

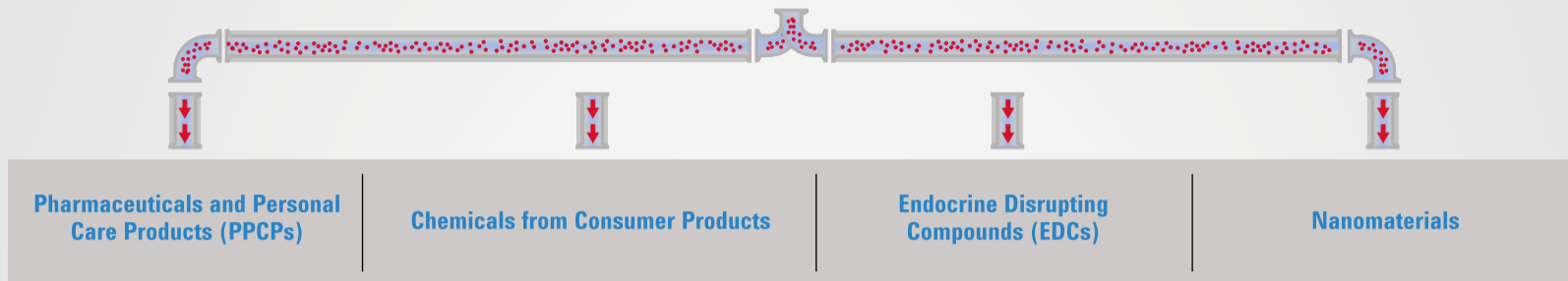
IMPACT OF EMERGING CONTAMINANTS IN OUR WATER SUPPLY

NEWLY DISCOVERED CHEMICALS IN THE WATER SUPPLY ARE BECOMING OF INCREASING IMPORTANCE DUE TO THEIR UNKNOWN EFFECTS ON THE ENVIRONMENT AND HUMAN HEALTH. IDENTIFICATION AND RISK ASSESSEMENT IS REQUIRED TO MEASURE THE POTENTIAL DANGERS OF THESE CHEMICALS IN THE WATER





WHAT ARE EMERGING CONTAMINANTS?

Any synthetic or naturally occurring chemical not commonly monitored in the environment. The presence of emerging contaminants in the environment may cause known or suspected adverse ecological and/or human health effects

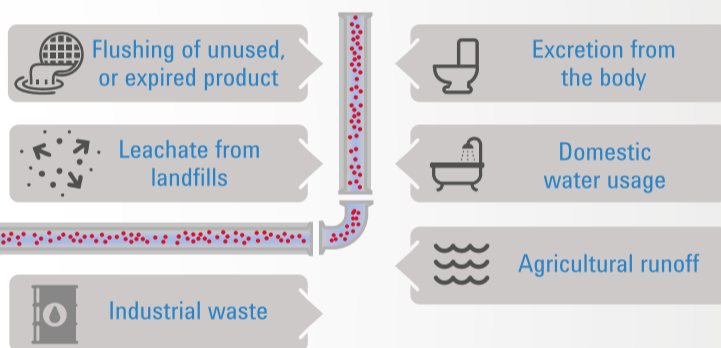
CHEMICAL CLASSES FOR POTENTIAL EMERGING CONTAMINANTS:



WHAT ARE THESE EMERGING CONTAMINANTS?

 <ul style="list-style-type: none"> Human and veterinary pharmaceuticals Steroid hormones Caffeine DEET (Diethyltoluamide) i.e. insect repellent <p>Sources include chemicals from lotions, fragrances, creams, insect repellents, prescription and over the counter drugs, and more</p>	 <ul style="list-style-type: none"> PFOA (Perfluorooctanoic Acid) PFOS (Perfluorooctane Sulfonate) Bisphenol A Glyphosate Phthalates PBDEs (Polybrominated Diphenyl Ethers) <p>Sources include cleaning products, plasticizers, flame retardants, varnishes, and more</p>	 <ul style="list-style-type: none"> Industrial solvents/lubricants and their byproducts Plastics Plasticizers Pesticides and fungicides Pharmaceutical agents <p>Sources include protective coatings and treatments, herbicides, flame retardants, heavy metals, and more</p>	 <ul style="list-style-type: none"> Silver Copper Iron Zinc Oxide Titanium Oxide Aluminum Oxide <p>Sources include cosmetics, sunscreens, material coatings, paints, agricultural products, and more</p>
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HOW DO THESE CONTAMINANTS ENTER THE WATER?



WHAT DO WE KNOW ABOUT THE IMPACT OF THESE CONTAMINANTS?

The full extent is unknown due to the trace levels currently detected. Are they dangerous/not dangerous?



Potential unknown health issues

Physiological and biochemical changes in biota

Regulatory uncertainty

Consumer sensitivity/stigma

HOW DO WE TEST FOR THESE CONTAMINANTS TODAY?

Gas Chromatography/Mass Spectrometry

Liquid Chromatography/Mass Spectrometry

Inductively Coupled Plasma/Mass Spectrometry

WHAT HAPPENS TO CONTAMINANTS IN WASTEWATER TREATMENT FACILITIES?

Wastewater treatment facilities may not have the technologies required to test and monitor removal of emerging contaminants. Understanding the chemicals and identifying unknowns allows water treatment facilities to tune their processes to improve removal efficiency

While regulatory methods target those identified as presenting the highest risk, non-targeted screening helps to characterize newly identified, emerging contaminants for future research and risk assessment

Some emerging contaminants, e.g. nanoparticles, are removed during sedimentation or filtration processes ending up in the biomass or sludge layer

Formation of unknown transformation products

Other unknowns may not be fully removed through conventional treatment processes and are released into the environment

Depending on its source, sludge or biomass is disposed of in landfills or used as a field nutrient source for agricultural purposes

WHAT NEW TECHNOLOGIES ARE BEING DEVELOPED TO IDENTIFY EMERGING CONTAMINANTS?

These solutions help researchers develop new technologies and platforms to address emerging contaminants. Researchers use Agilent solutions for LC-QTOF, GC-QTOF and ICP-QQQ to identify emerging contaminants. These solutions develop new or refine existing contaminant removal processes



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