

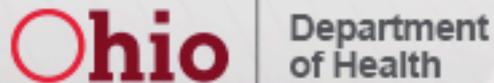
Operator or Public's Risk of Exposure to Waterborne Disease



Rebecca Fugitt

Bureau of Environmental Health and Radiation Protection

Ohio Department of Health



Exposure Pathways – Waterborne Diseases

- Dermal contact
 - Then to mouth/nose
 - Open wounds/cuts
- Incidental ingestion - eating, drinking
- Inhalation- breathing spray or mist

Common pathogens in wastewater

- Bacteria, viruses, and protozoa are three types of microorganisms that can be found in wastewater.
- Many wastewater-treatment processes can remove microorganisms, but no process removes all microorganisms from wastewater.

Common pathogens in wastewater

- Waterborne bacterial pathogens in the United States include species of Salmonella, Shigella, Vibrio, Campylobacter, and pathogen strains of E. coli.
- Waterborne protozoan pathogens include Cryptosporidium and Giardia.
- Human enteric viruses, which cause a wide range of diseases and symptoms and are excreted in high numbers in the feces of infected individuals, include enteroviruses, adenoviruses, noroviruses, rotaviruses, and hepatitis A virus.

Francy, et al. 2011

Characteristics of various wastewater viruses

Virus group	Mode of transmission	Incubation period	Period of communicability
Adenovirus	Inhalation	5–7 days	Short
Echovirus	Inhalation	1–2 days	Short
Hepatitis A	Ingestion	15–40 days	Long
Poliovirus	Ingestion	5–20 days	Long
Norwalk	Ingestion		
Rotavirus	Ingestion		
Coxsackie A	Ingestion or inhalation		
Coxsackie B	Ingestion or inhalation		

Source: WEF, 2001

Coronavirus - Survivability

Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1

Doremalen, et al, National Institutes of Health, 2020

- Coronavirus remained viable in aerosols throughout the duration of the 3 hour experiment
- Coronavirus was most stable on plastic and stainless steel and viable virus could be detected up to 72 hours post application
- No viable virus could be measured after 4 hours on copper or after 24 hours on cardboard
- *“Our results indicate that aerosol and fomite transmission of HCoV-19 are plausible, as the virus can remain viable and infectious in aerosols for multiple hours and on surfaces up to days.”*

Coronavirus Disease 2019 (COVID-19)

CDC > Coronavirus Disease 2019 (COVID-19) > Health Departments



- Coronavirus Disease 2019 (COVID-19)
- Symptoms & Testing +
- Prevent Getting Sick +
- Daily Life & Coping +
- If You Are Sick +
- People Who Need Extra Precautions +
- Frequently Asked Questions
- Travel +
- Cases & Surveillance +

Water and COVID-19 FAQs

Information about Drinking Water, Recreational Water and Wastewater

Updated April 3, 2020

Summary of Changes

- Added guidance for boil advisories
- Added information on spread of COVID-19 virus in spas and water playgrounds

- Can the COVID-19 virus spread through drinking water? +
- Is the COVID-19 virus found in feces? +
- Can the COVID-19 virus spread through pools, hot tubs or spas, and water playgrounds? +
- Can the COVID-19 virus spread through sewerage systems? +

CDC: Is the COVID-19 virus found in feces?

- The virus that causes COVID-19 has been detected in the feces of some patients diagnosed with COVID-19.
- The amount of virus released from the body (shed) in stool, how long the virus is shed, and whether the virus in stool is infectious are not known.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

CDC: Is the COVID-19 virus found in feces?

- The virus that causes COVID-19 has been found in the feces of some patients diagnosed with COVID-19.
- However, it is unclear whether the virus found in feces may be capable of causing COVID-19.
- There has not been any confirmed report of the virus spreading from feces to a person.
- Scientists also do not know how much risk there is that the virus could be spread from the feces of an infected person to another person.
- However, the risk is expected to be low based on data from previous outbreaks of related coronaviruses, such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS).

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

World Health Organization

Water, sanitation, hygiene and waste
management for COVID-19 virus, Interim
Guidance 19 March 2020

file:///C:/Users/10071803/Downloads/
WHO-2019-nCoV-IPC_WASH-2020.2-eng.pdf

WHO – WASH Guidance

- Primary route of transmission is through respiratory droplets and contact of viruses on surfaces.
- *Approximately 2–10% of cases of confirmed COVID-19 disease present with diarrhoea, and two studies detected COVID-19 viral RNA fragments in the faecal matter of COVID-19 patients. However, only one study has cultured the COVID-19 virus from a single stool specimen. There have been no reports of faecal–oral transmission of the COVID-19 virus.*

CDC: Can the Coronavirus spread through sewerage systems?

- CDC is reviewing all data on COVID-19 transmission as information becomes available.
- The virus that causes COVID-19 has been found in untreated wastewater.
- Researchers do not know whether this virus can cause disease if a person is exposed to untreated wastewater or sewerage systems. There is no evidence to date that this has occurred.
- At this time, the risk of transmission of the virus that causes COVID-19 through properly designed and maintained sewerage systems is thought to be low.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

CDC: Can the Coronavirus spread through sewerage systems?

- Researchers have analyzed the available information which suggest that standard municipal wastewater treatment practices should inactivate the virus that causes COVID-19.
- CDC is reviewing information on COVID-19 transmission as it becomes available.
- Guidance will be updated as new evidence is assessed.

CDC: Can the Coronavirus spread through sewerage systems?

- In the 2003 SARS outbreak, there was documented transmission associated with sewage aerosols (Korea).
- Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

CDC: Should wastewater workers take extra precautions to protect themselves from the COVID-19 virus?

- Wastewater treatment plant operations should ensure workers follow standard practices to prevent exposure to wastewater.
- These include using engineering and administrative controls, safe work practices, and PPE normally required for work tasks when handling untreated wastewater.
- No additional COVID-19–specific protections are recommended for employees involved in wastewater management operations, including those at wastewater treatment facilities.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

World Health Organization

Information.

Critical Control Point	Potential Risk	Risk Response
Wastewater treatment - open basins	<i>Aerosols created during wastewater treatment process</i>	<ul style="list-style-type: none"> Communicate risks, provide signage, and PPE barriers to wastewater treatment operators regarding the potential transmission of coronaviruses and precautionary sanitation practices
Wastewater disinfection	<i>Infectious coronaviruses persisting in domestic sewage</i>	<ul style="list-style-type: none"> Ensure optimal contact time for chemical disinfection
Drinking water treatment	<i>Infectious coronaviruses in water supplies impacted by wastewater effluent</i>	<ul style="list-style-type: none"> Ensure continuous monitoring and performance of drinking water disinfection processes for systems with upstream wastewater impacts during, and after, and outbreak

Basic recommendations for treatment-plant operators when dealing with a potential virus outbreak

Global Water, Sanitation, & Hygiene (WASH)

- Home Global Water, Sanitation, & Hygiene (WASH)
- Community Water Systems
- Household Water Treatment & Safe Water Storage
- Sanitation & Hygiene**
 - Toilets & Latrines
 - Sewer Systems & Wastewater
 - Potential Sanitation Solutions During an Emergency Response
 - Guidance for Workers Handling Human Waste or Sewage**
- Travelers' Health

Guidance for Reducing Health Risks to Workers Handling Human Waste or Sewage

Workers who handle human waste or sewage may be at increased risk of becoming ill from waterborne diseases. To reduce this risk and protect against illness, such as diarrhea, the following guidance should be followed by workers and employers.¹

Guidelines

- Basic Hygiene Practices for Workers +
- Personal Protective Equipment (PPE) +
- Training for Workers +
- Vaccination Recommendations for Workers +

Related Pages

Basic Hygiene Practices for Workers

- Wash hands with soap and water immediately after handling human waste or sewage.
- Avoid touching face, mouth, eyes, nose, or open sores and cuts while handling human waste or sewage.
- After handling human waste or sewage, wash your hands with soap and water *before* eating or drinking.
- After handling human waste or sewage, wash your hands with soap and water *before* and *after* using the toilet.
- Before eating, removed soiled work clothes and eat in designated areas away from human waste and sewage-handling activities.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

Basic Hygiene Practices for Workers

- Do **not** smoke or chew tobacco or gum while handling human waste or sewage.
- Keep open sores, cuts, and wounds covered with clean, dry bandages.
- Gently flush eyes with safe water if human waste or sewage contacts eyes.
- Use waterproof gloves to prevent cuts and contact with human waste or sewage.
- Wear rubber boots at the worksite and during transport of human waste or sewage.
- Remove rubber boots and work clothes before leaving worksite.
- Clean contaminated work clothing daily with 0.05% chlorine solution (1 part household bleach to 100 parts water)

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

Personal Protective Equipment

- Workers handling human waste or sewage should be provided proper PPE, training on how to use it, and hand washing facilities.
- Workers should wash hands with soap and water *immediately after* removing PPE.
- The following PPE is recommended for workers handling human waste or sewage:
 - **Goggles:** to protect eyes from splashes of human waste or sewage.
 - **Protective face mask or splash-proof face shield:** to protect nose and mouth from splashes of human waste or sewage.
 - **Liquid-repellent coveralls:** to keep human waste or sewage off clothing.
 - **Waterproof gloves:** to prevent exposure to human waste or sewage.
 - **Rubber boots:** to prevent exposure to human waste or sewage.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

Training For Workers

- All workers who handle human waste or sewage should receive training on disease prevention.
- The training should include information on basic hygiene practices; use and disposal of personal protective equipment; and proper handling of human waste or sewage.
- Workers must also be urged to promptly seek medical attention if displaying any signs or symptoms of diarrhea, such as vomiting, stomach cramps and watery diarrhea.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

Vaccination Recommendations for Workers

- Vaccination recommendations for workers exposed to sewage or human waste should be developed in consultation with local health authorities.
- Tetanus vaccinations should be up to date, with consideration also given to the need for polio, typhoid fever, Hepatitis A and Hepatitis B vaccinations.
- The recommendations made by the CDC are based on best practices and procedures.
- Worker health and safety risks are likely to vary among specific locations and a trained health and safety professional should be consulted to create site specific worker health and safety plans.

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>



Occupational Safety and Health Administration

CONTACT US FAQ A TO Z INDEX ENGLISH ESPAÑOL

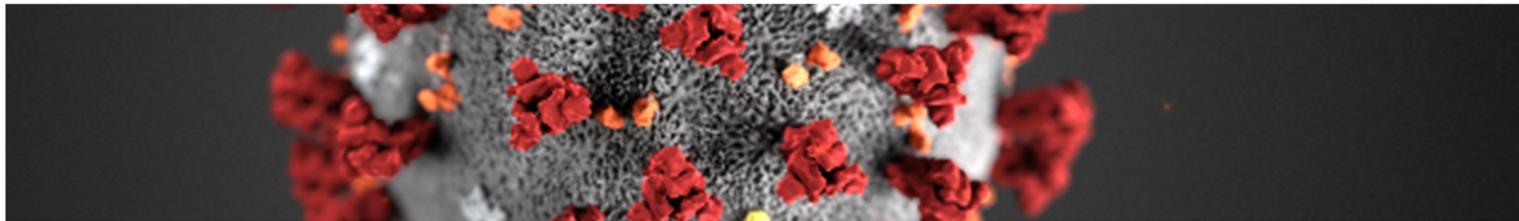
Occupational Safety and Health Administration - HOME

OSHA ▾ STANDARDS ▾ TOPICS ▾ HELP AND RESOURCES ▾

SEARCH OSHA

Safety and Health Topics / COVID-19

COVID-19



- Home
- News and Updates >
- Hazard Recognition >
- Standards >
- Medical Information >
- Control and Prevention >
- Background >

Control and Prevention

Measures for protecting workers from exposure to, and infection with, SARS-CoV-2, the virus that causes Coronavirus Disease 2019 (COVID-19), depend on the type of work being performed and exposure risk, including potential for interaction with people with suspected or confirmed COVID-19 and contamination of the work environment. Employers should adapt infection control strategies based on a thorough [hazard assessment](#), using appropriate combinations of engineering and administrative controls, safe work practices, and personal protective equipment (PPE) to prevent worker exposures. Some OSHA standards that apply to preventing occupational exposure to SARS-CoV-2 also require employers to train workers on elements of infection prevention, including PPE.

OSHA has developed this interim guidance to help prevent worker exposure to SARS-CoV-2. The general guidance below applies to all U.S. workers and employers. Depending on where their operations fall in OSHA's [exposure risk pyramid \(Spanish\)](#), workers and employers should also consult additional, specific guidance for those at increased risk of exposure in the course of their job duties broken down by exposure risk level.

General Guidance for All Workers and Employers

OSHA – Control and Prevention

- Measures for protecting workers from exposure to, and infection with, SARS-CoV-2, the virus that causes Coronavirus Disease 2019 (COVID-19), depend on:
 - the type of work being performed and exposure risk,
 - including potential for interaction with people with suspected or confirmed COVID-19 and
 - contamination of the work environment.
- Employers should adapt infection control strategies based on a thorough hazard assessment, using appropriate combinations of engineering and administrative controls, safe work practices, and personal protective equipment (PPE) to prevent worker exposures.



Guidance on Preparing Workplaces for COVID-19

OSHA 3990-03 2020

[https://www.osha.gov/Publications/
OSHA3990.pdf](https://www.osha.gov/Publications/OSHA3990.pdf)

OSHA – Hazard Recognition

Classifying Risk of Worker Exposure to SARS-CoV-2

- Worker risk of occupational exposure to SARS-CoV-2 during a pandemic may depend in part on the industry type and the need for contact within 6 feet of people known to be, or suspected of being, infected with SARS-CoV-2.
- Other factors, such as conditions in communities where employees live and work, their activities outside of work (including travel to COVID-19-affected areas), and individual health conditions, may also affect workers' risk of getting COVID-19 and/or developing complications from the illness.
- OSHA has divided job tasks into four risk exposure levels: very high, high, medium, and lower risk, as shown in the occupational risk pyramid, below. The four exposure risk levels represent the probable distribution of risk.

OSHA Exposure Levels

Lower Exposure Risk (Caution)

Jobs that do not require contact with people known to be, or suspected of being, infected with SARS-CoV-2. Workers in this category have minimal occupational contact with the public and other coworkers.

Medium Exposure Risk

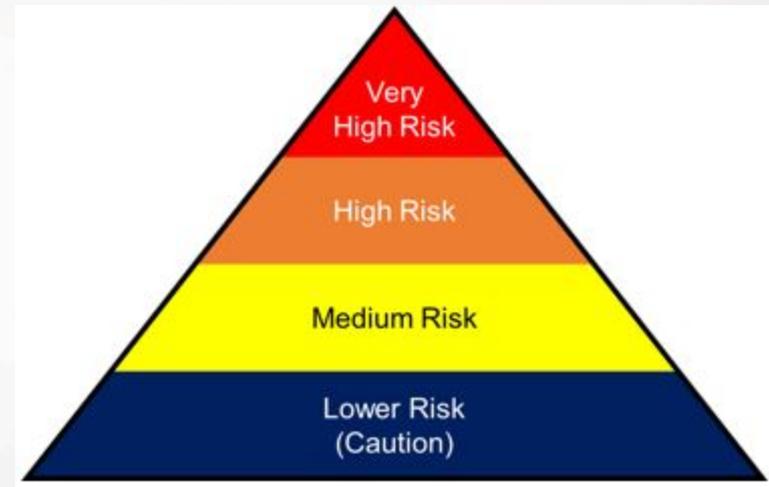
Jobs that require frequent/close contact with people who may be infected, but who are not known to have or suspected of having COVID-19 (retail, schools, high population density work environments)

High Exposure Risk

Jobs with a high potential for exposure to known or suspected sources of SARS-CoV-2 (healthcare delivery and support staff, medical transport, mortuary).

Very High Exposure Risk

Jobs with a very high potential for exposure to known or suspected sources of SARS-CoV-2 during specific medical, postmortem, or laboratory procedures (healthcare workers, laboratory personnel).



OSHA – Job Duties Affect Workers’ Exposure Levels

- As workers’ job duties change or they perform different tasks in the course of their duties, they may move from one exposure risk level to another.
- Additional examples of workers who may have increased risk of exposure to SARS-CoV-2 include those in:
 - *Solid waste and wastewater management*

OSHA – Identifying Potential Risks and Sources of Exposure

- OSHA requires employers to assess occupational hazards to which their workers may be exposed. Some OSHA standards, such as those for personal protective equipment (PPE) (29 CFR 1910.132) and respiratory protection (29 CFR 1910.134), include these types of requirements.
- In assessing potential hazards, employers should consider if and when their workers may encounter someone infected with SARS-CoV-2 in the course of their duties.
- Employers should also determine if workers could be exposed to environments (e.g., work sites) or materials (e.g., laboratory samples, waste) contaminated with the virus.

- Home
- News and Updates >
- Hazard Recognition >
- Standards >
- Medical Information >
- Control and Prevention >
- Background >
- Additional Resources >
- Workers' Rights

Solid Waste and Wastewater Management Workers and Employers

This guidance provides information for solid waste and wastewater management workers and employers. This guidance supplements the guidance for employers and workers in the following areas:

Employers should assess the hazards to which their workers may be exposed, evaluate the risks, implement controls, and ensure workers use controls to prevent exposure. The table below provides examples of waste management work tasks associated with the exposure risk levels in OSHA's occupational exposure risk pyramid, which may serve as a guide to employers in this sector.

Examples of waste management work tasks associated with exposure risk levels

	High	Very High
	<ul style="list-style-type: none">Category not applicable for most anticipated work tasks.	<ul style="list-style-type: none">Category not applicable for most anticipated work tasks.
	Note: Most solid waste and wastewater management work tasks are associated with no more than medium exposure risk; see the other columns of this chart.	Note: Most solid waste and wastewater management work tasks are associated with no more than medium exposure risk; see the other columns of this chart. Avoid tasks that would place workers in this risk category, such as shredding waste, that could re-aerosolize potentially infectious SARS-CoV-2 from environmental surfaces.

Generally, management of waste that is suspected or known to contain or be contaminated with COVID-19 does not require special

OSHA

- Generally, management of waste that is suspected or known to contain or be contaminated with COVID-19 does not require special precautions beyond those already used to protect workers from the hazards they encounter during their routine job tasks in solid waste and wastewater management.

OSHA Wastewater Information

Wastewater

- Coronaviruses are susceptible to the same disinfection conditions in the healthcare setting as other viruses, so current disinfection conditions in wastewater treatment facilities are expected to be sufficient.
- This includes conditions for practices such as oxidation with hypochlorite (i.e., chlorine bleach) and peracetic acid, as well as inactivation through the use of ultraviolet irradiation.

OSHA Wastewater Information

- There is no evidence to suggest that additional, COVID-19-specific protections are needed for employees involved in wastewater management operations, including those at wastewater treatment facilities.
- Wastewater treatment plant operations should ensure workers follow routine practices to prevent exposure to wastewater, including using the engineering and administrative controls, safe work practices, and PPE normally required for work tasks when handling untreated wastewater.

Coronavirus Disease 2019 (COVID-19)

CDC > Coronavirus Disease 2019 (COVID-19) > Schools, Workplaces & Community Locations > Businesses



- Coronavirus Disease 2019 (COVID-19)
- Symptoms & Testing +
- Prevent Getting Sick +
- Daily Life & Coping +
- If You Are Sick +
- People Who Need Extra Precautions +
- Frequently Asked Questions
- Travel +
- Cases & Surveillance +

Interim Guidance for Businesses and Employers to Plan and Respond to Coronavirus Disease 2019 (COVID-19)

Plan, Prepare and Respond to Coronavirus Disease 2019

Other Languages

Older adults and people who have severe underlying chronic medical conditions like heart or lung disease or diabetes seem to be at higher risk for developing more serious complications from COVID-19 illness.
[Find more information here.](#)

Summary of Changes to the Guidance:
Below are changes as of March 21, 2020

CDC Industry Guidance

- [Resources for Airlines](#)
- [Resources for the Ship Industry](#)

OSHA/HHS Guidance

CDC - Preparing Workplaces for Covid-19

All employers need to consider how best to decrease the spread of COVID-19 and lower the impact in their workplace. This may include activities in one or more of the following areas:

- reduce transmission among employees,
- maintain healthy business operations, and
- maintain a healthy work environment.

CDC - Preparing Workplaces for Covid-19

Reduce transmission among employees

- Actively encourage sick employees to stay home
- Identify where and how workers might be exposed to COVID-19 at work
- Separate sick employees
- Educate employees about how they can reduce the spread of COVID-19

CDC - Preparing Workplaces for Covid-19

Maintain Healthy Business Operations

- Identify a workplace coordinator
- Implement flexible sick leave and supportive policies and practices.
- Assess your essential functions
- Determine how you will operate if absenteeism spikes
- Consider establishing policies and practices for social distancing

Social Distancing

- Implementing flexible worksites (e.g., telework)
- Implementing flexible work hours (e.g., staggered shifts)
- Increasing physical space between employees at the worksite
- Increasing physical space between employees and customers (e.g., drive through, partitions)
- Implementing flexible meeting and travel options (e.g., postpone non-essential meetings or events)
- Downsizing operations
- Delivering services remotely (e.g. phone, video, or web)
- Delivering products through curbside pick-up or delivery

CDC - Preparing Workplaces for Covid-19

Maintain a Health Work Environment

- Consider improving the engineering controls using the building ventilation system.
- Support respiratory etiquette and hand hygiene for employees, customers, and worksite visitors
- Perform routine environmental cleaning and disinfection:
- Perform enhanced cleaning and disinfection after persons suspected/confirmed to have COVID-19 have been in the facility
- Advise employees before traveling to take additional preparations
- Take care when attending meetings and gatherings

Engineering Controls and Ventilation

- Increase ventilation rates.
- Increase the percentage of outdoor air that circulates into the system.

Routine Environmental Cleaning

- Routinely clean and disinfect all frequently touched surfaces in the workplace, such as workstations, keyboards, telephones, handrails, and doorknobs.
 - If surfaces are dirty, they should be cleaned using a detergent or soap and water prior to disinfection.
 - For disinfection, most common EPA-registered household disinfectants should be effective. A list of products that are EPA-approved for use against the virus that causes COVID-19 can be found on the US EPA website. Follow the manufacturer's instructions for all cleaning and disinfection products (e.g., concentration, application method and contact time, etc.).

Routine Environmental Cleaning

- Discourage workers from using other workers' phones, desks, offices, or other work tools and equipment, when possible. If necessary, clean and disinfect them before and after use.
- Provide disposable wipes so that commonly used surfaces (for example, doorknobs, keyboards, remote controls, desks, other work tools and equipment) can be wiped down by employees before each use. To disinfect, use products that meet EPA's criteria for use against SARS-Cov-2[external icon](#), the cause of COVID-19, and are appropriate for the surface.

**For information about COVID-19:
coronavirus.ohio.gov
1-833-4-ASK-ODH**

Rebecca Fugitt
Bureau of Environmental Health and
Radiation Protection
Rebecca.fugitt@odh.ohio.gov
614-466-1390