



Opportunistic Premise Plumbing Pathogens Molecular Testing

Premise plumbing is defined as the portion of the water distribution system located within the property lines of a property, comprising all buildings and permanent structures. Premise plumbing consists of hot and cold-water pipes, fixtures like faucets and showers, devices like hot water heaters and HVAC systems, and drains like toilets and sinks. Premise plumbing plays a key role in determining the final quality of water consumed by end users.

Intrinsic characteristics of premise plumbing such as periods of water stagnation, high surface to volume ratio, and relatively warm temperature can create conditions favorable for growth and propagation of pathogenic microorganisms, generally described as Opportunistic Premise Plumbing Pathogens (OPPPs). They are capable of colonizing components of premise plumbing systems and forming stable microbial communities resistant to mechanical and chemical treatment. OPPPs' survival in plumbing systems is enhanced by certain features shared by these microorganisms, which include ability to form biofilms, growth in low nutrient conditions, and resistance to disinfectants. Additionally, pathogenic bacteria can be harbored within free-living environmental amoebae, where they can survive and proliferate, which further complicates OPPPs eradication.

OPPPs are waterborne microorganisms widely distributed in different aquatic environments. Water quality in environmental reservoirs and municipal drinking water distribution systems is traditionally monitored by detection and enumeration of other microbial species, designated as fecal indicator bacteria. Presence of OPPPs in plumbing systems therefore is frequently overlooked even though they might represent a significant public health threat. Accurate and reliable testing for OPPPs can become an invaluable tool in assessing a quality of water distributed to consumers.

Approximately 94% of the United States population have access to public water systems which makes exposure to OPPPs almost inevitable. Certain at-risk population groups however are more susceptible to the danger of OPPPs, including individuals with predisposing conditions, advanced age, or immunodeficiency. Despite the high quality of water distributed by municipal water facilities the end-point quality of water in residential houses, apartment buildings, hospitals, and senior living communities can vary greatly. Special considerations should be made for healthcare facilities. According to the United States Center for Disease Control and Prevention "CDC considers it essential that hospitals and nursing homes have a water management program that is aligned with ASHRAE industry standards and limit OPPPs from growing and spreading in their facility". Monitoring OPPPs presence in premise plumbing by environmental sampling and advanced molecular testing can be a vital part of water management programs in healthcare facilities. Testing for water microbial quality in residential houses is also important especially for elderly residents or outpatients receiving home-based therapy.



EMSL Analytical, Inc. offers a wide array of qPCR tests targeting OPPP microorganisms:

1. Test Code M339: OPPP qPCR Panel (Includes all of the below organisms)
2. Test Code M337: *Pseudomonas aeruginosa* qPCR
3. Test Code M103: *Legionella pneumophila* qPCR
4. Test Code M144: *Mycobacterium avium* complex qPCR
5. Test Code M207: *Helicobacter pylori* qPCR
6. Test Code M338: *Vermamoeba vermiformis* qPCR

Test results are reported in a quantitative format in cell equivalents per 100 mL of water units. All EMSL in-house developed tests have been validated following the highest Environmental Protection Agency (EPA) standards for molecular testing of environmental matrices. EMSL DNA Laboratory is accredited by the American Industrial Hygiene Association (AIHA). EMSL is a part of CDC Environmental Legionella Isolation Techniques Evaluation (ELITE) Program.

