

Codeine Screening Profile

Codeine is a contaminant that has been detected in Minnesota waters. The information in this profile was collected for the screening process of the Minnesota Department of Health's Contaminants of Emerging Concern (CEC) program in June 2015. The chemicals nominated to the CEC program are screened and ranked based on their toxicity and presence in Minnesota waters. Based on these rankings, some chemicals are selected for a full review. CEC program staff have not selected codeine for a full review.

Codeine Uses

Codeine is a pharmaceutical painkiller, cough suppressant, and anti-diarrhea medication. Codeine is also used to manufacture other painkillers including hydrocodone and oxycodone. Codeine is a component of opium and is an abused substance. Codeine is classified as a controlled substance by the Drug Enforcement Administration (DEA).

Codeine in the Environment

Codeine enters the environment through human excretion and through the disposal of unused medications into toilets, sinks, and landfills. One way to reduce codeine in the environment is to dispose of unused medication properly. Follow the recommendations from the Minnesota Pollution Control Agency (MPCA) for disposing of unwanted medications.¹

Codeine has been found in Minnesota waters at maximum concentrations of:

- 0.248 parts per billion (ppb) in wastewater²
- 0.121 ppb in streams and rivers²

Once codeine enters the environment, it is likely to stay there for a long time. Codeine is not likely to build up in the tissues of fish and other wildlife.³

Exposure to Codeine

Exposure to codeine can occur through taking medication containing codeine or taking medication with ingredients derived from codeine. Since codeine is excreted in breastmilk, nursing mothers should talk to their doctor about taking codeine while nursing.⁴

Due to genetics, some people are more sensitive to codeine and experience the effects more strongly and rapidly.⁴ Children under the age of three should not take codeine.⁴ Talk to your doctor before giving codeine to children.

Potential Health Effects

Although side effects of codeine at therapeutic doses are known, there is little information available about the health effects of codeine at the lower levels found in the environment.

MDH developed a pharmaceutical water screening value of 0.5 ppb in drinking water using a rapid assessment methodology.⁵ Concentrations at or below this level are unlikely to pose a health risk.⁵

Based on the screening assessment, a full review of codeine may be possible; however, it is ranked lower than other nominated CEC chemicals at this time.

References

1. MPCA. Disposal of Household Hazardous Waste. 2015. <http://www.pca.state.mn.us/index.php/living-green/living-green-citizen/household-hazardous-waste/disposing-of-unwanted-medications.html>
2. Lee K, et al. Presence and distribution of organic wastewater compounds in wastewater, surface, ground, and drinking waters, Minnesota, 2000-02. U.S. Geological Survey Scientific Investigations Report, 2004-5138.
3. U.S. Environmental Protection Agency. PBT Profiler. www.pbtprofiler.net
4. U.S. Library of Medicine. DailyMed for codeine and acetaminophen. Updated May 2015. <http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=e11a6cd0-97fb-4dc4-b754-485ff364e35f>
5. MDH. Pharmaceutical Water Screening Values Report. 2015. http://www.health.state.mn.us/divs/eh/risk/guidance/dwec/p_harmwaterrept.pdf

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Contaminants of Emerging Concern Program

Chemical Review Process

The Contaminants of Emerging Concern (CEC) program investigates the potential health concerns of contaminants of emerging concern in drinking water. This investigation includes a rapid assessment ('screening') to prioritize nominated chemicals for in-depth research and evaluation that result in drinking water guidance and information about exposure.

Chemical Nomination and Eligibility

Minnesota risk managers, stakeholders, and the public are encouraged to nominate contaminants for review. After chemicals are nominated, MDH program staff determine eligibility by examining the likelihood that the chemical will enter Minnesota waters and whether adequate guidance already exists.

Screening and Risk Based Selection

Program staff conduct a screening of where and how a contaminant is used in the state, its potential to enter the water supply, and its potential to harm humans. The results from the screening are used to prioritize nominated chemicals.

Chemicals having higher exposure and harm potential are selected for in-depth review and development of guidance (a contaminant water concentration that is not harmful to people). Chemicals that rank lower remain candidates for future in-depth review. For some contaminants, however, the information is too limited. For chemicals that are not selected for in-depth review, the results of the screening assessment are summarized in a Screening Profile. The screening and prioritization process is repeated as additional chemicals are nominated and screened.

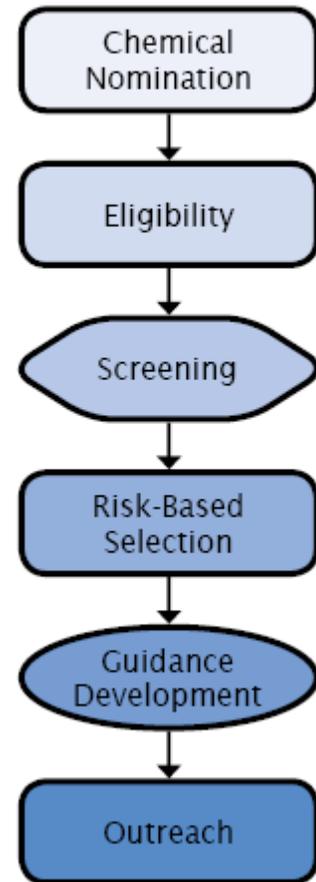
Guidance Development

When a chemical is selected for a full review, program staff carefully review exposure and toxicological information to understand how humans may be exposed and what adverse health effects occur from exposure. Staff combine the results of in-depth analyses of toxicity and exposure to calculate a guidance, a level of contaminant in water that causes little to no harm to someone drinking the water.

Outreach

CEC program staff work to communicate the results of the chemical review process. This includes making key findings publicly available on web pages and at a variety of meetings and events. An email subscription service (GovDelivery) is also used to alert the interested public (subscribers) of chemical review activities and guidance values.

Chemical Review Process



Subscribe to the CEC Program GovDelivery service to receive notification when reviews are initiated for water contaminants and other announcements by visiting: <http://www.health.state.mn.us/cec>