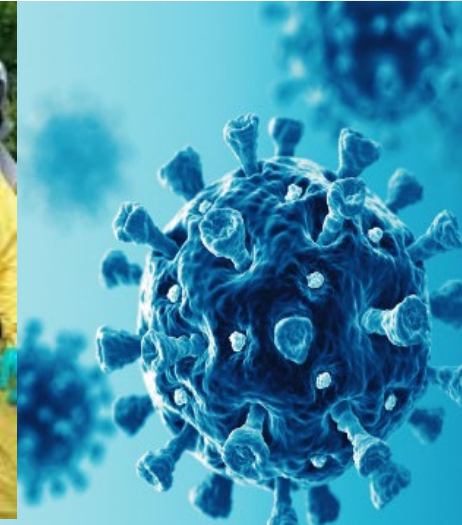


EPA Research on COVID-19 in the Environment



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EPA and CDC's Reopening Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes



Cleaning and Disinfection

GUIDANCE FOR CLEANING & DISINFECTING

PUBLIC SPACES, WORKPLACES, BUSINESSES, SCHOOLS, AND HOMES



SCAN HERE
FOR MORE
INFORMATION

1 DEVELOP YOUR PLAN

DETERMINE WHAT NEEDS TO BE CLEANED. Areas unoccupied for 7 or more days need only routine cleaning. Maintain existing cleaning practices for outdoor areas.

DETERMINE HOW AREAS WILL BE DISINFECTED. Consider the type of surface and how often the surface is touched. Prioritize disinfecting frequently touched surfaces.

CONSIDER THE RESOURCES AND EQUIPMENT NEEDED. Keep in mind the availability of cleaning products and personal protective equipment (PPE) appropriate for cleaners and disinfectants.

Follow guidance from state, tribal, local, and territorial authorities.

2 IMPLEMENT

CLEAN VISIBLY DIRTY SURFACES WITH SOAP AND WATER prior to disinfection.

USE THE APPROPRIATE CLEANING OR DISINFECTANT PRODUCT. Use an EPA-approved disinfectant against COVID-19, and read the label to make sure it meets your needs.

ALWAYS FOLLOW THE DIRECTIONS ON THE LABEL. The label will include safety information and application instructions. Keep disinfectants out of the reach of children.

3 MAINTAIN AND REVISE

CONTINUE ROUTINE CLEANING AND DISINFECTION. Continue or revise your plan based upon appropriate disinfectant and PPE availability. Dirty surfaces should be cleaned with soap and water prior to disinfection. Routinely disinfect frequently touched surfaces at least daily.

MAINTAIN SAFE PRACTICES such as frequent handwashing, using cloth face coverings, and staying home if you are sick.

CONTINUE PRACTICES THAT REDUCE THE POTENTIAL FOR EXPOSURE. Maintain social distancing, staying six feet away from others. Reduce sharing of common spaces and frequently touched objects.

For more information, please visit **CORONAVIRUS.GOV**





Develop Your Plan

MAKING YOUR PLAN TO CLEAN AND DISINFECT

Cleaning with soap and water removes germs, dirt, and impurities from surfaces. It lowers the risk of spreading infection.

Disinfecting kills germs on surfaces. By killing germs on a surface after cleaning, it can further lower the risk of spreading infection.



Is the area indoors?

YES

It is an indoor area.

NO

Maintain existing cleaning practices.

Coronaviruses naturally die in hours to days in typical indoor and outdoor environments. Viruses are killed more quickly by warmer temperatures and sunlight.

Has the area been occupied within the last 7 days?

YES

Yes, the area has been occupied within the last 7 days.

NO

The area has been unoccupied within the last 7 days.

The area will need only routine cleaning.



Is it a frequently touched surface or object?

YES

Yes, it is a frequently touched surface or object.

NO

Thoroughly clean these materials.

Consider setting a schedule for routine cleaning and disinfection, as appropriate.



What type of material is the surface or object?

Hard and non-porous materials
like glass, metal, or plastic.

Visibly dirty surfaces should be cleaned prior to disinfection.

Consult EPA's list of disinfectants for use against COVID-19, specifically for use on hard, non-porous surfaces and for your specific application need. More frequent cleaning and disinfection is necessary to reduce exposure.

Soft and porous materials like carpet,
rugs, or material in seating areas.

Thoroughly clean or launder materials.

Consider removing soft and porous materials in high traffic areas. Disinfect materials if appropriate products are available.



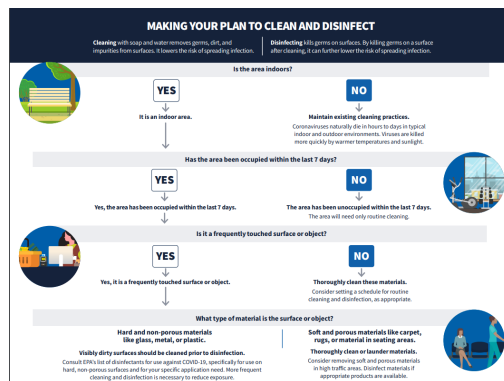
1 DEVELOP YOUR PLAN

DETERMINE WHAT NEEDS TO BE CLEANED.

Areas unoccupied for 7 or more days need only routine cleaning. Maintain existing cleaning practices for outdoor areas.

DETERMINE HOW AREAS WILL BE DISINFECTED. Consider the type of surface and how often the surface is touched. Prioritize disinfecting frequently touched surfaces.

CONSIDER THE RESOURCES AND EQUIPMENT NEEDED. Keep in mind the availability of cleaning products and personal protective equipment (PPE) appropriate for cleaners and disinfectants.



- Is the area Indoors?
 - Outdoors – maintain existing cleaning practices
- Has the area been occupied within the last 7 days?
 - Unoccupied – routine cleaning
 - Building reopening considerations
- Is it a frequently touched surface or object?
- What type of material is the surface or object?
 - Hard and non-porous
 - Soft and porous



Implement Your Plan

2 IMPLEMENT

CLEAN VISIBLY DIRTY SURFACES WITH SOAP AND WATER prior to disinfection.

USE THE APPROPRIATE CLEANING OR DISINFECTANT PRODUCT. Use an EPA-approved disinfectant against COVID-19, and read the label to make sure it meets your needs.

ALWAYS FOLLOW THE DIRECTIONS ON THE LABEL. The label will include safety information and application instructions. Keep disinfectants out of the reach of children.

<https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

- **Cleaning with soap and water** removes germs, dirt and impurities from surfaces.
- **Disinfecting with an EPA-approved disinfectant against COVID-19 virus** kills germs on a surface.
- Follow the label directions
 - Safety
 - Clean
 - Disinfect
 - Appropriate application
 - Wetted contact time



Maintain and Revise Your Plan

3 MAINTAIN AND REVISE

CONTINUE ROUTINE CLEANING AND DISINFECTION.

Continue or revise your plan based upon appropriate disinfectant and PPE availability. Dirty surfaces should be cleaned with soap and water prior to disinfection. Routinely disinfect frequently touched surfaces at least daily.

MAINTAIN SAFE PRACTICES such as frequent handwashing, using cloth face coverings, and staying home if you are sick.

CONTINUE PRACTICES THAT REDUCE THE POTENTIAL FOR EXPOSURE. Maintain social distancing, staying six feet away from others. Reduce sharing of common spaces and frequently touched objects.

- Frequency of cleaning and disinfection
 - Consider use of surface/object
 - Follow specific guidance, as appropriate
- Safe practices
 - Hand washing
 - Cloth face coverings
 - Staying home if sick
- Consider other adjustments
 - Social distancing
 - Reducing shared spaces and objects
 - Reducing soft and porous materials, if appropriate



EPA SARS-CoV-2 Capabilities and Research

- EPA has capabilities to respond to environmental emergencies and address biological contamination
- The world continues to learn much about COVID-19 – EPA ORD has the expertise to add to that knowledge, especially in the areas of exposure, wastewater, and cleaning and disinfection
- EPA researchers are building on an expansive body of world-class research and applying that knowledge to reduce the risk of exposure to SARS-CoV-2
- Aimed to help states & territories, tribes and local governments (e.g., public health agencies) guide the public, businesses and institutions to reduce risk of SARS-CoV-2
- Partnering with CDC, state and local agencies and others





EPA SARS-CoV-2 Research Areas

Applied, rapid response research



**Disinfection of
Real-World
Materials**

**Virus in
Sewage**



**Delivery of
Disinfectant**

**Environmental
Methods
Development**



EPA CoV-2 Questions Being Addressed



Research topics were selected because they can result in a critical and rapid impact on the current CoV-2 response:

- How can real-world surfaces be disinfected most effectively?
- Are there ways to disinfect high-touch, public spaces that remain effective for long periods of time?
- Can personal protective equipment (PPE) be successfully disinfected and reused?
- Can wastewater be used to monitor infection in our communities?

- **Challenge**

- [List-N](#) is EPA's list of approved products for use against SARSCoV-2; however most are limited to nonporous surfaces
- Need information on real-world disinfection of large or complex areas and variety of surfaces, including porous materials

- **Approach**

- Develop decontamination methods and applications using EPA List-N products to disinfect real-world areas
- Test on materials including seat fabric (e.g., buses, airplanes), elevator hand rails, and latex painted surfaces

- **Deliverables**

- Test methods
- Interim data results shared with end users
- Data reported to the EPA Technical Working Group to guide ongoing tech support/response decisions
- Final data reports



Disinfecting Large Areas



- **Challenge**

- Understand how to apply disinfectants to larger areas than most traditional methods (e.g., trigger spray) cover
- Limited disinfectants approved for use with alternative application methods (e.g., sprayers, foggers, etc.) – common disinfectants need to be tested with these methods

- **Approach**

- Evaluate variety of alternative disinfectant applications, such as electrostatic sprayers or foggers, using EPA List-N products for effectiveness against SARS-CoV-2

- **Deliverables**

- Data packets for EPA Office of Pesticide Programs, can use to consider application methods for specific disinfectants
- Interim testing results for use by stakeholders
- Data reported to the EPA Technical Working Group to guide ongoing tech support/response decision
- Final reports/publications to inform use of these methods/devices



Efficacy/Application for Long-Lasting Disinfectants

- **Challenge**
 - Continual re-application of cleaning/disinfection for frequently touched surfaces in public areas poses significant challenge
 - Some products claim to offer residual disinfection, e.g., continuing to disinfect surfaces for days to months
 - No residual disinfectant products currently registered for use against SARS-CoV-2
 - Residual disinfectants can have tremendous impact
- **Approach**
 - Evaluate antimicrobial coatings and application methods for surfaces and objects frequently touched by multiple people
- **Deliverables**
 - Interim results for use by stakeholders
 - Final reports/publications to inform use of these methods/devices



Alternative Disinfection Devices

- **Challenge**

- Use of disinfection devices does not fall squarely under FIFRA. They are regulated by FDA as devices; neither EPA nor FDA verify claimed efficacy
- Devices could be useful in larger spaces or sensitive applications, but need to understand effectiveness and how best to deploy

- **Approach**

- Evaluate ultraviolet (UVC) light, ozone, and steam generating devices to determine effectiveness against SARS-CoV-2, especially on porous materials

- **Deliverables**

- Data reported to the EPA Technical Working Group to guide ongoing tech support/response decisions
- Final reports/publications to inform use of these methods/devices



Personal Protective Equipment (PPE) Disinfection



- **Challenge**

- High demand for and shortages of PPE for hospitals, nursing homes and essential workers
- Need to reuse PPE and extend effectiveness with proper disinfection
- Need to extend available, proven, disinfection options

- **Approach**

- Evaluate methods of disinfecting PPE and whether methods damage the PPE

- **Deliverables**

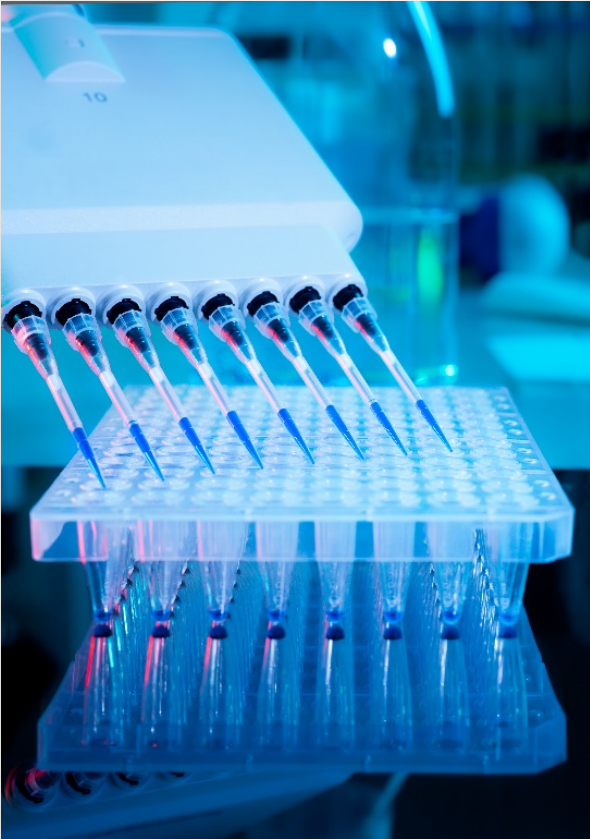
- Development and publication of protocols for PPE disinfection for reuse
- Interim results
- Final results/reports

Surface Sampling Efficiency

- **Challenge**
 - Surface sampling for microorganisms is inefficient and unreliable
 - Lots of interest in understanding capability of surface sampling
- **Approach**
 - Determine environmental sampling efficiency and level of detection for SARS-CoV-2 on various surfaces and materials
- **Deliverables**
 - Test methods
 - Interim data results shared with end users
 - Data reported to the EPA Technical Working Group to guide ongoing tech support/response decisions
 - Final data reports



CoV-2 Rapid, Molecular Viability Assay



- **Challenge**
 - Need to be able to quickly distinguish live virus from non-living viral RNA to determine if virus detected is viable (infectious) or not
- **Approach**
 - Develop method to quickly and cost-effectively analyze surface samples for virus before and after disinfection
 - Adapting from EPA's Anthrax spore method
- **Deliverables**
 - Method development
 - Proof of concept



Development of Standardized Methods to Assess CoV-2 in Sewage



- **Challenge**

- CoV-2 has been detected in feces from patients diagnosed with COVID-19 as well as raw sewage
- Sensitive, standardized methods are needed for detecting and quantifying CoV-2 in raw sewage, including infectious virus

- **Approach**

- Develop, evaluate and apply methods for concentrating and quantifying CoV-2 by molecular and live (infectious) assays in wastewater
- Quantify the level of CoV-2 detected using molecular and live virus measurement of raw sewage at wastewater treatment plants

- **Deliverables**

- Validated, standardized methods for concentrating and detecting CoV-2 in raw sewage using molecular and infectivity measurements
- Report documenting the assessment of CoV-2 levels in sewage using the standardized methods



Sewage Virus Levels for Assessing Community Infection Rate

- **Challenge**

- Early evidence suggests SARS-CoV-2 RNA levels in wastewater may be a leading indicator of rising community infections
- Linking the RNA sewage signal to community prevalence requires:
 - Application of consistent analytical method with proper controls
 - Improved understanding of decay rates and dilution in sewer systems
 - Monitoring temporal changes in communities with varying infection levels

- **Approach**

- Rapidly assess molecular approach in collaboration with local (Cincinnati) sewer district
- Initiate pilot monitoring effort to understand factors affecting sewage signal
 - Partnering with CDC, groups representing large/small utilities across State of Ohio, local and state public health agencies

- **Deliverables**

- Ongoing communication of monitoring results with local/state health agencies
- Input data to refine/evaluate CDC model linking sewer signal to community infection rate
- Report summarizing lessons learned/recommendations for sewer monitoring





EPA Research on COVID-19 Website

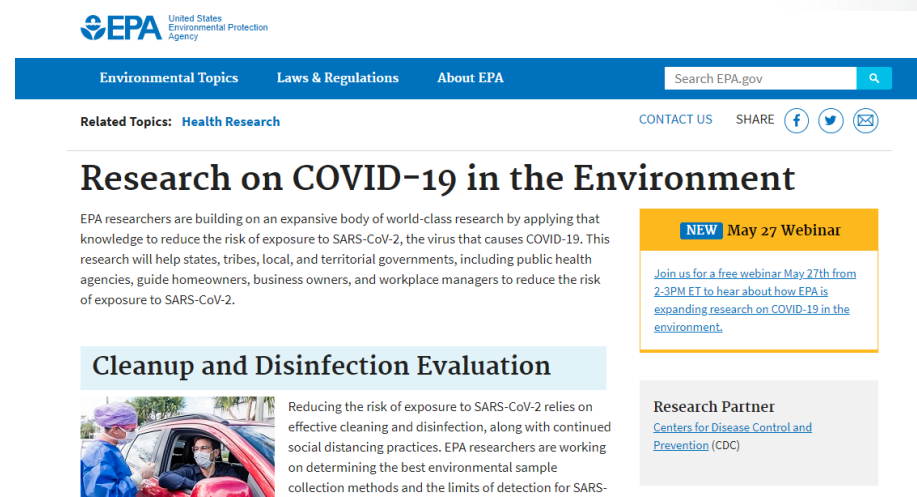
More information is available at EPA's CoV-2 Research website:

<https://www.epa.gov/healthresearch/research-covid-19-environment>

Information and results will also be shared through:

- EPA Program Offices and Regions
- Stakeholders, including state and local agencies and public health organizations
- Future webinars

Additional questions can be submitted to CESER@epa.gov





More Information

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