REALM PROJECT
REopening Archives, Libraries, and Museums

Connecting to Collections Care
10 March 2021

oc.lc/realm-project
#REALMproject
WHO IS PART OF THE REALM PROJECT?

- INSTITUTE of Museum and Library Services
  - Project funder
  - Consults on project goals and activities
  - Convenes steering committee and working groups

- OCLC
  - Collects and synthesizes stakeholder input to inform decisions
  - Publishes and distributes research and information to the archives, libraries, and museums communities

- Battelle
  - Conducts literature review
  - Conducts research on materials
PROJECT ACTIVITIES

- Review and summarize relevant authoritative research
- Ongoing engagement with representatives and subject matter experts from archives, libraries, and museums
- Laboratory testing of materials
- Synthesize the above inputs into toolkit resources
- Share project information and toolkit resources
- Project began in May 2020 and continues through September 2021
REALM is providing data that helps us better understand the virus. Local institutions can use that data, along with local information about risk levels, to inform their practices and policies.

The project is NOT making recommendations. Every institution is different, and its team will need to develop policies that work for them and their community.
STATUS OF COVID-19 RESEARCH
How might the virus spread through general operations?

How long does the virus survive on material surfaces through environmental attenuation?

How effective are various prevention and decontamination measures available in the near term?
Knowledge about the new coronavirus and COVID-19 is still emerging from the scientific community. Keep the following “known unknowns” in mind when interpreting and applying REALM data.

1. **Unknown**: How much virus an infected person will leave on an object

2. **Unknown**: How much virus someone can pick up from an object

3. **Unknown**: How much virus is needed to cause infection
HOW THE VIRUS SPREADS

Most likely:
• Direct contact between people
• Droplets passed between people

Possibly:
• Aerosol particles
• Contaminated objects (*fomites*)
• Other body fluids
ENVIRONMENTAL CONDITIONS ARE A FACTOR

- Temperature
- Relative humidity
- Air quality
- Air flow
- **BUT, more research is needed**
PREVENTION AND DECONTAMINATION TACTICS

• Social distancing
• Hand washing and toilet hygiene
• Masks/PPE
• Fresh air and open spaces
• Surface cleaners and disinfectants*
• UVA/UVC treatment*

*These may not be appropriate for sensitive library, archive, and museum materials.
LAB TESTING
How long does the virus remain active on materials commonly found in archives, libraries, and museums?

Active ... viable ... infectious ... “alive”
• Eight test rounds, up to five material types per round
• Droplets of live virus applied to material surface via ‘fake spit’
• Materials stored in stacked or unstacked configurations at standard room temperature and humidity
• TCID50 cell-based assay measures quantity of infectious virus at selected time points to capture the attenuation (drop) in total virus
• Virus may not completely die off during the time of the test
• Two tests at warm and cold temperatures
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.

<table>
<thead>
<tr>
<th>ITEM / MATERIAL*</th>
<th>DAYS OF VIRUS SURVIVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD case</td>
<td>6</td>
</tr>
<tr>
<td>Softback book cover</td>
<td>6</td>
</tr>
<tr>
<td>Hardback book cover</td>
<td>6</td>
</tr>
<tr>
<td>Archival folders</td>
<td>2</td>
</tr>
<tr>
<td>Plain paper pages</td>
<td>3</td>
</tr>
<tr>
<td>Plastic protective cover</td>
<td>6</td>
</tr>
<tr>
<td>Braille paper</td>
<td>4</td>
</tr>
<tr>
<td>Glossy pages</td>
<td>4</td>
</tr>
<tr>
<td>Children’s board book</td>
<td>4</td>
</tr>
<tr>
<td>Magazine pages</td>
<td>4</td>
</tr>
<tr>
<td>DVD disc</td>
<td>5</td>
</tr>
<tr>
<td>Storage bag</td>
<td>5</td>
</tr>
<tr>
<td>Storage container</td>
<td>5</td>
</tr>
<tr>
<td>Plexiglass</td>
<td>5</td>
</tr>
<tr>
<td>USB cassette</td>
<td>5</td>
</tr>
<tr>
<td>Storage foam</td>
<td>6</td>
</tr>
<tr>
<td>Leather book cover</td>
<td>8</td>
</tr>
<tr>
<td>Synthetic leather</td>
<td>8</td>
</tr>
</tbody>
</table>
How long the virus survives on commonly used library, archive, and museum **surfaces**

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>DAYS OF VIRUS SURVIVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marble</td>
<td>2 days</td>
</tr>
<tr>
<td>Brass</td>
<td>2 days</td>
</tr>
<tr>
<td>Laminate</td>
<td>6 days</td>
</tr>
<tr>
<td>Glass</td>
<td>6 days</td>
</tr>
<tr>
<td>Powder-coated steel</td>
<td>6 days</td>
</tr>
</tbody>
</table>

* For more information about the items and materials tested, please visit oclc/realm-project.
Items tested
- Hardcover book cover
- Softcover book cover
- Plastic protective cover
- Expanded polyethylene foam
MAKING POLICY DECISIONS
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
5 RULES TO HELP DECISION-MAKING

1. Most data will be flawed or incomplete. Be honest and transparent about this.

2. We may never have a “final answer” for many questions. Do you wait for certainty or act on the evidence you have?

3. Acknowledge the complexity, admit ignorance, and be open to exploring paradoxes.

4. Different people interpret data differently. Seek out outside perspectives for solutions.

5. Observing real-world interventions can complement the findings of controlled trials and other forms of evidence.
REALM 101: A PROJECT OVERVIEW

For libraries

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

For museums

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

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REALM PROJECT
REopening Archives, Libraries, and Museums

REALM 101
How long the virus survives on commonly used library, archive, and museum materials

### Table 2. Test total \( \log_{10} \) SARS-CoV-2 recovered at day 0 and 2

<table>
<thead>
<tr>
<th>Description</th>
<th>Inoculum (^1)</th>
<th>0 Day (^2)</th>
<th>2 Day 1</th>
<th>2 Day 2</th>
<th>3 Day</th>
<th>4 Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talking book, USB cassette</td>
<td>5.26</td>
<td>2.55</td>
<td>1.30</td>
<td>1.06</td>
<td>0.78</td>
<td>&lt; LOD</td>
</tr>
<tr>
<td>DVD</td>
<td>5.26</td>
<td>1.30</td>
<td>0.52</td>
<td>&lt; LOD</td>
<td>&lt; LOD</td>
<td>&lt; LOD</td>
</tr>
<tr>
<td>Storage bag (flexible plastic)</td>
<td>5.26</td>
<td>1.82</td>
<td>0.82</td>
<td>0.78</td>
<td>0.26</td>
<td>&lt; LOD</td>
</tr>
<tr>
<td>Storage container (rigid plastic)</td>
<td>5.26</td>
<td>3.16</td>
<td>2.05</td>
<td>0.52</td>
<td>0.57</td>
<td>&lt; LOD</td>
</tr>
<tr>
<td>Plexiglass</td>
<td>5.26</td>
<td>2.13</td>
<td>1.31</td>
<td>0.25</td>
<td>&lt; LOD</td>
<td>0.25</td>
</tr>
</tbody>
</table>

\(^1\) Total number of virus applied to each material

\(^2\) Total number of virus recovered after **1hr dry period**

---

**Figure 2:** Total \( \log_{10} \) SARS-CoV-2 Recovered at days 1, 2, 3 and 4

**Table 2. Test total \( \log_{10} \) SARS-CoV-2 recovered at day 0 and 2**

<table>
<thead>
<tr>
<th>Description</th>
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<th>0 Day (^2)</th>
<th>2 Day 1</th>
<th>2 Day 2</th>
<th>3 Day</th>
<th>4 Day</th>
</tr>
</thead>
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<td>5.26</td>
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<td>0.25</td>
<td>&lt; LOD</td>
<td>0.25</td>
</tr>
</tbody>
</table>

\(^1\) Total number of virus applied to each material

\(^2\) Total number of virus recovered after **1hr dry period**

---

**Figure 3.** Test attenuation of SARS-CoV-2 at days 0, 2, 3, 4, 5, 6, with ± 50% confidence intervals indicated by the black vertical bars for each test date and item.
MATERIAL COMPARISONS

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

<table>
<thead>
<tr>
<th>ITEM / MATERIAL</th>
<th>DAYS OF VIRUS SURVIVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>1</td>
</tr>
<tr>
<td>Biaxially oriented polyester film</td>
<td>3</td>
</tr>
<tr>
<td>Polycarbonate</td>
<td>3</td>
</tr>
<tr>
<td>LDPE plastic</td>
<td>5</td>
</tr>
<tr>
<td>HDPE plastic</td>
<td>5</td>
</tr>
<tr>
<td>Plexiglass</td>
<td>5</td>
</tr>
<tr>
<td>ABS plastic</td>
<td>5</td>
</tr>
<tr>
<td>Expanded polyethylene foam</td>
<td>6</td>
</tr>
<tr>
<td>Expanded polyvinyl chloride “vinyl”</td>
<td>8</td>
</tr>
</tbody>
</table>

How long the virus survives on books & paper

<table>
<thead>
<tr>
<th>ITEM / MATERIAL</th>
<th>DAYS OF VIRUS SURVIVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softback book cover</td>
<td>1</td>
</tr>
<tr>
<td>Hardcover book cover</td>
<td>1</td>
</tr>
<tr>
<td>Archival folders</td>
<td>2</td>
</tr>
<tr>
<td>Plain paper pages</td>
<td>3</td>
</tr>
<tr>
<td>Plastic protective cover</td>
<td>3</td>
</tr>
<tr>
<td>Braille paper</td>
<td>4</td>
</tr>
<tr>
<td>Colour pages</td>
<td>4</td>
</tr>
<tr>
<td>Children’s board book</td>
<td>4</td>
</tr>
<tr>
<td>Magazine pages</td>
<td>4</td>
</tr>
<tr>
<td>Leather book cover</td>
<td>4</td>
</tr>
<tr>
<td>Synthetic leather</td>
<td>8</td>
</tr>
</tbody>
</table>
LIT REVIEW

• How the virus spreads
• Decontamination strategies
• Prevention strategies

TAKEAWAYS

Key takeaways from Phase 2 literature review

The Phase 2 literature review synthesized and summarized the available scientific literature on SARS-CoV-2 (the virus that causes COVID-19) from mid-May through mid-August 2020. The review focused on studies of how the virus is spread, virus attachment to materials, and effectiveness of prevention and decontamination strategies.

Decontamination and prevention strategies

Researchers suggest several options for reducing the presence of SARS-CoV-2 in environments, which may help prevent transmission among people in those environments.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cleaning hands</strong></td>
<td>• Wash hands for 20 seconds from fingertip to forearm with soap and warm water</td>
</tr>
<tr>
<td></td>
<td>• Rub hands with 60-80% ethanol hand sanitizer for 30 seconds</td>
</tr>
<tr>
<td></td>
<td>• Rub hands with 75% 2-propanol hand sanitizer for 30 seconds</td>
</tr>
<tr>
<td><strong>Mask wearing</strong></td>
<td>• Wear face masks that cover the nose and mouth, such as medical and triple-layer cotton masks</td>
</tr>
<tr>
<td></td>
<td>• Provide masks to all guests and staff</td>
</tr>
<tr>
<td><strong>Social distancing</strong></td>
<td>• Maintain a physical distance of at least 5.2–9.8 ft</td>
</tr>
<tr>
<td></td>
<td>• Implement intermittent occupancy</td>
</tr>
<tr>
<td></td>
<td>• Schedule visits</td>
</tr>
<tr>
<td><strong>Disinfecting</strong></td>
<td>• Refer to list of disinfectants and surface cleaners that meet the EPA’s criteria for use against SARS-CoV-2</td>
</tr>
<tr>
<td><strong>Heating and cooling systems</strong></td>
<td>• Use continuous air renewal from fresh outdoor air</td>
</tr>
<tr>
<td></td>
<td>• Use UVC energy with HVAC systems</td>
</tr>
<tr>
<td><strong>Ventilation</strong></td>
<td>• Use local air exhaust</td>
</tr>
<tr>
<td></td>
<td>• Use high-efficiency particulate air (HEPA) and MERV 14 filters</td>
</tr>
<tr>
<td></td>
<td>• Mix fresh outdoor air with existing air</td>
</tr>
<tr>
<td></td>
<td>• Ensure cool air enters the room at floor level and exhausts at ceiling level</td>
</tr>
<tr>
<td></td>
<td>• Use stand-alone air purifiers</td>
</tr>
<tr>
<td><strong>UV light</strong></td>
<td>• Expose to combined UVA/UVC light for 9 minutes</td>
</tr>
<tr>
<td></td>
<td>• Expose to pulsed-UVe light for 1 minute</td>
</tr>
</tbody>
</table>

* UV light is known to cause damage to collections materials.
CHECKLISTS

- Decision-making considerations
- Cleaning considerations
- Reopening considerations
RESOURCES ROUNDUPS

VIRTUAL PROGRAMMING

VACCINE INFO

SOCIAL DISTANCING

Virtual Programming: Resource Roundup

Virtual programming offers endless opportunities for learning, fun, and connecting with others. Here are some resources available:

- **Museums**: Many museums are offering virtual tours and webinars. Check out the websites of your favorite museums for upcoming events.
- **Library Programs**: Many libraries are offering virtual storytimes, book clubs, and other programs. Check your local library’s website for details.
- **Online Workshops**: Look for virtual workshops on a variety of topics such as art, history, or science. Websites like Skillshare and Udemy offer a wide range of options.

Vaccines: Resource Roundup

Understanding the vaccine

- **Facts about the Vaccine**: Here are some key facts about how vaccines work and why they are important. (Source: CDC)
- **Vaccine FAQs**: Answers to common questions about vaccines, such as effectiveness and side effects. (Source: Mayo Clinic)

Vaccine acceptance and uptake

- **COVID-19 Vaccine FAQs**: A comprehensive list of frequently asked questions about the COVID-19 vaccine. (Source: WHO)

Social Distancing: Resource Roundup

- **Guidelines and Tips**: Follow the latest guidelines from health authorities on how to practice social distancing. (Source: CDC)
- **Resources for Teachers**: Ideas and activities for teaching and learning during times of social distancing. (Source: National Education Association)

Libraries

- **Virtual Storytimes**: Many libraries are offering virtual storytimes for children. Check your local library’s website for details.
- **Online Workshops**: Look for virtual workshops on a variety of topics such as art, history, or science. Websites like Skillshare and Udemy offer a wide range of options.

Museums

- **Virtual Tours**: Many museums are offering virtual tours of their exhibits. Check out the websites of your favorite museums for tour information.
- **Online Exhibits**: Explore virtual exhibits on a variety of topics. Websites like the Smithsonian’s National Museum of Natural History offer virtual tours of their exhibits.

Resources

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VIDEOS

- Library perspective interview
- Intro to REALM
TOOLKIT RESOURCES

Topics of upcoming resources include:

- vaccines and variants
- mask policies
- docent & volunteer management
- decision making in times of uncertainty

Keep up to date with toolkit resource releases on the REALM website and through our mailing list.

oclc.org/realm/resources
March 10, 2021
AIC, Connecting to Collections Care

Caring for Your Resources During COVID-19

Bexx Caswell-Olson
Director of Book Conservation, Northeast Document Conservation Center
Founded in 1973, NEDCC was the first independent conservation laboratory in the nation to specialize exclusively in treating collections made of paper or parchment, such as works of art, photographs, books, documents, maps, and manuscripts. Today, the Center offers conservation treatment, digital imaging, and audio preservation services, as well as preservation training, assessments and consultations, and disaster advice on collections. NEDCC is a trusted resource worldwide for information on the preservation of paper-based collections.
3. Emergency Management

3.5 Disinfecting Books and Other Collections 2020 UPDATED HTML PDF
Disinfection of Surfaces

• The role of fomites (surface transmission) is still unclear, but we do know that the virus can live on different surfaces for long periods of time.

• Regularly disinfect high-touch or shared surfaces, *i.e.* doorknobs, worktables, public computers, keypads.
Disinfection: Liquid Cleaning Products

- EPA's **List N: Disinfectants for Coronavirus** provides the contact time necessary for disinfection. Times range from 30 seconds – 10 minutes.
- Products on this list are only recommended for use on hard, non-porous surfaces (i.e. tables, door handles).
- Many liquid cleaning products contain harsh chemicals including bleach, hydrogen peroxide, chlorine, ammonia, etc.
- These chemicals can:
  - cause moisture damage to covers and pages
  - accelerate aging and embrittlement of materials
  - weaken paper or cloth
  - cause staining, discoloration, or bleaching; may remove color from leather, cloth, and paper

![EPA's List N: Disinfectants for Coronavirus](https://www.epa.gov/pesticide-registration/list-n-advanced-search-page-disinfectants-coronavirus-covid-19)
The bookcloths shown above meet the requirements of ANSI/NISO/LBC Z39.78-2000 (R2018): Library Binding, which dictates that covering material must be colorfast and water resistant.

While a scrubbing with a wet paper towel did not remove color, the bleach-free disinfecting wipe (active ingredient ammonium chloride) and 70% isopropyl alcohol removed color from all 3 samples.
Fogging

- Fogging of disinfectant to control the spread of COVID-19 is not currently approved by the EPA because more research is needed. [https://www.epa.gov/coronavirus/can-i-use-fogging-fumigation-or-electrostatic-spraying-or-drones-help-control-covid-19](https://www.epa.gov/coronavirus/can-i-use-fogging-fumigation-or-electrostatic-spraying-or-drones-help-control-covid-19)

- Fogging of disinfectant is only recommended for use on hard, non-porous surfaces (i.e. it should not be used on cloth, paper, upholstery, carpeting).

- Fogging will only apply disinfectant to exposed surfaces – stacked materials and hard to reach areas will not be sanitized.
Ultraviolet Light (UV)

There are 3 types of UV: UVA, UVB, UVC:

- **UVC** - Most effective for disinfection, but direct exposure can burn your skin or eyes. UVC lamps may generate ozone; ozone is damaging to the respiratory, cardiovascular and central nervous system.

- **UVB** – B=Burning. Penetrates deep into skin/eyes and exposure increases your risk of developing skin cancer and cataracts.

- **UVA** – A=Aging. Exposure increases your risk of skin cancer, advanced aging. 1,000x less effective than UVC for disinfection.

- Not all UV lamps are equal. Lamps sold for consumer use may be less effective.

- While UV can be an effective sanitation method, only surfaces in direct contact with light will be disinfected; a closed book or books in a stack will not be adequately sanitized.

- UV is known to cause damage to collections materials.
Ultraviolet Light (UV)

- All light is damaging, but UV is the most damaging; light damage is cumulative and irreversible.
- Light damage causes fading, discoloration, advanced aging, and embrittlement of paper, fabrics, plastics, etc.
- Best practices for collections care include eliminating or minimizing as much UV light as possible in areas where collections are present. See NEDCC Preservation Leaflet 2.4, “Protection from Light Damage”.

REALM PROJECT

OCLC

INSTITUTE of Museum and Library SERVICES

BATTELLE
Heat

- Best practices for preservation of collections materials do not recommend exposure to high temperatures or extreme fluctuations in temperature.
- Increased temperature = increased rate of decay.
- Exposure to heat causes advanced aging, discoloration, distortion, and embrittlement of many materials.
- Adhesives, resins, varnishes, plastics, etc. may soften, melt, or shrink when exposed to high temperatures.
Hygiene Procedures

- NEDCC recommends implementing hygiene and quarantine procedures over disinfection of materials.
- Wear a mask and follow other CDC guidance to stop the spread of COVID-19.
- Practice good hand hygiene; always wash your hands before handling collections materials. Use hand sanitizer only if soap and water are not available.
- Disinfect shared tables, workstations, equipment, etc. after each use.
- For soft supports (book cradles, foam) that cannot be disinfected - use a disposable barrier layer that can be discarded after use.
Quarantine

When hygiene protocols can’t be followed or if you suspect materials have been contaminated:

• quarantine materials to allow for natural attenuation (extinction) of the virus
• duration of quarantine will depend on the type of material and method of containment (i.e. stacked vs. unstacked)

Quarantining materials is a **safe**, **effective**, and **low-cost** way of mitigating risk for both staff and patrons.

Extended Closures

Have a plan to address:

• Who has access to the building when it is closed - include collections care staff if possible
• How collections will be monitored during an extended closure and who is responsible for gathering data
• Continuation of regular building maintenance
• A schedule for regular site visits and review of collections storage areas
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 review federal, state, tribal, territorial, and local guidance. The authors, sponsors, and researchers are not liable for any damages resulting from use, misuse, or reliance upon this information, or any errors or omissions herein.

Questions?

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