At-A-Glance Pathogen Information for Water Professionals
September 2025

Pathogen	Why is it a concern in the U.S.?	What type of disease does it cause?	Is it infectious in wastewater?	Which disinfectants are effective for inactivating the pathogen?	Is a vaccine available?	How can wastewater-based surveillance work for this pathogen?
Antimicrobial resistance (AMR)	A growing public health threat, with antimicrobial resistant infections causing >2.8 million illnesses and >35,000 deaths in 2019 in the U.S. and an increasing number since the start of the COVID pandemic. Complicates treatment, increases healthcare costs, and limits effective therapeutic options.	Depends on the type of antimicrobial-resistant pathogen that infects an individual. Infections caused by antimicrobial-resistant microorganisms are more difficult to treat and associated with a higher risk of severe illness and death.	Possibly, however, while antimicrobial resistance bacteria (ARB) are present in wastewater, exposure to ARB doesn't always result in infection.	Suitable disinfectants depend on the type of microorganism with antibiotic resistance. EPA maintains a list of registered disinfectants for different types of microorganisms.	No.	Profiles of antibiotic-resistance genes (ARGs) in wastewater may help supplement clinical antibiograms. However, ARGs may be present in wastewater due to human, animal, or environmental contributions, complicating the interpretation of wastewater data for AMR.
Candidozyma auris (formerly Candida auris)	An emerging fungal pathogen that causes severe, often drug-resistant infections with high mortality rates, particularly in immunocompromised individuals. Incidence has risen sharply since the first U.S. case in 2013, with over 4,500 cases reported by the end of 2023.	Many different types of potentially life-threatening infections (such as bloodstream, urinary tract, skin, ear, bone etc.). Reported mortality rates from *C. auris* infection range from 0 to 72%, with a reported average of about 34% in hospitalized individuals.	Probably. *C. auris* has been shown to survive in the environment for days to weeks and has been detected in untreated wastewater using culture-based methods.	Disinfectants on EPA's List P are effective against *C. auris* contamination on surfaces. This list includes various readily available products with sodium hypochlorite, hydrogen peroxide, isopropyl alcohol, and other common disinfectants as active ingredients.	No.	May be valuable for identifying sewersheds containing healthcare facilities with ongoing outbreaks. The background environmental occurrence of *C. auris* is unknown, which may complicate interpretation of wastewater surveillance data.
Influenza virus	Causes an estimated 10 to 40 million illnesses in the U.S. annually. Remains a leading cause of death, especially among adults ≥ 65 years.	A respiratory illness that can be mild to severe, and be associated with various complications, including bacterial pneumonia, febrile seizures, organ failure, and death. Can cause gastrointestinal symptoms, too, predominantly in children.	Possibly, depending on type (A vs. B). Spiked infectious influenza A can persist in water matrices for days, weeks, and potentially longer, although positive cultures from wastewater have not been documented.	Disinfectants on EPA's List M are effective against contamination on surfaces by influenza A and B viruses that infect humans. This list includes various readily available products with sodium hypochlorite, hydrogen peroxide, isopropyl alcohol, quaternary ammonia, and other common disinfectants as active ingredients.	Yes: a new seasonal flu vaccine is available each year, and everyone 6 months or older is encouraged to get the seasonal flu vaccine, unless they have known life-threatening allergies to any ingredient in the flu vaccine. Vaccination substantially reduces the risk of hospital admission, intensive care unit admission, and death.	More accurate indication of the onset and peak of an influenza outbreak. More complete accounting of influenza illness. Early identification of seasonal flu strains to assess vaccine effectiveness. More complete capture of populations underserved in clinical data. Better information on the anticipated burden on healthcare systems.

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Measles virus	Extremely contagious disease that can pose serious risks to those infected. Has recently resurged in the U.S., with more cases reported in 2025 than in any year since 1992, despite measles being declared eliminated from the U.S. in 2000.	Fever, cough, runny nose, conjunctivitis, and characteristic rash. Most people in the U.S. recover without complications, but the risks remain serious for unvaccinated people, especially children. Complications include diarrhea, ear infection, pneumonia, brain swelling, and death.	Unknown. Although no data are available on the persistence of infectious measles virus in environmental waters or wastewater, studies have shown that measles virus RNA spiked into influent wastewater can persist for days to weeks.	Considered a "Tier 1", easy-to-disinfect virus by EPA. Numerous disinfectants on EPA's List Q are effective against Tier 1 viruses on surfaces.	Yes, there are two live-attenuated measles vaccines (available only in combination formulations), which are approximately 95% effective at preventing illness after one dose and 96% effective after two doses. Vaccination is the best way to prevent measles infection, and people who are vaccinated are less likely to transmit the virus to others if they become infected.	Early indication of the presence of measles virus in a community and community-level transmission. More complete tracking of transmission trends as a complement to clinical data.
Monkeypox virus	Caused a major U.S. outbreak in 2022 (> 34,000 cases due to mpox clade II), after historically being confined to central Africa. Mpox clade II continues to circulate at low levels in the U.S., while cases of mpox clade I (considered to be more virulent than clade II) were first identified in the U.S. in 2024.	Flu-like symptoms, swollen lymph nodes, and a rash with painful lesions. Complications include secondary bacterial infections, ocular lesions, hospitalization, and death. Mortality rate for the clade II outbreak in the U.S. has been < 0.2%.	Likely. Infectious monkeypox virus has been isolated from wastewater and shown to remain stable for 5 to 8 days in spiking studies, but it is unknown whether virus shed naturally by infected individuals remains similarly viable.	Considered a "Tier 1", easy-to-disinfect virus by EPA. Numerous disinfectants on EPA's List Q are effective against Tier 1 viruses. Household or workplace items that come into contact with confirmed or suspected mpox case bodily fluids, skin, or lesions should be laundered with bleach (0.05% solution) and/or detergent.	Yes, two vaccines (ACAM2000 and JYNNEOS) have been approved by the FDA. Vaccination is only recommended for high-risk groups. The risk of exposure for wastewater workers is considered low, reducing the need for industry-wide vaccination campaigns.	Early detection, as well as reassurance of absence, of mpox transmission. Genomic characterization of circulating monkeypox virus. Identifying increases, peaks, and declines in mpox cases. Identifying hot spots.
Respiratory syncytial virus	Leading cause of infant hospitalizations in the U.S. Causes 58,000 to 80,000 children < 5 years and 60,000 to 160,000 adults ≥ 65 to be hospitalized each year.	Usually mild, cold-like symptoms that resolve within 1 to 2 weeks. Severe illness can lead to pneumonia and other infections and exacerbate serious chronic conditions such as asthma and congestive heart failure. Co-infection with influenza or SARS-CoV-2 has the potential to increase the severity of illness.	Unknown. There are no known studies on the persistence of RSV RNA or infectious RSV in raw wastewater or water matrices.	RSV can be inactivated on surfaces with many readily-available disinfectants, including a dilute (1:50) solution of 5.25% sodium hypochlorite (bleach) or commercial disinfectant formulations with alcohol, aldehydes, or hydrogen peroxide.	Yes. As of 2023, a RSV vaccine is available and one dose is recommended for all adults 75 years of age and older, as well as for adults aged 60 to 74 who are at increased risk. Obtaining the RSV vaccine may not eliminate the possibility of becoming infected with RSV, it will likely decrease the duration and severity of disease.	Identifying distinct circulating lineages within and between RSV seasons. Informing timely deployment of pharmaceutical and non-pharmaceutical interventions. Identifying the onset, peak, and offset of RSV season. Supplementing data available from other surveillance systems.

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SARS-CoV-2	Responsible for the most significant global pandemic since 1918. Although acute impacts have declined, the virus continues to evolve, and hundreds of Americans—especially older adults and immunocompromised individuals—still die from COVID-19 each week.	Mild to severe respiratory illness, depending on the variant and the immune status of the person infected. Symptoms can be very similar to those of influenza infection. Some people, including those with minor or no symptoms, will develop "long COVID", a serious illness that can result in chronic conditions requiring comprehensive care.	Unlikely. There is no documented evidence of infectious SARS-CoV-2 in wastewater matrices or infection, illness, or death from COVID being due to exposure to wastewater and other water media.	Disinfectants on EPA's List N are expected to kill all strains and variants of SARS-CoV-2 on surfaces when used according to the label directions.	Yes. Two types of COVID-19 vaccines are recommended by the CDC: • mRNA vaccines (Moderna Spikevax or mNexspike) and Pfizer-BioNTech Comirnaty • Protein subunit vaccine (Novavax Nuvaxovid) Vaccination is recommended for everyone over age 6 months. Data from the 2024-2025 respiratory illness season shows that the COVID vaccine was > 40% effective in reducing hospitalizations and critical illness in immunocompetent adults aged ≥ 65 years.	Timely assessment of quantitative infection trends including the timing of local increases, peaks and declines. Timely identification of circulating SARS-CoV-2 variants and mutations of interest. Relevant data that can be integrated with clinical, environmental and other information. Early detection of SARS-CoV-2 (or a specific strain of concern) incursion, facilitating public health action. Additional reassurance of the absence of significant SARS-CoV-2 community transmission.

Abbreviations: AMR = antimicrobial resistance; ARB = antibiotic-resistant bacteria; ARG = antibiotic resistance gene; COVID-19 = coronavirus disease of 2019; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; mpox = monkeypox; RSV = respiratory syncytial virus; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2; WBS = wastewater-based surveillance