

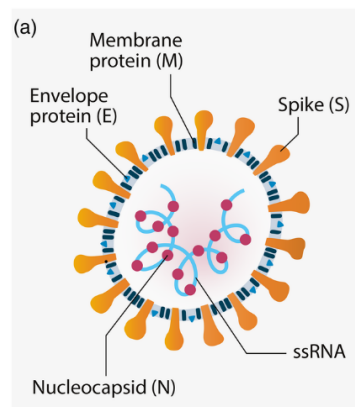
## FAQs on COVID-19

### **What is coronavirus and its structure? How does it survive in a water environment (under which conditions of pH, TDS, etc.)?**

Coronaviruses are a large and diverse family of viruses. The name 'corona' comes from their round appearance and the spikes on their surface that can be likened to a solar corona (see image to the right).

The data available suggests that:

- I. CoV seems to have a low stability in the environment and is very sensitive to oxidants, like chlorine;
- II. CoV appears to be inactivated significantly faster in water than non-enveloped human enteric viruses with known waterborne transmission;
- III. Temperature is an important factor influencing viral survival (the titer of infectious virus declines more rapidly at 23°C-25 °C than at 4°C);
- IV. There is no current evidence that human coronaviruses are present in surface or ground waters or are transmitted through contaminated drinking-water;
- V. Further research is needed to adapt to enveloped viruses the methods commonly used for sampling and concentration of enteric, non-enveloped viruses from water environments.



### **What is the fate of coronavirus in the water and wastewater treatment process?**

The virus that causes COVID-19 has not been detected in treated drinking water. Water treatment plants use filters and disinfectants to remove or kill germs, like the virus that causes COVID-19. The Environmental Protection Agency regulates water treatment plants to ensure that treated water is safe to drink.

Currently, there is no evidence that the virus that causes COVID-19 can be spread to people by drinking treated water. If a coronavirus did contaminate a drinking water supply system (perhaps one with low disinfection residual), survival might be enhanced by colonising bacteria in biofilms. If this were to occur, there could be exposure risks from the production of aerosols during activities such as showering.

COVID-19 is spread mainly through close contact from person-to-person. Previous studies have shown that coronaviruses (including SARS-CoV) can exist and maintain viability in sewage and hospital wastewater, originating from the fecal excretions of infected patients. Previous studies have also highlighted the persistence of (other surrogate) coronaviruses in aquatic environments and wastewater treatment plants.

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Some particular wastewater treatment processes, such as membrane bioreactors may also play an important role as they have been shown to be effective for virus removal, including for some enveloped viruses (such as coronaviruses) and some non-enveloped viruses (e.g. norovirus) that are known to be more resistant than enveloped viruses.

Current water and wastewater disinfection strategies, using chlorine and UV irradiation are anticipated to be very effective for SARS-CoV-2 inactivation, but proper operational control is always essential.

### **Can COVID-19 virus spread through sewage system? And what measures should be in place to protect wastewater worker from being infectious by this virus?**

Recently, the virus that causes COVID-19 has been found in untreated wastewater. While data are limited, there is no information to date that anyone has become sick with COVID-19 because of exposure to wastewater. 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.

Standard practices associated with wastewater treatment plant operations should be sufficient to protect wastewater workers from the virus that causes COVID-19. These standard practices can include engineering and administrative controls, hygiene precautions, specific safe work practices, and personal protective equipment (PPE) normally required when handling untreated wastewater.

No additional COVID-19-specific protections are recommended for workers involved in wastewater management, including those at treatment facilities.

### **What is your strategy to maintain a stable and continuous supply chain (chemical & PPE) for your water & wastewater treatment plant during COVID-19?**

Strategies include constant assessment of monitoring and lab capabilities as well as the need to procure two alternative suppliers. Balance planning and operational needs to support continuation of supply. Constantly monitor and account for the remaining chemicals, equipment, and PPE available in the warehouse, and plan for future chemical, equipment and PPE orders depending on what is available. Coordinate with suppliers on a regular basis. Develop and implement more preventative maintenance to maintain support for contractors.

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### **What is your experience in helping water & wastewater workers get rid of their fear of COVID-19 and encouraging them back to work following health & safety guidelines?**

Allow field staff to go directly from home to the site to reduce any risk of transmission. Constantly maintain communications with staff, form a crisis management team and develop a pandemic response plan / business continuity plan. Conduct mock exercises based on different stages and scenarios including weather and what the 'new normal' looks like.

### **What is your plan to keep your business continuity and recover post COVID-19?**

Refine the splitting of work force teams and consider splitting maintenance teams including preventing physical interaction between teams. Cross train sewerage and treatment operators with network operators to ensure back filling of roles. Utilise online tools and telecommunications for consistent interaction (long term positive legacy). Engage within the industry and community (neighboring councils and industry bodies) for support.

Operations will benefit from additional depth in key areas (treatment operations, water quality testing) as future sickness in these teams will stretch these key skills. Procurement / stock levels for critical items can be identified and additional stock can be purchased (targeting operations and repairs). In addition:

- Work with council to support economic recovery
- Continue to keep cost focused so that as many businesses in the region are viable
- Look for opportunities to undertake necessary upgrades / renewals area whilst the impact is lower
- Listen and engage to seek to work together to recover, locally and globally

### **What have you done to minimise the risks of virus spreading where physical contact with users, customers, etc. is unavoidable?**

For customers/contractors visiting sites:

- Provide free masks to all visiting customers,
- Measure body temperature for all customers;
- Record customer's information details.
- Encourage customers to use online payment if possible
- Maintain social distancing while working with customers.
- Installing protection shield for reception desks

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### **What is your strategy to help people in remote areas and others, being in shortage of water supply, to deal with COVID-19?**

Utilities have donated many items for responding and preventing activities to COVID-19 organised by provincial agencies, including:

- Bottles of dry hand-sanitiser
- Automated hand-washing machines with anti-virus sanitiser
- Disinfecting chambers and disinfecting liquid to public health centers
- Small drinking water to quarantine camps and health testing depots

### **What is your strategy to minimise the risk of spreading COVID-19 virus among operators and workers working in the office and on the sites?**

Physical distancing:

- Stay at least 1.5 or 2m apart, no handshaking or other close physical contact

Create separate work teams:

- Ensure that each team has the work skills that are needed to do all tasks
- In this way, if one team tests positive for COVID-19, the other team has a good chance of remaining COVID-19 free

Practice good personal hygiene:

- Ensure there is sufficient soap or hand sanitiser at each work site
- Make sure that all staff know the importance of regular handwashing, particularly after touching common surfaces, using the washroom, or working with wastewater
- Remember: no handshaking, or other close contact

Know who has visited each site:

- Record the names and contact details of all staff and visitors who visit each site, in case someone tests positive for COVID-19

If staff unwell – do not come to work:

- If staff are feeling unwell, they must not come to work to avoid infecting others
- Stay in isolation and get tested, if possible
- If a close family member is unwell; again, staff do not come to work – even if they show no symptoms, they may have COVID-19
- If staff are in the office, and begin to feel unwell – tell supervisor and go home

COVID-19 and wastewater/sewage:

- Current PPE and hygiene measures are protective against contracting COVID-19 from sewage

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### **What is your strategy to respond to incidents happening on the network and/or at the treatment plant where a big group of workers are required for the task?**

- Secure support staff and your supply chains of items required for ensuring workplace health and safety (tissues, soap, antiviral wipes and/or sanitisers).
- Staff from other utilities and third parties may need training to familiarise themselves with sites in case they are to be drawn upon at short notice.
- Develop guidelines for each essential work requiring involvement of a group of workers (e.g. using valve key with extension to maintain social distancing, etc.).

### **What are some measures to minimise exposure to wastewater containing coronavirus?**

- Develop safe work methods for working with faeces, sewage and sludge.
- Use controls to minimise the generation of aerosols and splashes (e.g. insertion seals and covers over manholes).
- Wear appropriate PPE to prevent ingestion and inhalation of aerosols and/or splashes/droplets (e.g. face shields or goggles and P2/N95 masks) when working in areas where exposure to untreated sewage droplets and aerosols is unavoidable.
- Wash hands after removal of contaminated PPE.
- Disinfect equipment and surfaces if they become contaminated with sewage.
- Change and launder clothing if potentially contaminated with sewage and shower using provided facilities.

### **What are measures to disinfect COVID-19 in wastewater sources suspected to have coronavirus contamination?**

- Chlorination pretreatment: Bleaching powder is commonly used for the chlorination pretreatment. The added bleaching powder should be flushed into the septic tank with flowing water and the residual chlorine would be measured at the outlet of septic tank in case of violation of the water quality standard.
- Chlorine-containing disinfectants (liquid chlorine, chlorine dioxide, and sodium hypochlorite): Chlorine is a kind of strong oxidiser, which is one of the most early used disinfection methods in disinfecting hospital wastewater. Usually, 30 mg/L-50 mg/L and 15 mg/L-25 mg/L chlorine is added to wastewater after primary treatment and secondary treatment, respectively.

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### **Can COVID-19 be removed by conventional disinfectants?**

Yes, COVID-19 is susceptible to conventional viricidal disinfectants, such as chlorine.

### **What are some problems experienced relating to public perception and other impacts?**

- People being afraid of drinking water, thinking it might be contaminated with COVID-19 virus, particularly if water is sourced from downstream of sewage discharges.
- Fear of using recycled sewage water for irrigation of crops.
- Fear of working with sewage, such as sewer workers and plumbers.
- People buying bottled water and not wanting to drinking tap water.
- Problems with sewer workers and plumbers being worried about working with sewage People who swim in water bodies concerned about sewage discharges to those water bodies.
- Concerns about high levels of chlorine being added to the water to control COVID-19 virus.

### **How can you effectively treat wastewater from quarantine centers?**

In principle, wastewater treatment from quarantine camps is like the treatment of wastewater from hospitals. Unfortunately, the criteria of choosing quarantine centers does not consider the water supply source and wastewater treatment facility.

Therefore, the solution is that black water from toilets is required to go to septic tanks. Sludge withdrawal from septic tanks should not be conducted during the pandemic period. Grey water, if it can go through a septic tank is good, if not, it must be at least disinfected before being discharged to the receiving body. Water supply in the quarantine camp needs to be disinfected, directly taken from the tap but not from the public tank.

***Thank you to all the water professionals and water scientists who provided answers to these frequently asked questions. For further information, please visit the Telewater page [here](#).***