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