Drinking Water Contaminants of Emerging Concern Program

The mission of the Drinking Water Contaminants of Emerging Concern (CEC) program is to investigate and communicate the health and exposure potential of contaminants of emerging concern in drinking water. The CEC program supports the Clean Water Fund mission to protect drinking water sources and the Minnesota Department of Health (MDH) mission to protect, maintain, and improve the health of all Minnesotans.

Program staff review the exposure and toxicity of nominated chemicals and develop water guidance values.

Chemicals Nominated for Review this Quarter

Chemicals are nominated to the CEC program via our website: [http://www.health.state.mn.us/divs/eh/risk/guidance/dwec/nominate.cfm](http://www.health.state.mn.us/divs/eh/risk/guidance/dwec/nominate.cfm). Nominators can be from state or local agencies, organizations, or the public.

Three chemicals were nominated to the CEC program this quarter:

- Anatoxin-a, a toxin produced naturally by blue-green algae (cyanobacteria),
- Bifenthrin, an insecticide known to be toxic to aquatic organisms, and
- Tetrahydrofuran, an industrial solvent.

Chemicals Screened by the CEC Program

Chemicals eligible for review by the CEC program are screened based on their toxicity and exposure potential.

- No chemicals were screened this quarter.

Ongoing Reviews

- Microcystin, a toxin produced naturally by blue-green algae (cyanobacteria) is being rereviewed due to the availability of new information from the U.S. Environmental Protection Agency.

- 2,4-Dichlorophenoxyacetic acid (2,4-D), an herbicide used to control broadleaf weeds, is under review. A new combination pesticide has been created which could increase the use of 2,4-D in Minnesota.

Finalized Guidance

- Dichlorofluoromethane (DCFM), is an industrial refrigerant, most commonly known as Freon®21. DCFM is a hydrochlorofluorocarbon, a chemical that depletes the ozone layer. MDH developed a risk assessment advice value of 30 parts per billion (ppb) in drinking water.

- Octylphenol, is an ingredient in many consumer products including detergents, lotions, cosmetics, and inks. Octylphenol disrupts normal endocrine system functions and reproduction in fish at low levels in the environment. MDH has developed a guidance value of 100 ppb for octylphenol in drinking water.
Program staff identify gaps in methods for communicating and assessing risks of emerging contaminants. MDH also works to develop and fund research to fill those gaps.

**Pharmaceutical Water Screening Values**

Many pharmaceuticals (medications) are currently being detected in drinking water sources throughout the world, including wastewater, surface water in rivers and lakes, groundwater, and in drinking water from the tap. Pharmaceuticals enter water when human waste, animal waste, or discarded medications move from storm water systems, sewer systems, or septic tanks into water sources. Wastewater and drinking water treatment cannot always completely remove these pharmaceuticals. Concentrations of pharmaceuticals found in Minnesota waters are usually low. However, even low environmental levels may be a cause for concern for human populations.

Due to the concern over potential risks to human populations posed by pharmaceuticals in the environment and potential drinking water sources, MDH required a rapid assessment method that could be performed efficiently and with limited information sources to assess and prioritize a large number of pharmaceuticals including commonly prescribed pharmaceuticals not currently included in water monitoring programs.

By developing methodology and generating water screening values for 119 Active Pharmaceutical Ingredients (API), MDH along with our partners, can start to prioritize which APIs may pose the largest potential threat to humans drinking contaminated water. The developed values also provide context for monitoring results in drinking water sources throughout Minnesota. This is one step closer, albeit a small step, to getting a complete picture of the overall risks of pharmaceuticals in water.


**Other Special Projects**

- MDH is investigating the occurrence, effectiveness of water treatment, and possible health risks arising from radionuclides in Minnesota’s groundwater used for drinking water. MDH designed a pilot water sampling study to determine the occurrence of one particular radionuclide, Polonium-210 in groundwater. The first phase of this special project was completed this quarter. MDH is developing a follow-up study to assess the levels of Polonium-210 in groundwater over time and the effectiveness of water treatment for removal of Polonium-210. The preliminary findings of this project have been presented at a number of scientific conferences and meetings.

- MDH is working with the University of Minnesota to study the microbial populations in two water reuse systems. One system uses rainwater to flush toilets in a dormitory and the other system uses collected stormwater to irrigate a park. Researchers from the University of Minnesota are collecting samples and analyzing the water in the water reuse systems to identify microbial populations and concentrations. MDH will use these data to perform a quantitative microbial risk assessment to determine what, if any, risk there is to human health from these systems. The results of this special project will help us formulate guidance for installation and operation of water reuse systems.

- MDH is evaluating potential uses for the US EPA’s ToxCast™ dataset. This includes a pilot study estimating the toxicity of pesticides and their environmental degradates. Surface and groundwater monitoring in Minnesota has shown that pesticide degradates are often found more frequently and at higher concentrations in water compared to their parent pesticides. Information on degradate toxicity is rarely available for use in establishing drinking water guidance. Our preliminary study showed that in cases where the dataset allowed for comparison, degradates were generally less toxic than their parent pesticides. These findings are consistent with available toxicological information and MDH’s current guidance for these chemicals. The findings support continued investigation of parent and degradate relative toxicity and potency using ToxCast™. The initial findings of this project have been presented at the Society of Toxicology’s FutureTox III meeting.
In order to share the results of the CEC program, contribute to further discussion, and encourage further research in this area, program staff have shared our work at professional conferences and meetings.

**FSTRAC Webinar.** The Federal-State Toxicology and Risk Analysis Committee (FSTRAC) is an integral part of the U.S. Environmental Protection Agency’s (EPA) communication strategy with states and tribes. FSTRAC fosters cooperation, consistency, and an understanding of EPA’s and different states’ and tribes’ goals and problems in human health risk assessment. MDH program staff presented on the findings and methodology of the Pharmaceutical Water Screening Values project during the September FSTRAC webinar.

**CEC Website.** In an effort to further share CEC program knowledge and expertise, we have added new “Sharing the Science” sections to a number of our Special Projects webpages. Program staff are using these webpages to share their presentations, poster presentations, and research papers with the community.

Program staff continue our outreach and education activities to the public, other agencies, and stakeholders.

**Accessibility.** Program staff are dedicated to creating materials that meet state and department accessibility standards. In an effort to better reach more Minnesotans, program staff have updated the design of our information sheets, quarterly reports, presentations, and posters. We have also dedicated time and effort to improving the knowledge and skills of all program staff on accessibility, statewide requirements, and tips for creating accessible documents.

**Screening Profiles.** Program staff have created over thirty screening profile documents on contaminants that were previously screened by the CEC program but not selected for a full review. Some of the chemicals were evaluated further using pharmaceutical rapid screening or pesticide rapid assessment methods, and the results are included in those profiles. MDH has not derived health-based guidance values for these chemicals, instead, we are creating these profiles in order to share what we have learned. CEC program staff are dedicated to “sharing the science,” and the screening profiles allow our toxicologists to share the information they used to screen the contaminant.

**Eco Experience.** A number of program staff volunteered their time and knowledge at the Minnesota State Fair Eco Experience. Staff discussed contaminants in drinking water, the water cycle, and well water testing with interested fair visitors. Program staff also worked on planning and coordinating the Eco Experience Exhibit.

The *Drinking Water Contaminants of Emerging Concern Quarterly Report* is meant to provide an overview of program activities occurring during Fiscal Year 2016, Quarter 1 (July 2015-September 2015). It does not provide an exhaustive list of activities complete in this time. For more information on chemical reviews, program reports, grant opportunities, and other announcements visit our website: [http://www.health.state.mn.us/divs/eh/risk/guidance/dwec/index.html](http://www.health.state.mn.us/divs/eh/risk/guidance/dwec/index.html)

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