Pharmaceuticals in the Great Lakes: prevention priorities

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Olga Lyandres
Research Manager
Olyandres@greatlakes.org
A Community that Cares for the Great Lakes

Formed in 1970, the Alliance for the Great Lakes is the oldest independent Great Lakes citizens' organization in North America. Our community today includes...

- Individuals
- Businesses
- Elected officials
- Teachers and students
- Environmental advocates
- Policy leaders
- Recreational enthusiasts
- Civic organizations

The Alliance is the only independent policy organization working solely to improve the Great Lakes every day.
Issues that Matter to the Alliance

- Clean water
- Sustainable water use
- Ecosystem restoration
- Emerging threats
- Invasive species
- Education
- Civic and youth participation, e.g. Adopt-a-Beach™
Clean Water and Emerging Contaminants

- **Alliance’s goals include:**
  - Curbing unintended drug releases into the environment at the source
  - Supporting further research into the dangers these drugs pose once discharged
  - Evaluating methods to optimize removal efficiencies in water and wastewater treatment systems
What are emerging contaminants?

Definitions vary - natural or synthetic; perceived, potential, or real threat to human health or environment; lack of published standards or controls

- Pharmaceuticals
- Personal care products
- Pesticides and herbicides
- Halogenated compounds
- Synthetic fragrances
- Phthalates
- Bisphenol A
- Phytoestrogens
- Nanomaterials
Environmental and Public Health Threats

- Bioaccumulation in aquatic food webs
- Endocrine disruption
- Toxicity of metabolites and byproducts
- Resistant bacteria
- Low-level chronic exposure
- Synergistic effects of chemical mixtures

Limited information on fate, persistence, epidemiological and ecological effects, for mixtures of chemicals and their byproducts
Multitude of point and diffuse sources

- Relative contributions debatable – major sources are typically considered human and animal waste, agricultural runoff

Image: U.S. EPA
Priorities for reducing pharmaceuticals in the Great Lakes

Prioritization and standardization
- Monitor to establish baseline and see trends
- Drug take-back programs
- Risk assessment

Further research
- Analysis of metabolites and byproducts
- Identification of tracer compounds
- Optimization of water and wastewater treatment

Curbing pollution at the source
- Education and policy reform
- Adoption of green chemistry policies
- Medical industry behavior change
Local efforts

- Drinking water suppliers – voluntary monitoring of hundreds of compounds
  - Milwaukee Water Works
  - City of Chicago, Department of Water Management
  - Central Lake County Joint Action Water Agency

- Wastewater Treatment facilities – monitoring of receiving waters and wildlife, treatment optimization
  - Metropolitan Water Reclamation District of Greater Chicago
  - Milwaukee Metropolitan Sewer District

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<th>Pharmaceutical</th>
<th>Activated sludge</th>
<th>Chlorine disinfection</th>
<th>UV disinfection</th>
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Contact Us

www.greatlakes.org

Email us:
Olyandres@greatlakes.org

Call us:
1-312-939-0838

Photo by David Riecks