

New water
threats, new health
concerns



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Is our tap water safe to use?

We want to give people a level playing field to make informed choices on the water they consume or use from their taps at home and work. Bluewater's white papers are geared to outline the technology options available to householders, business owners and others to help ensure their tap drinking water meets wellbeing and health expectation.

Reducing the presence of contaminants in our tap water at home and business premises

Water is life. It fuels our growth, health and wellbeing. If you've ever been concerned about lead in residential tap water, then you need to start getting really worried about the emerging contaminants increasingly being found from domestic, commercial and industrial uses.

These emerging potential threats to human health include pharmaceuticals, personal care products (PCPs) and endocrine disrupting chemicals (EDCs). Typical PCPs can be shampoos, bug sprays and sun screens, while pharmaceuticals encompass antibiotics, heart or cancer medications and livestock food additives. EDCs are chemicals that interfere with the action of natural hormones responsible for human (or animal) reproduction, development and behavior and range across stuff like pesticides, herbicides and synthetic hormones.

The threat comes from the fact that although most of the emerging compounds are found in water at very low levels, exposure over time to the likes of prescription drug or shampoo residues may nonetheless pose associated health risks over time. High levels of nitrates, atrazine and arsenic in drinking water were linked in a 2016 U.S. study to birth defects such as cleft palate, cleft lip and limb deficiencies.

What can we do as individuals to protect ourselves from contaminants that may make their way into municipal tap water or well water. At Bluewater, we believe the safest option for people is to reduce the presence of such contaminants in the water they use for consumption at home or in commercial environments by installing efficient water purifiers at the point-of-use source.

This white paper is based on a Bluewater article published in the Water Quality Products Magazine in Fall 2016 that examined the issues of emerging contaminants.



Our passion at Bluewater is to deliver contaminant free drinking water from the tap using the world best water purification technologies.



New threats, new human health concerns



In the summer of 2016 the Federal USGS science agency warned that research is 'documenting with increasing frequency that many chemical and microbial constituents that have not historically been considered as contaminants are present in the environment on a global scale'.

Noting these "contaminants of emerging concern" are commonly derived from municipal, agricultural, and industrial wastewater sources and pathways, the agency says the newly-recognized contaminants 'represent a shift in traditional thinking as many are produced industrially yet are dispersed to the environment from domestic, commercial, and industrial uses'.

The contamination of the environment with pharmaceuticals such as antibiotics as well as personal care products contaminants clearly pose a clear and present threat to both aquatic life and human health. The mounting evidence is that antibiotic-resistant bacteria that survives on beaches, on plant surfaces, and in the soil, as well as other contaminants such as herbicides, pharmaceuticals, and high production volume chemicals, can and do find their way into water destined for our homes.

100s of compounds in water

However, detecting pollution in water and eliminating it are two different things. As far back as 2008, the UK's prestigious Royal Society of Chemistry [reported](#) how surveys in Europe and the US have found traces of around 100 therapeutic drug compounds such as painkillers, antibiotics, antiseptics, contraceptive pills and beta-blockers in surface waters, groundwater, sewage, effluent from wastewater treatment plants, and, 'more worryingly, tap water'.

The problem, according to the RSC, is that pharmaceuticals are usually non-volatile, water-soluble, and often charged molecules, and many of them pass through treatment plants designed to get rid of traditional pollutants. Further evidence of the health threat to humans posed by emerging contaminants came in a late 2013 report by a joint U.S.-Canadian organization that found not all prescription drugs and other chemicals are removed by water treatment plants, including some antibiotics, an antibacterial drug, an anti-seizure drug, an anti-inflammatory drug and a herbicide.

[The International Joint Commission \(IJC\)](#), which regulates shared water uses, raised concerns that the Great Lakes and other bodies of water are being contaminated with so-called "chemicals of emerging concern" (CECs), which may eventually show up in drinking water. The IJC said the chemicals are often used in household items, agriculture, personal care products, pharmaceuticals and flame retardants.

Filtration efficiency

Today, numerous alternative treatment methods for the removal of these substances are being examined, such as activated carbon treatment or membrane filtration. But the current efficiency is under doubt. WHO [says](#) conventional water treatment processes, such as chlorination, can remove approximately 50% of these compounds, whereas more advanced treatment processes, such as ozonation, advanced oxidation, activated carbon, nanofiltration and reverse osmosis, can achieve higher removal rates.

For WHO, reverse osmosis seems to offer the most hope at this moment. For example, the organization notes how reverse osmosis can remove more than 99% of large pharmaceutical molecules.

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Time to change attitude?

America is one of the countries where most people believe they can drink out of the tap and not worry too much about getting sick. But that attitude may have been changed by recent man-made disasters such as the Flint, Mich., water crisis or the Californian drought. In Flint, where the lead contaminants leached into the drinking water supply, people have been relying on water filters and bottled water.

The U.S. government defines CECs as synthetic or naturally occurring chemicals or microorganisms that have not been commonly monitored but are known or suspected of causing human health effects or environmental problems. Many water treatment plants weren't designed to completely eliminate these trace contaminants. The exact effects that CECs may have on human health and the environment are unknown.

"These substances are called emerging contaminants partially because they can now be detected in the drinking water supply and because they are emerging as potential issues," said Brent Alspach, an environmental engineer with Arcadis, a Netherlands-based water treatment design and consultant company that operates in more than 70 countries.

"It includes compounds that are better known to science but now we are detecting them in water supplies where we hadn't previously."

"The difference between now and 15 to 20 years ago is that our analytical techniques are getting much, much better," he continued. "It's not that they weren't there in the past but now we can look for them."

"The compounds are so numerous and in different combinations and concentrations so we don't know what the effects might be," Alspach said. "It would be very difficult for any research study as a broad brush to say they aren't hazardous."

Greater individual responsibility

At Bluewater, we believe consumers and businesses in the USA and elsewhere need to take greater individual responsibility for purifying their own water. Using a reverse osmosis system means you are just about as protected as you can get. Bluewater's unique RO technology efficiently removes all traces of toxic metals such as lead as well as chemicals, microorganisms and pharmaceutical by-products. There is also an added bonus. By producing clean water on demand Bluewater is helping consumers reduce their need to buy plastic bottles of water – and thereby contributing to keeping our environment as pristine as nature intended.

No quick fix

"Fixing our water supply system is not something we are going to do overnight," noted David Sedlak, professor at the University of California, Berkeley. "These are big publicly run and operated systems that are designed to last many, many decades so

change happens over decades unless an emergency happens." When an emergency happens, such as with Flint or the drought in California, then investments are made to make rapid changes.

Sedlak looked at the problems of over-population, climate change and pollution on the sources of clean, drinkable water in his 2014 book *Water 4.0*. These circumstances are leading to the next major change in how cities look to treat water for human consumption including using seawater, storm water runoff and sewage.

"Modern reverse osmosis technology can remove nearly all contaminants from water and have water that is ultra-pure and clean," said Sedlak, who is also co-director of Berkeley Water Center and director of the Institute for Environmental Science and Engineering.



Second generation reverse osmosis technology for a cleaner, healthier planet

Bluewater offers unique second generation, direct flow reverse osmosis technology that slashes the water wastage traditionally associated with RO systems by up to 82 percent.

In January 2016 the company donated two of its high-performance, lead removing Bluewater PRO models to two charities in Flint, the Catholic Charities' North End Soup Kitchen (NESK) and the Shelter of Flint, a program providing emergency shelter, transitional housing and outreach services.

Bluewater's compact water purifiers are designed for use in home and commercial environments, including schools, hospitals and restaurants. Bluewater's patented filtration technologies capture practically everything down to 0.0001 micron (that's 500,000 times less than the diameter of a human hair, and can deliver 1,248 gallons of purified water per day, which equals 4,726 one-liter (33.8 fl.oz) bottle of water over 24 hours.

Consumers around the world want safer, cleaner drinking water like never before. Yet today's traditional water treatment systems often use parameters established many years ago, based on conditions and knowledge available at that time. As this white paper notes, there are a host of new chemicals, pharmaceuticals and other contaminants that municipal water treatment systems in many areas of the industrialized and developing world were not designed to eradicate. From Swiss lakes to Canadian streams to aquifers deep underground, you will find water being 'poisoned' by a cocktail of hormones, antibiotics and other contaminants in ever growing amounts.



Bluewater's premium water purifiers harness patented SuperiorOsmosis™ technology to filter tap water efficiently and slash unnecessary water wastage.



Drink
Bluewater



Bluewater is a world leading water purification company. Headquartered in Stockholm, Sweden, the company helps people and businesses in Europe, the USA, China and elsewhere in Asia enjoy the health and wellbeing benefits of cleaner, healthier tap water. Bluewater innovates, makes and sells compact water purifiers that harness the company's patented reverse osmosis technology to remove virtually all pollutants from tap water, including lead, bacteria, pesticides, medical residues, chlorine and lime-scale. Please visit us at www.bluewatergroup.com

